# ANNUAL REPORT 2017 - 2020

EUROPEAN GRADUATE SCHOOL OF NEUROSCIENCE


euron

**CONTENT**

**ANNEXES**

# 1. INTRODUCTION

## THE NETWORK

The European Graduate School of Neuroscience - EURON - is a **network of currently seven universities** in the Netherlands (Maastricht University - UM), Belgium (Universiteit Hasselt – UHasselt - and Université catholique de Louvain – UC Louvain), Germany (RWTH Aachen University - Aachen - and Universität zu Köln - UKöln), France (Université de Lille - ULille) and Luxembourg (University of Luxembourg - ULux). EURON aims to train, in this international setting and through its multidisciplinary staff, a new generation of neuroscientists with a unique set of skills in research, networking and scientific collaboration. The neuroscience and mental health based institutes and departments combine their teaching know-how, research expertise, and facilities in order to broadly train PhD students, and to make further use of this collaboration to be attractive for other opportunities such as European grant applications.

## A BRIEF HISTORY

The EURON collaboration is based on a long history starting in 1995 with initially three partner universities: Maastricht, Liège and Aachen. In 2001, EURON was awarded a grant from the European Commission within the FP5-LIFE QUALITY EU Programme for research, technological development and demonstration (2001-2005) and hosted 43 PhD students (mobility periods between 3-12 months) at the eight EURON partner universities (UM, Université de Liège – ULg -, Katholieke Universiteit Leuven – KULeuven -, Université Libre de Bruxelles – ULB - , University of Bonn - UBonn, Aachen, UKöln and the University of Saarland, Homburg - USaar) followed up by an EC grant within the FP6-MOBILITY programme Human resources and Mobility a specific programme for research, technological development and demonstration "Structuring the European Research Area" (period 2006 – 2010). With the latter support the at that time ten EURON partner universities (UM, ULg, KU Leuven, ULB, UBonn, Aachen, UKöln, UHasselt, Université catholique de Louvain – UC Louvain and Radboud University Nijmegen – RU Nijmegen) could train 25 PhD students and could expand its doctoral training programme. Accreditation of EURON as research school has been achieved by the Koninklijke Academie van Wetenschappen (KNAW) in the Netherlands (period 2003-2009) and has again been acknowledged as a Research School by the ECOS (Research School accreditation committee of the KNAW) for the period 2010 – 2015. After that, national accreditation of an international programme was no longer possible. In 2017, eight partners (the seven current members and the Université de Liège, Belgium) agreed to sign a formal agreement, at the level of the Executive Board of the institutes, for a period of four years. The director and founder of EURON, Prof. Dr. Harry Steinbusch retired in 2017, and in 2018 Dr. Gunter Kenis took over this role. Since the founding of EURON, the school for Mental Health and Neuroscience – MHeNs – of Maastricht University has been coordinating the graduate school and appoints the director in consultation with the partner universities. A **renewed agreement for the period 2021 – 2024**, has recently been ratified by the Executive Boards or Rectorates of all partner universities.

## EURON ACHIEVEMENTS PERIOD 2017 – 2020

Since 2018, EURON has invested in the development and improvement of several key elements of the EURON doctoral training programme. This has resulted in a **new course curriculum** "the EURON PhD curriculum in Neuroscience" that offers a range of courses aimed to educate PhD students in diverse neuroscience disciplines. The courses are intended to increase the student's understanding of different approaches and methods in neuroscience research. The curriculum consists of basic courses (lasting 4-5 days, starting at master level but rapidly evolving to PhD level) and advanced courses and workshops (enabling students to specialize in specific neuroscience topics). An **Educational Committee** has been established consisting of teaching experts of the EURON partner universities. This committee advises the Executive Board on the educational tasks of EURON and the quality of the educational PhD programme. In addition, EURON redefined the criteria to achieve the **EURON Certificate of Excellence**, which is awarded to PhD students that fulfil the required criteria in terms of training, networking, international mobility, and scientific publications. The EURON PhD Certificate of Excellence is recognized by the Executive Boards of the participating universities. Since one important requirement for the certificate is mobility, PhD students are encouraged to spend a period of at least 3 months abroad to receive international experience. To facilitate this, a mobility **grant scheme** has been implemented, allowing students to spend a period of maximal three months at another EURON partner for the purpose of methodological training or a joint project. In this way, collaboration between EURON research groups is further stimulated.

A **new website** has been developed focusing on adequate information and facilitating connections between investigators and PhD students. Further, EURON established a **PhD committee** with members representing the PhD students from each EURON partner to provide input to adjust our activities and to meet the needs and desires of the PhD students. The representatives are "ambassadors" for EURON at their home university and are key to stimulate further networking among students of our partner universities. This way, we also ensure that the EURON programmes fit the aspirations of our PhD candidates. Lastly, the annual **EURON PhD Days**, in turn organized at one of the partner universities, have been reformatted and are now primarily organized by a committee of PhD students. Due to the corona pandemic the last PhD Days could not take place in 2020, and is now scheduled for February 2022 at Hasselt University. The organization is a testimony of the excellent cooperation between the local staff and their PhD candidates and those from the other participating institutions. The scientific part of the programme shows the high quality of the research and diversity of topics and methodologies within EURON. PhD students present their work via oral and poster presentations while also EURON staff researchers and external speakers are invited. In addition, the programme consists of networking workshops and interactive discussion groups to enhance the soft skills of our PhD candidates.

# 2. MISSION AND OBJECTIVES

## MISSION

EURON is dedicated to the training of early stage researchers in the field of basic and translational neuroscience. By sharing expertise, knowledge and infrastructure of the EURON partners we are able to offer a high level training programme with a broad orientation on neuroscience.

- We focus on education, scientific collaboration, and on enhancing skills in networking and research.
- We engage a multidisciplinary staff and work in an international context.
- We stimulate the transfer of knowledge between EURON partners.

## OBJECTIVES

a) To organize courses, workshops and the annual EURON PhD Days.
b) To stimulate the mobility of master students, PhD candidates and postdocs between all EURON partner universities.
c) To stimulate the achievement of the EURON PhD Certificate of Excellence for doctoral dissertations of EURON PhD candidates.
d) To stimulate joint doctorates between the EURON partner universities leading to joint or double doctorate degrees.
e) To stimulate joint research projects between the EURON partner universities which should result in joint papers.
f) To stimulate comparable academic standards for PhD degrees in neuroscience in the EURON partner universities' countries.
g) To stimulate the transfer of knowledge between the EURON partner universities.
h) To acquire research and educational funding necessary for the execution of the tasks of EURON.
i) To stimulate collaborations with other Graduate Schools, academia, industry and public and patient organizations to establish joint activities and networking events.

# 3. ORGANIZATION

During the latest agreement period (2017-2020), EURON comprised eight partner universities in Belgium, France, Germany, Luxembourg and the Netherlands, with Maastricht University being the **Lead Partner** and coordinator of EURON (Annex 1). The EURON coordinating office is the School for Mental Health and Neuroscience (MHeNs) of the Faculty of Health, Medicine and Life Sciences. The organizational structure of EURON, which was installed during this agreement period, is depicted in Figure 1.


*Figure 1: Organizational structure of EURON*

The strategic management of EURON is executed by the **Executive Board** consisting of the Director and the representatives of each partner university (referred to as **Local coordinators**, see Annex 1 for the members). The **Educational committee**, consisting of senior lecturers of the EURON partner universities, advises the Executive Board and the EURON Director on educational tasks of EURON and all other matters related to educational affairs, hereby especially evaluating the quality of the educational programme for the PhD candidates (Annex 1). In addition, a **PhD committee**, with student representatives from each EURON partner, provides input on many aspects of EURON activities, including content and organization of courses, PhD days, the website and communication. The daily coordination and management of EURON is executed by the **EURON Office**, for which the lead partner provides the necessary resources and facilities. The coordinating office assists the director and consists of the programme coordinator, secretary and communication officer (Annex 1).

# 4. PARTNER UNIVERSITIES

## 4.1 FULL PARTNERS[1]

### MAASTRICHT UNIVERSITY

**Faculty of Health, Medicine and Life Sciences (FHML), School for Mental Health and Neuroscience (MHeNs)**
*https://mhens.mumc.maastrichtuniversity.nl/*

**MHeNs** (Scientific Director: David Linden) integrates the clinical and translational research activities of the neuroscience and mental health departments at Maastricht University Medical Center+ (MUMC+) and has a strong position in national and international research in translational approaches based on fundamental research and psychopathology. MHeNs is one of the six graduate schools of FHML aligned to MUMC+. The School is organized in a research division structure. The three divisions of MHeNs are of great importance for MHeNs and its research infrastructure and community of researchers. They ensure our integrated approach among the various disciplines in Neuroscience, Behavioural Science, Bioinformatics and the wider areas of Medicine and Life Sciences. Each of the divisions brings together researchers from different departments and a wide range of disciplinary backgrounds and fosters interdisciplinary research and education through regular seminars, workshops, training events and other means of academic interaction. The MHeNs research themes are: Neuroimaging; Monitoring; Neuromodulation; Rehabilitation and Prevention and Cell Biology and Genetics. Coming together at crucial intersections is where MHeNs researchers (from these five MHeNs research themes) and clinicians from 11 clinical pillars (**MUMC+ Brain and Nerve Centre**) meet and work together. The clinical pillars are: Cognition and Dementia; Epilepsy; Movement; Stroke; Hearing and Balance; Vision and Ophthalmology; Autonomic Control; Mood, Anxiety and Trauma; Psychosis and Neurodevelopment; Eating Disorders and Pain.

***Mission***
The School for Mental Health and Neuroscience (MHeNs) strives to advance our understanding of brain-behaviour relationships by using an approach integrating various disciplines in neuro- and behavioural science, medicine, and the life sciences. MHeNs performs high-impact neuroscience research and educates master's students and PhD researchers. MHeNs performs translational research, meaning practical collaboration [1]between researchers in the lab and in the hospital. MHeNs' unique research approach is "collaboration in crossroads": coming together at crucial intersections is where MHeNs researchers (from the five MHeNs research themes) and clinicians from the clinical pillars from MUMC+ Brain and Nerve Centre (BNC)) meet and work together.

**Faculty of Psychology and Neuroscience (FPN), Dept. Neuropsychology and Psychopharmacology (NP&PP)**
*https://www.maastrichtuniversity.nl/research/neuropsychology-and-psychopharmacology*

The **Dept. NP&PP** (Chair: Arjan Blokland) consists of two sections: Neuropsychology (NP) and Psychopharmacology (PP). Research and education in these sections is dedicated to the scientific investigation of brain-behaviour relationships. NP focuses on neurocognitive development, ageing and brain injury in a lifespan perspective as well as the underlying contributions of biological and psychosocial factors. PP assesses biological mechanisms that underlie cognitive, affective and behavioural functions by means of controlled pharmacological interventions.

*1 Full partner information details in Annex 1*

## HASSELT UNIVERSITY

**Faculty of Medicine & Life Sciences, Biomedical research institute (BIOMED)**
*https://www.uhasselt.be/BIOMED-en*

***Mission***
The Biomedical Research Institute (BIOMED – Director Niels Hellings) of Hasselt University conducts high level multidisciplinary research to advance progress in human life sciences. High-end technology is used to deliver novel insights in three main disease areas: (neuro)immunology, neuroscience and cardiovascular disease. BIOMED aims to translate new scientific discoveries into applications that contribute to a healthy society in line with the civic ambition of Hasselt University.

***Vision***
BIOMED wants to create an inspiring and dynamic work environment where current and future leaders in the field of human life sciences join forces to tackle future societal challenges related to medicine, good health and well-being. To reach this goal, BIOMED will further invest in academic excellence, regional and international positioning and strong partnerships with other academic institutes, the health sector and the life science industry.

## RWTH AACHEN UNIVERSITY

**Faculty of Mathematics, Computer Science and Natural Sciences, Institute of Biology**
*http://www.bio2.rwth-aachen.de*

At the Institute of Biology II research is centered on biological and biomedical problems in diverse fields, including neuroscience, reproductive physiology, infectious disease biology, developmental biology, and epigenetics. The different principle investigators and their groups employ both experimental and theoretical / computational approaches. The analytical scale ranges from the molecular and cellular to the systems and behavioral levels.

**Faculty of Medicine**
*https://www.medizin.rwth-aachen.de/cms/Medizin/Die-Fakultaet/~ikt/Profil/?lidx=1*

The Faculty of Medicine is one of the nine faculties of the RWTH Aachen University. It consists of 59 institutes and departments. The central and connecting features in research at the University will be the multidisciplinary, research-based description, analysis, understanding, and design of complex systems. The Faculty of Medicine has developed its specializations in order to increasingly engender these aspects in its research: Organ Crosstalk, Phase Transition in Disease, Translational Neurosciences, and Medical Technology & Digital Life Sciences.

## UNIVERSITY OF COLOGNE

**Faculty of Medicine**
*https://medfak.uni-koeln.de/en/*

The **Faculty of Medicine** (Dean: Gereon R. Fink) is composed of more than 3,500 students and about 1,800 scientists in over 50 clinics, institutes and centres for research and teaching, the Faculty of Medicine focuses on interdisciplinary, practice-, patient- and science-oriented teaching. Scientists explore problems of great societal relevance in three research focus areas: "Tumor biology, infection and immunity", "Homeostatic principles in metabolism and tissue regeneration" and "Neuromodulation".

**Faculty of Mathematics and Natural Sciences**
*https://mathnat.uni-koeln.de/index.php?id=13698&L=1*

**Faculty of Mathematics and Natural Sciences** (Dean: Paul H. M. van Loosdrecht), **Department of Biology** (Director Matthias Hammerschmidt), is composed of researchers who continuously generate new knowledge. For instance, Research at the **Institute for Genetics** covers a broad spectrum of issues in molecular and computational biology. Molecular mechanisms controlling cellular homeostasis at all levels are studied through mouse models and other model organisms, complemented by evolutionary and computational approaches. In collaboration with colleagues from the Medical Faculty, researchers from the Institute for Genetics founded the cologne Excellence cluster on cellular stress responses in aging associated Diseases **(CECAD). The Institute for Zoology** is a multidisciplinary academic research and teaching institution that addresses biological phenomena at levels ranging from genes, molecules and cells to entire organisms, populations and ecosystems. The research can be grouped into three main research themes: Ecology and Evolution, Developmental Biology, and neuroscience One of the main drivers for the research is the fascination of studying how animals function and how their outstanding capabilities develop and evolved, with a specific focus on the central nervous system.

## UNIVERSITÉ CATHOLIQUE DE LOUVAIN

**Institute of Neuroscience (IoNS)**
*https://uclouvain.be/en/research-institutes/ions*

The **Institute of Neuroscience** of UCLouvain (President André Mouraux) brings together a multidisciplinary team of approximately 210 researchers and 30 administrative and technical staff working in the fields of cellular and molecular neurosciences **(CEMO division)**, systems and cognitive neurosciences **(COSY division)** and clinical neurosciences **(NEUR division)**. Its research facilities are located in Brussels and in Louvain-la-Neuve, and include three technological platforms, one dedicated to studying animal behaviour, the second to the analysis of human neuroimaging data, and the third to investigations in clinical nutrition. The institute also benefits from close interactions with two academic hospitals: the Saint-Luc University Hospital in Brussels and the CHU-UCL-Namur.

***Objectives and mission***
IoNS is there to stimulate Neuroscience at UCLouvain to encourage the university to take part in the current movement by making cost effective and rationalizing efforts as far as possible. Research is carried out by researchers and not by the structures. Consequently, the success of neuroscience at UCLouvain depends on the quality and the motivation of the people involved. Nevertheless, by providing a “fertile” environment and furthering a judicious use of resources, suitable structures will allow researchers to work better. The idea is indeed to reach a critical mass to enhance visibility and to arouse interest in questions that are sometimes so complex they might put young researchers off. Furthermore its aim is to promote exchange between different disciplines, to fund and work closely together on projects.
From a more pragmatic point of view, the main scientific target is to increase the number of publications of the different research groups which belong to the Institute, and, therefore, to put the university at the forefront of scientific research in Neuroscience. A further aim is to encourage the deposit of patents and the setting up of spin offs. Moreover, we strive to encourage the cooperation between research teams, to promote the recruitment of researchers, to contribute to the training of young scientists, and to provide a neurobiological expertise for external partners. The Institute has to encourage interaction with outside labs, particularly those which are located in Louvain La Neuve (LLN) and the University hospitals. It should become in the long term the favourite communication channel for interaction in all areas connected to neurosciences, not only at UCLouvain and the Louvain Academy but also for those outside the University. An intersectorial group will be set up to make the integration of “neuroscience system and cognition” research groups at LLN and Woluwe easier.

## UNIVERSITÉ DE LILLE

*https://www.univ-lille.fr/*

**Faculty of Sciences and Technologies (FST)**
*https://sciences-technologies.univ-lille.fr*

***FST*** provides 55 mentions of diplomas ranging from bachelors to doctoral degrees (20,000 students) in the following fields: biology, chemistry, electronics, electrical engineering, automation, computer science, mathematics, mechanics, physics, earth sciences. FST integrates 29 research laboratories including some INSERM and CNRS units working on basic mechanisms associated to the field of Neurosciences (Cancer, Glycobiology, Neuroinflammation, Neuromuscular disorders, Cell Physiology, Perinatal Environment and brain development) and provides technological platforms in Bioinformatics, Bioanalysis, Biomolecular Interaction Analysis, Proteomics and BioImaging.

**Faculty of Medicine (FM)**
*https://medecine.univ-lille.fr/*

FM is the largest medical training and research center in France, all disciplines combined with more than 12,000 students. FM is embedded into the CHRU of Lille, among the three best university hospital centers in France, offering its students the opportunity to practice cutting-edge clinical medicine and access the latest advances in biomedical research. FM also integrates about 30 research teams among which INSERM and CNRS labs in Neuroscience Center and Pasteur Institute work on Neuroinflammation, Neurological and mental illnesses and Neurochemistry in close contact with patients.

## UNIVERSITY OF LUXEMBOURG

**LCSB - Luxembourg Centre for Systems Biomedicine**
*https://wwwen.uni.lu/lcsb*

The LCSB (Director: Rudi Balling) is accelerating biomedical research by closing the link between systems biology and medical research. Neurodegenerative diseases like Parkinson's disease and description of diseases as networks are at the focus of LCSB's research.

## UNIVERSITÉ DE LIÈGE

**GIGA Neurosciences**
*https://www.giganeurosciences.uliege.be/cms/c_4213415/en/giganeuro*

**GIGA-Neurosciences** (Head : Julie Bakker) focuses on the cellular and molecular underpinnings of the development and function of the central and peripheral nervous system. In addition, the GIGA-Neurosciences investigates different pathologies related to the nervous system, such as epilepsy, Parkinson's and Alzheimer's diseases, autism spectrum disorders, deafness, and disorders of sexual differentiation.

**GIGA CRC In vivo imaging**
*https://www.gigacyclotron.uliege.be/cms/c_4221332/en/gigacyclotron*

Director GIGA CRC Platform: Eric Salmon
Research at GIGA – CRC (Cyclotron Research Center: in vivo imaging range from radiopharmaceutical production to in vivo imaging with positron emission tomography and also with magnetic resonance imaging and electrophysiology. Studies are conducted in small animals for brain, cancer or cardiology preclinical researches and for drug development, and in humans for understanding biological processes underlying sleep, mood, addiction, cognition (memory, attention, executive functions), movements, consciousness and their disorders (dementia, Parkinson, impaired consciousness, epilepsy…).

## 4.2 PARTNERSHIPS

EURON always held partnerships with neuroscience departments of universities within and outside Europe. During the 2017-2020 agreement period, the following partnerships were active: Ege University, Izmir, Turkey (Department of Psychiatry and Institute for Addiction, Toxicology and Drug Sciences; period 2014 – 2020); University of Sri Jayewardenepura, Nugegoda, Republic of Sri Lanka (2013 – 2019), CEITEC (Programme Brain and Mind), Masaryk University, Brno, Czech Republic (2012 – 2018) and the University of Crete, Heraklion, Greece (2013-2019). These partnerships have resulted in collaborations and contribution of teachers from Ege University, Masaryk University and the University of Crete in the EURON course “Human Neuroanatomy” and the EURON workshop “Drugs and the Brain”. Especially with the University of Crete a long-term collaboration has been set up for the organization of the workshop Drugs and the Brain that will have its 12$^{th}$ edition organized with the University of Crete in 2021 (see section 5.1).

In addition, an EU Erasmus Bilateral cooperation grant was awarded (period 01/10/2013 – 30/09/2017) based on a Memorandum of Understanding between four EURON partner universities (Maastricht, Lille, UC Louvain and Cologne) and three Japanese universities (Kyoto Prefectural University of Medicine, Tohoku University and Toho University) to set up a Double Degree Master’s programme in Biomedicine and Neuroscience.

For the next agreement period, 2021-2024, EURON retains the possibility to set up limited partnerships or cooperations with other graduate schools, universities, hospitals, companies and public and patient organizations, to stimulate joint activities and networking events. The accession of such partnerships requires a decision based on the majority of the full partners and will be agreed upon by EURON and the other organisation. Depending on the nature of the collaboration, the respective organization may be entitled to several benefits, e.g. reduction of registration fees for EURON courses or PhD days for master students, PhD candidates and postdocs.

# 5. PHD TRAINING PROGRAMME

The aim of the PhD training programme is to promote a high level of competence in a specific research field, but also in generic, transferable skills that are important for high-profile careers in research, education, health care policy, clinical practice and industry. A large part of the PhD training occurs in the context of the PhD research project, supervised by an expert. In addition, all PhD students will engage in more specific or generic educational activities.PhD candidates will follow courses and workshops of the EURON PhD curriculum in Neuroscience, in the context of their training as a researcher. The training programme will help them to conduct their research, to write their dissertation and to develop their career, and to gain self-insight.

## 5.1 EURON PHD CURRICULUM IN NEUROSCIENCE

The EURON PhD curriculum offers a range of courses aimed to educate PhD students in diverse neuroscience disciplines. The courses are intended to increase the student's understanding of different approaches and methods in neuroscience research.

- Basic courses will last 4-5 days, start at master level but will rapidly evolve to PhD level.
- Advanced courses and workshops enable students to specialize in specific neuroscience topics.

Students that follow the program will have a broad orientation on the neuroscience research field, and will be able to understand neuroscience disciplines that go beyond their PhD project.Courses have theoretical and practical parts, include a preparation phase (reading papers or assignments) and the setup is based on student-centered learning, implicating that interactive and problem-based teaching formats are included in each course.

## 5.2 EURON CERTIFICATE OF EXCELLENCE

In addition to the local university PhD degree, EURON offers an additional EURON PhD Certificate of Excellence, which will be awarded if the PhD student fulfils the required criteria in terms of training, networking, international mobility, and scientific publications. The EURON PhD Certificate of Excellence is recognized by the Executive Boards of the participating universities. Since one important requirement for the certificate is mobility, PhD students are encouraged to spend a period of at least 3 months abroad to receive international experience.

List of awarded EURON certificates (period 2017 – 2020), see Annex 3.

EURON PhD students may obtain a EURON certificate if they meet the following requirements:

- The PhD thesis is written in English.
- The PhD student has participated in EURON activities (courses, PhD days, organizational and outreach), totaling at least 6 ECTS*.
- The dissertation review committee or the dissertation defencecommittee should have one member of another EURON partner University.
- During her/his PhD project, the PhD student undertook a scientific exchange visit(s) preferably to other EURON research groups (or other international research groups) for a total period of at least 3 months (cumulative).
- The thesis should consist of one or more published (or accepted) paper(s) with a cumulative Impact Factor of at least 8**.

** 1 ECTS is equal with 28 hours of work (including preparatory work and assignments)*

*** For 1st /last authorship of original research paper: Journal Impact Factor; for co-authorship: 0,5 x Journal Impact Factor; for 1st /last authorship of review paper: 0,25 x Journal Impact Factor*

# 6. OUTPUT

## 6.1 EURON COURSES AND WORKSHOPS

**2017**

**Course "From Human Neuroanatomy to Psychopathology"**
3-6 April, 2017 Maastricht University
***Organizers:*** A. Jahanshahi, H. Jacobs, B. Kramer, J. Mey, N. Senden
***Involved lecturers from EURON:*** B. Brône (UHasselt, A. Goswami (Aachen), S. Johann ( Aachen) E. Salmon (ULg; key lecture "Neural correlates of unawareness in Alzheimer's disease"); *Invited speaker*: A. Flohr (Hoffmann-La Roche, Switzerland) on "Drug development for neurological diseases".
***Topics:*** lectures on neuroanatomy, cerebrovasculature, imaging, development, cognition, glia and pathology (AD, epilepsy, ALS); practical microscopy (rodent and brain normal and pathology; macro-dissectioning of the brain.

**EURON PhD Workshop "Microglia in health and disease"**
4 May 4, 2017 Hasselt University
***Organizers:*** B. Brône, T. Vanmierlo
***Lecturers from EURON:*** C. Lefebvre (Lille) and J. Walter (Bonn); *Invited speakers:* A. Sierra (Achucarro Basque Center for Neuroscience), P. Ponsaerts (University of Antwerp), V. Wittamer (ULB), K. Biber (University of Freiburg).
The PhD course was preceding the annual Spring meeting of the Belgian Society for Cell and Developmental Biology.

**EURON Workshop "Psychoparmacology: from laboratory to Clinic"**
7-11 October, 2017 Maastricht University in collaboration with the University of Crete, Heraklion (associated partner EURON); Venue University of Heraklion
***Organizers:*** A. Blokland, J. Prickaerts, W. Riedel, N. Senden, H. Steinbusch, K. Thermos, D. Karagogeos.
**Involved speakers from EURON**: Arjan Blokland, Harry Steinbusch, Kim Kuypers, Jos Prickaerts, Wim Riedel; *Invited speakers*: Harald Schmidt (UM), Ioannis Zaganas (Crete), George Panagis (Crete), Panagiotis Bitsios (Crete); Brian Leonard (Galway, Ireland), Martien Kas (Groningen, NL), Barbara Biemans (Roche, Basel, Switzerland), Judith Homberg (Nijmegen, NL), Tomas Palenicek (NIMH, Czech Republic), Jordi Riba (Barcelona, Spain), Massimo Bani (UCB, Brussels) and John Bothmer (Grünenthal, Germany).
***Topics:*** neurodegeneration, neurodevelopment, psychosis, addiction and experimental medicine, drug development and neurohealth. The latest developments in these fields and understanding of how drugs work in the brain and drugs can be developed for treatment in various brain diseases.

**2018**

**EURON Course "From Human Neuroanatomy to Psychopathology"**
11-14 June, 2017 Maastricht University ***Organizers:*** UM: A. Jahanshahi, G. Kenis, B. Kramer, J. Mey, N. Senden
***Involved partners from EURON***: B. Brône (UHasselt), A. Jankovski (UC Louvain), A. Goswami (Aachen).
C.Yurttas (Ege University, Izmir), D. Linden (UM; key lecture on "Function and dysfunction of the human brain – insights from functional neuroimaging").

**EPI-AD/EURON Advanced Workshop "Neuroepigenetics: a life span perspective"**
October 3-5, 2017 Venue: University of Barcelona
***Organization:*** EPI-AD consortium (D. van den Hove) and EURON (G. Kenis, N. Senden).
***Involved partnersfrom EURON***: T. Van Mierlo (UHasselt), A. Ramirez (UKöln), S. Jung (U Lux); *Invited speakers*: M. Esteller, IDIBELL, Spain and K. Lunnon, University of Exeter, UK ***Topics:*** in this workshop the students were introduced into the latest developments in epigenetic regulation of brain development and aging; neuroepigenetics of psychiatric and neurodegenerative disorders; stem-cell based approaches in epigenetics research; epigenetic editing and epigenomic technologies & data analyses.

**2019**

**EURON Course "From Human Neuroanatomy and its clinical application"**
1-4 April, 2019 Maastricht University
***Organizers:*** UM: A. Jahanshahi, G. Kenis, B. Kramer, J. Mey, N. Senden.
***Involved partners from EURON***: B. Brône (UHasselt), A. Jankovski (UC Louvain); Invited speaker: W. van de Berg, Dept. Anatomy and Neurosciences, Amsterdam UMC on "The Normal Aging Brain Collection Amsterdam (NABCA): a comprehensive collection of MRI, neuropathological and morphometric datasets of the human brain".

**EURON Advanced Workshop Drugs and the Brain: from Laboratory to Clinic"**
October 1-5, 2019 Maastricht University in collaboration with the University of Crete, Heraklion (associated partner EURON) and with the Hellenic Society for Neuroscience; Venue University of Heraklion
***Organizers:*** A. Blokland, G. Kenis, J. Prickaerts, N. Senden, K. Thermos, Niki Mastrodimou, Kyriaki Sidiropoulou
***Topics:*** neurodegeneration, neurodevelopment, brain-gut axis, illicit drugs and mood. The latest developments in these fields and understanding of how drugs work in the brain and drugs can be developed for treatment in various brain diseases.

## 6.2 OTHER COURSES AND EVENTS ORGANIZED IN COLLABORATION WITH EURON

**2017**

Jan. 9 — **11th MHeNS Topics in Translational Neuroscience Workshops "Studying Experience and Behaviour in Neuroscience: Methods and Challenges"**
Maastricht University
***Organizers:*** J. van Os, G. Kenis, U. Reinighaus, N. Senden
***Topic:*** in this workshop, the faculty, consisting of clinical professors of psychiatry and psychology in Division 2 (Mental Health) of MHeNs, and working at the interface of science and mental distress, have presented the challenges facing translational neuroscience in bridging the gap between molecules and experience. The translational leap from neuron to mental symptom represents the fundamental frontier; progress in this area is crucial but faces numerous difficulties that in recent years have come more to the fore in the scientific and societal debate.

Jan. 25-26 — **EURON-Japan Workshop: New Developments applied to Neuroscience**
Kyoto Prefectural University of Medicine, Kyoto, Japan
***Organizers:*** H. Steinbusch, N. Senden, T. Mizuno, K. Ono
***Speakers from EURON:*** A. Jahanshahi, B. Rutten, H. Steinbusch, H. Vles; Invited speakers Japan: Hiroshi Kiyama (Nagoya University), Ryosuke Takahashi (Kyoto University).
The workshop has been organized in the framework of the EU program EDU-NEURO EU-JP: a Double Degree Master's programme between 4 EURON partner universities (UM, Cologne, UC Louvain and Lille) and 3 Japanese universities (KPUM, Tohoku University and Toho University) - a mobility programme for Master students.

June 14 **Master Class "Autoimmunity in neuropsychiatric disorders"**
Maastricht University
***Organizers***: C. Hoffmann, P. Martinez, N. Senden
Invited speakers: J. Damoiseaux (MUMC), M. Titulaer (UMC Rotterdam), R. Rouhl (MUMC), V. Ramaeker (Liège)
***Topics:*** Autoantibodies, identification of the antigens "membrane proteins and ion channels" targeted by the autoantibodies and understanding how the autoantibodies can cause neuropsychiatric symptoms.

July 2-7 **Summer Course on Mood, Aggression & Attraction**
University of Florence
***Organizers:*** Maastricht University (K. Schruers, L. Goosens) and University of Florence
This course is part of the International Master of Affective Neuroscience, a postgraduate programme by the universities of Maastricht and Florence, a combination of residential courses and distance teaching. The Summer School on Affective Neuroscience offers the Summer Courses of the Master in Affective Neuroscience as stand-alone courses. The courses are well suited for clinicians and other professionals who want to update their expertise on affective pathology.

Oct. 19-22 **3rd Clinical Neuroscience Course "Neuromodulation – the rising trend in treating nervous system disorders**
Ondokuz Mayıs University, Samsun, Turkey
***Organizers:*** Maastricht University (Y. Temel, A. Jahanshahi, S. Hescham) and E. Kocabicak
In this course, most relevant developments in the field of neuromodulation for Neurological, Psychiatric and Neurosensory disorders will be discussed. This will be combined by highlighting promising new experimental approaches.

**2018**

Jan. 23 **12th MHeNS Topics in Translational Neuroscience Workshop "Stress, depression and Alzheimer's Disease**
Maastricht University
***Organizers:*** D. van den Hove, S. Koehler, N. Senden
Invited speaker: A. Ikram on "Depression and dementia: risk factor, prodrome or consequence? Insights from epidemiology", UMC Rotterdam.

March 13-16 **Euro-CNS Basic Course in Neuropathology**
Universitätsklinikum Aachen
***Organizer:*** J. Weis (local organizer)
The course is intended for trainees in general pathology, neuropathology, neurology or neurosurgery but also for neurobiologists and PhD students in neurological sciences. Specifically, for PhD researchers that will be involved with the neuropathology of, for example, neurodegenerative diseases, developmental diseases, brain tumors or white matter diseases.

May 24-25 **Science of Translation: Optimizing animal models for neuropsychiatric disorders**
University of Cologne
***Organizers:*** T. Sesia, V. Visser-Vandewalle
***Speaker from EURON***: A. Blokland (UM)
***Topics:*** animal modeling and testing causality; animal modeling and decoding the brain signaling; translating from animal Models to human Schizophrenia: Insights into pathophysiology, treatment and prevention; animal modeling and piloting new approaches.

May 25-26 **4th Joint meeting of the Belgian-Dutch Neuromuscular study group and German Reference center for Neuromuscular Diseases, DGNN**
Vaals, The Netherlands
***Organizers:*** J. Weis (Aachen), P. Van den Bergh (Brussels), K. Claeys (Leuven), K. Faber (Maastricht), N. Goemans (Leuven), N. Notermans (Utrecht), W. Stenzel (Berlin), N. Senden (Maastricht)
***Topics:*** Motor neuron diseases and Myasthenia, Peripheral neuropathies, Muscle disorders.

1-6 July **Summer Course on Fear, Anxiety, Obsessions & Trauma**
Florence, Italy
***Organizers***: Maastricht University (K. Schruers, L. Goosens) and University of Florence.

**2019**

April 16 **13th MHeNS Topics in Translational Neuroscience Workshop "Pain and Comorbidities"**
Maastricht University
***Organizers:*** B. Joosten, R. van Reij, N. van den Hoogen, N. Senden
***Topic:*** this workshop takes a closer look at pain and its comorbidities in three distinct settings: experimental research, clinical practice, and genetic aspects through lectures and case studies. The case studies will further integrate pain and comorbidities (e.g. how do we measure average pain last week in patients with Alzheimers disease).

June 30 - July 5 **Summer Course on Fear, Anxiety, Obsessions & Trauma**
Florence, Italy
***Organizers:*** Maastricht University (K. Schruers, L. Goosens) and University of Florence.

Nov. 19 **Workshop on CNS barrier models**
Hasselt University
***Organizer***: B. Broux
Keynote speakers: Prof. E. de Vries (Amsterdam), Prof. A. Prat (Montréal, Canada), Prof. B. de Spiegeleer (Gent), Prof. B. Vanhollebeke (Brussels)
***Topic:*** this workshop will provide an update on different CNS barrier models and their broad applicability in various research topics (including neuroinflammation and drug transport).

**2020**

Sept. 15 **14th MHeNS Topics in Translational Neuroscience Workshop "Neurodegeneration a vascular perspective"**
Maastricht University
***Organizers:*** S. Foulquier, J. Prickaerts, N. Senden
***Speakers from EURON***: A. Bronckaers (UHasselt), S. Köhler (UM) and A. Casas Guijarro (UM); Invited speakers: A. Joutel (Paris), A. Kiliaan (Nijmegen)
***Topics:*** this workshop aims at presenting recent epidemiological, genetic, dietary and therapeutic investigations looking at neurodegeneration from a vascular perspective.

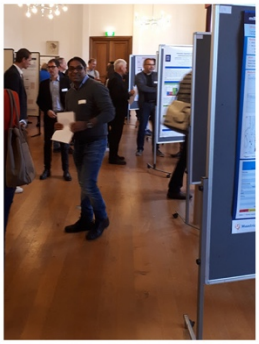
## 6.3 EURON PhD days

The EURON PhD candidates meet annually at the PhD Days, in turn organized at one of the partner universities (Annex 4). Due to the corona pandemic the last PhD Days could not take place in 2020.

**19th EURON PhD days**
**Oct. 25-26, 2017**
***Local organizer***: Maastricht University - Venue: Abdij Rolduc Kerkrade
***Organisation:*** Coordinating office: Marie-Therese Moers, Nicole Senden, Harry Steinbusch; PhD students Maastricht: Dean Paes, Elentina Argyrousi, Nynke van den Hoogen, Natasha Mason; PhD students Hasselt: Jens Devoght, Evelien Houben; PhD students University of Lille: Quentin Lemaire, Kevin Carvalho.
The EURON PhD days 2017 was an important milestone for EURON because it reflected the last meeting chaired by Prof. Harry Steinbusch, founding director of EURON (period 1995- 2017).
***Highlights:*** alumni PhD students were invited to talk on their career and jobs; elevator pitches of EURON PhD students, oral and poster presentations EURON PhD students; EURON PI lectures; workshop on "TMS, Driving Stimulation, MRI, Virtual Reality".

**20th EURON PhD Days**
**Sept. 13-14, 2018**
The EURON PhD days 2018 were organized as a **joint PhD student meeting of the Institute of Neuroscience (IoNS) of UC Louvain and EURON.**
***Local organizer***: UC Louvain - Venue: Auditorium Maisin, UC Louvain Woluwé Campus, Brussels
***Organisation*** (local): P. Kienlen-Campard, A. Jankovski, S. Yernaux, C. Friand, D. Sulcova, I. Slobodeaniuc, F. Javier Saez Orellana; EURON coordinating office: G. Kenis, M. Moers, P. Bisschoff, N. Senden.
***Topics sessions:*** The Developing Brain; (Patho) physiology of the mature Brain and The Aging Brain; Invited Key Note lecture "Biological mechanisms of mental disorders – new insights from genetics and neuroimaging", Prof. David Linden, Maastricht University.

**21st EURON PhD days**
**Sept. 23-24, 2019**
The 20th EURON PhD days were organized as a **joint PhD student meeting with the Life Science Days of University of Luxembourg**
***Local organizer***: University of Luxembourg – Venue: Maison du Savoir (MSA), Luxembourg University.
***Organisation*** (local PhD students): Mehri Baniasadi, Ugnė Dubonytė, Sonja Fixemer, Beatriz Garcia Santa Cruz, Myrto Patraskaki, Daniele Proverbio, Yue Zhang; EURON coordinating office: G. Kenis, D. Kentgens, P. Bisschoff, N.Senden.
***Highlights:*** Interdisciplinary workshops on: Introduction to single cell techniques; Approaches for (multi-omics) big data analysis; Introduction to single-cell data analysis; How does my research leads to treatments in patients?
Key note lectures: Prof. K. Murai (The McGill Centre for Research in Neuroscience, Montreal, Canada), Prof. F. Hertel (Centre Hospitalier de Luxembourg), Dr. M. Cerdeira (Catenion) and Dr. A. Jahanshahi (Maastricht University)


## 6.4 EURON MEETINGS

**EURON Executive Board Meetings**
Meetings periode 2017 – 2020:
2017: 23/03/2017 (Maastricht) – 22/06/2017 (Maastricht) – 25/10/2017 (Rolduc, Kerkrade, NL)
2018: 25/01/2018 (Maastricht) - 27/06/2018 (Maastricht) - 13/09/2018 (UC Louvain)
2019: 11/04/2019 (Maastricht) - 17/09/2019 (Maastricht)
2020: 09/06/2020 (zoom meeting) - 16/09/2020 – (zoom meeting)

**EURON Educational Committee meetings**
The EURON Educational Committee was installed Sept. 2018
Meetings period Sept. 2018 – 2020:
2019: 08/01/2019 (Maastricht) – 26/03/2019 (Maastricht) – 17-09-2019 (Maastricht)

**EURON PhD Committee meetings**
The EURON PhD committee with representatives of the EURON partners was installed Jan. 2020
Meetings:
2020: 07/02/2020 (Maastricht) – 20/05/2020 (zoom)

## 6.5 JOINTLY SUPERVISED DOCTORATES

EURON encourages the achievement of **joint or double doctorate degrees, jointly supervised** by two EURON partner universities. PhD candidates who earn a joint doctorate degree will receive only one diploma from both universities and only one official graduation ceremony shall be held. Candidates with a double doctorate degree receive two diplomas, each mentioning the collaboration between the two universities. In case a joint or double PhD agreement cannot be established, the jointly supervised PhD candidate will have a single degree of one of the universities.

See below the overview of the defences of the joint PhD candidates (period 2017 – 2020) and the ongoing jointly supervised PhD trajectories.

**PhD defences period 2017 -2020**
*Maastricht University / University of Wurzburg / Université de Liège*
**Dmitrii Pavlov**
Defended: 03/05/2020 – Single PhD degree UM
Supervisors: K-P Lesch (Wurzburg), L. Bettendorff (Liège)
Co-supervisor: T. Strekalova (Maastricht)
Title PhD thesis: The contribution of CNS inflammation and Glycogen Synthase Kinase-3 (GSK-3)-cascades on adverse memory learning on mouse models of emotional stress.

*Maastricht University / University of Wurzburg / Université de Liège*
**Anna Gorlova**
Defended: 03/05/2020 – Single PhD degree UM
Supervisors: K-P Lesch (Wurzburg), L. Bettendorff (Liège)
Co-supervisor: T. Strekalova (Maastricht)
Title PhD thesis: Understanding the Molecular Mechanisms of Aggression in BALB/C and TPH2-Deficient Mice.

*Maastricht University / University of Sri Jayewardenepura, Sri Lanka*
**Printha Visharata**
Supervisors: Harry Steinbusch (Maastricht), Ranil de Silva (Sri Lanka)
Defended: 25/08/2020
Title PhD thesis: Age-related cytoskeletal pathologies: A study on elderly brains to investigate the extent of neuropathological and cerebrovascular changes at death ad their risk factors.
EURON associated partnership (2013 – 2019)

*Maastricht University / Kyoto Prefectural University of Medicine (Japan)*
**Takashi Koizumi**
Supervisors: Harry Steinbusch (Maastricht), Toshihiko Mizuno (Japan)
Co-supervisor: Sebastien Foulquier (Maastricht)
Defended: 28/08/2019 – Single PhD degree UM
Title PhD thesis: Genetic and neuroinflammatory components of familial and sporadic cerebral Small Vessel Disease.
EURON partnership via EU grant (2013 – 2017)

*Maastricht University / University of Luxembourg*
**Muhammad Ali**
Defended: 30/08/2020 - Double PhD degree
Supervisors: Antonio del Sol (Luxembourg), Jos Kleinjans (Maastricht)
Co-supervisors: Daniel van den Hove (Maastricht), Ehsan Pishva (Maastricht)
Title PhD thesis: Integrative network-based approaches for modeling human disease.

*Hasselt University / Maastricht University*
**Gwendoline Montes Diaz**
Supervisors: Veerle Somers (Hasselt), Raymond Hupperts (Maastricht)
Co-supervisors: Judith Fraussen (Hasselt)
Defended: 15/10/2020 – Double PhD degree
Title PhD thesis: Immune regulation by dimethyl fumarate (DMF) in relapsing-remitting multiple sclerosis patients.

**Current jointly supervised doctorates leading to a double PhD degree**
*Hasselt University / Maastricht University*
**Melissa Schepers**
Supervisors: Tim Vanmierlo (Hasselt), Jos Prickaerts (Maastricht)
Co-supervisors: Bart Rutten (Maastricht), Niels Hellings (Hasselt)
Title PhD project: Targeting phosphodiesterase 4 to treat multiple sclerosis

*Hasselt University / Maastricht University*
**Dean Paes**
Supervisors: Jos Prickaerts (Maastricht), Tim Vanmierlo (Hasselt)
Copromotors: Daniel van den Hove (Maastricht), Niels Hellings (Hasselt)
Title PhD project: Targeting PDE splice variants in Alzheimer's disease: a gene-editing approach

*Hasselt University / Maastricht University*
**Assia Tiane**
Supervisors: Tim Vanmierlo (Hasselt), Daniel van den Hove (Maastricht)
Co-supervisors: Niels Hellings (Hasselt), Jos Prickaerts (Maastricht)
Title PhD project: The epigenetic signature of myelin genes as an innovative biomarker for progressive multiple sclerosis

*Hasselt University / Maastricht University*
**Ben Rombaut**
Supervisors: Jos Prickaerts (Maastricht), Tim Vanmierlo (Hasselt)
Co- supervisors: Bert Brône (Hasselt), Daniel van den Hove (Maastricht)
Title PhD project: Out-of-control microglia as cellular mechanism of excessive synaptic elimination in Alzheimer’s

*Hasselt University / Maastricht University*
**Philippos Koulousakis**
Supervisors: Tim Vanmierlo (Hasselt), Daniel van den Hove (Maastricht)
Co-supervisors: Niels Hellings (Hasselt), Jos Prickaerts (Maastricht)
Title PhD project: Validation of OXT as a target for Alzheimer's Disease

*Hasselt University / Maastricht University*
**Lieve van Veggel**
Supervisors: Tim Vanmierlo (Hasselt), Jos Prickaerts (Maastricht)
Co-supervisors: Niels Hellings (Hasselt), Rudy Schreiber (Maastricht)
Title PhD project: All you can EAAT3: restoring myelin, the brain's favourite fat.

*University of Lille / Maastricht University*
**Guillaume Carey**
Supervisors: Kathy Dujardin (Lille), Albert Leentjens (Maastricht)
Title PhD project: "Anxiety disorders in Parkinson's disease and cognitive behavioural therapy"

**Jointly supervised doctorates leading to a single PhD degree**
*RWTH Aachen University / Maastricht University*
**Alfred Yamoah**
Supervisors: Joachim Weis (Aachen), Harry Steinbusch (Maastricht)
Co –supervisor: Anand Goswani (Aachen)
Title PhD project: Endoplasmic Reticulum Chaperones in ALS and Alzheimer's Disease.
Single degree UM

*RWTH Aachen University / Maastricht University*
**Priyanka Tripathi**
Supervisors: Joachim Weis (Aachen), Harry Steinbusch (Maastricht)
Co –supervisor: Anand Goswani (Aachen)
Title PhD project: Autophagy dysfunction and alterations of RNA binding protein homeostasis in vacuolar myopathies and Amyotrophic Lateral Sclerosis
Single degree UM

*Maastricht University / University of Sri Jayewardenepura, Sri Lanka*
**Landak Gwondala**
Supervisors: Harry Steinbusch (Maastricht), Ranil de Silva (Sri Lanka)
Title PhD project: Genotype-Phenotype correlation, identification and validation of serum biomarkers in Trinucleotide Repeat Disorders in a Sri Lankan population and the effect of natural products".
EURON associated partnership (2013 – 2019)
Single degree UM

# 7. RESEARCH COLLABORATION

In addition to offering an extensive educational programme EURON focusses on enhancing **scientific collaboration** and stimulating the **transfer of knowledge** between EURON partners. Annually, EURON staff researchers meet at the EURON PhD days to initiate and strengthen scientific collaborations between the partners. Collaboration is evidenced by **joint papers** (Annex 5).

Through the **EURON mobility grant** (established in 2018) we could encourage the EURON PhD students from the research groups affiliated to the EURON programme to spend a period of maximal three months at a EURON partner university for the purpose of methodological training or a joint project. Hereby EURON stimulates established or new research collaborations or initiatives (Annex 6).

# 8. HIGHLIGHTS

## 8.1 HISTORY OF THE EURON ADVANCED COURSE 'DRUGS AND THE BRAIN: FROM LABORATORY TO CLINIC

The course **Drugs and the Brain** started in 2002 (see in Annex 7 for a detailed overview of all workshops) as a two-day meeting in the Netherlands. Since then it has expanded, both in its content and duration. During these 19 years (in 2019 **the 11th edition** was organized) the course was adapted to meet the growing needs and interests of young neuroscientists throughout Europe.



As of 2009, the course was organized in collaboration with and at the venue of the University of Minho (Braga, Portugal), with an increasing international audience of students and speakers. Since 2017 the course is organized together with the University of Crete (Heraklion, Greece).

Over the years, the course Drugs and the Brain was several times awarded. In 2012 (8th edition, Braga), EURON was acknowledged as an organiser of a **FENS-IBRO European Neuroscience School**. In 2014 (9th edition, Braga) and in 2019 (11th edition, Heraklion), EURON received a FENS-IBRO grant to organize the course and to offer award four travel grants to selected participants.

We **are happy to announce the next edition of this advanced course, provisionally planned for end of September 2021 at the University of Crete (Heraklion).**
And we are especially proud that the course is again awarded, by the FENS Committee for Higher Education and Training (FENS-CHET) with the **grant for the "Education and Training Clusters" call** This grant, supported by FENS and IBRO-PERC, aims to stimulate and strengthen the cooperation among NENS schools.

Hereto, EURON brought together four graduate schools associated with the Network of European Neuroscience Schools (NENS): the Graduate Programme in Neuroscience of the University of Crete (Faculty of Medicine, Heraklion, Greece), the PhD in Neuroscience Programme of the University College Cork (Cork, Ireland), the Master in Health Sciences and PhD in Health Sciences Programme of the University of Minho (School of Medicine, University of Minho, Braga, Portugal) and EURON itself.

Under the lead of EURON, this cluster of graduate schools proposed a project entitled **"Advanced Skill Training in Neuroscience Courses: a Case Study of Drugs & Brain"**. The major aim of this project is to develop a new, interactive format, using online tools and team-based learning approaches, for neuroscience courses at PhD student level. It will result in a five-day course that is based on the EURON's traditional Drugs and The Brain course. The planned multidisciplinary course will cover all major neurobiological aspects related to traditional psychopharmacological treatments and new developments in drug modulation of brain function (including classical neuro- psychopharmacological agents, cognitive enhancers, illicit drugs and nutraceuticals), its

underlying mechanisms, as well as targetable biological systems and processes (microbiome & gut-brain axis, the blood-brain barrier and neuroinflammation). The set-up of the course is intended to encourage active participation of students and to stimulate interaction between experts and participants. After expert lectures in the morning, students will work on challenging problems or statements, present and discuss the outcome in a plenary meeting, during live-streamed Q&A sessions, and also present their research project in a pitch presentation. Background material will be provided online beforehand. The course is mainly intended for PhD students and junior post-docs. However, second year master students with a strong motivation to pursue a PhD in neuroscience may attend providing places are available. A maximum of 50 participants can attend the course on-site. Another 50 students of NENS schools can participate in the online activities.

## 8.2 JOINT DOCTORATE IN THE PICTURE

EURON encourages the achievement of joint or double doctorate degrees jointly supervised by two EURON partner universities. PhD candidates who earn a joint doctorate degree will receive only one diploma from both universities and only one official graduation ceremony shall be held. Candidates with a double doctorate degree receive two diplomas each mentioning the collaboration between the two universities.

### IN THE PICTURE

In 2019 Muhammad Ali defended his thesis on “INTEGRATIVE NETWORK-BASED APPROACHES FOR MODELING HUMAN DISEASE”. His research was part of the EU Joint Programme - Neurodegenerative Disease project “Targeting epigenetic dysregulation in the brainstem in Alzheimer’s disease – EPI-AD”, which was coordinated by prof. Daniel van den Hove (Maastricht University) and that included EURON partner Université de Luxembourg as work package leader.

The joint doctorate was completed between the Computational Biology Group, Luxembourg Centre for Systems Biomedicine & the School for Mental Health and Neuroscience of Maastricht University with as supervisors: Prof. Dr. Antonio del Sol, Prof. Dr. Jos Kleinjans and Prof. Daniel van den Hove based on the “Agreement for Joint Supervision of the Thesis” between the University of Luxembourg and Maastricht University to obtain the degree of Docteur de L’Université de Luxembourg en Biologie and the degree of Doctor awarded in the Netherlands.

*Abstract of the PhD thesis*

‘The large-scale development of high-throughput sequencing technologies has allowed the generation of reliable omics data related to various regulatory levels. Moreover, integrative computational modeling has enabled the disentangling of a complex interplay between these interconnected levels of regulation by interpreting concomitant large quantities of biomedical information (‘big data’) in a systematic way. In the context of human disorders, network modeling of complex gene-gene interactions have been successfully used for understanding disease-related dysregulation and for predicting novel drug targets to revert the diseased phenotype.

Recent evidence suggests that changes at multiple levels of genomic regulation are responsible for the development and course of multifactorial diseases. Although existing computational approaches have been able to explain cell-type-specific and disease-associated transcriptional regulation, they so far have been unable to utilize available epigenetic data for systematically dissecting underlying disease mechanisms.
In this thesis, we first provided an overview of recent advances in the field of computational modeling of cellular systems, its major strengths and limitations. Next, we highlighted various computational approaches that integrate information from different regulatory levels to understand mechanisms behind the onset and progression of multifactorial disorders. For example, we presented INTREGNET, a computational method for systematically identifying minimal sets of transcription factors (TFs) that can induce desired cellular transitions with increased efficiency. As such, INTREGNET can guide experimental attempts for achieving effective in-vivo cellular transitions by overcoming epigenetic barriers restricting the cellular differentiation potential. Furthermore, we introduced an integrative network-based approach for ranking Alzheimer's disease (AD)-associated functional genetic and epigenetic variation. The proposed approach explains how genetic and epigenetic variation can induce expression changes via gene-gene interactions, thus allowing for a systematic dissection of mechanisms underlying the onset and progression of multifactorial diseases like AD at a multi-omics level. We also showed that particular pathways, such as sphingolipids (SL) function, are significantly dysregulated in AD. In-depth integrative analysis of these SL-related genes reveal their potential as biomarkers and for SL-targeted drug development for AD. Similarly, in order to understand the functional consequences of CLN3 gene mutation in Batten disease (BD), we conducted a differential gene regulatory network (GRN)-based analysis of transcriptomic data obtained from an in vitro BD model and revealed key regulators maintaining the disease phenotype.

We believe that the work conducted in this thesis provides the scientific community with a valuable resource to understand the underlying mechanism of multifactorial diseases from an integrative point of view, helping in their early diagnosis as well as in designing potential therapeutic treatments.'

# 9. FINANCES

As of the agreement period 2017 – 2020, EURON is partly financed by annual membership contributions by the participating partner universities. Herewith, EURON was able to invest in the EURON course programme, the annual PhD days and the incentive for going abroad to another EURON partner university (mobility grant).

In addition, as MHeNs is the coordinator of EURON and is heading the coordinating office at Maastricht University, MHeNs itself and the Faculty of Health, Medicine and Life Sciences (of which MHeNs is one of the Schools), largely finance the coordinating office and its activities for EURON such as salary costs for the coordination, website and information material, costs for meetings and events.

# 10. FUTURE PERSPECTIVES

The realizations detailed in this report reflect the strong interaction between the EURON partners and their common dedication to continuously improve the training of PhD students in Neuroscience. As of January 2021, seven partners engaged themselves to continue these efforts and have signed a new collaboration agreement.

Together we're looking forward to fully implement the basic course curriculum that was developed during this agreement period. In 2021 the Human Neuroanatomy course will take place in a hybrid format, allowing fifteen participants to follow the lectures, seminars and hands-on workshop on-site. The online participants will be offered the opportunity to follow the hands-on workshop later this year. From 2022, we will start with the full curriculum by offering two basic courses every year.

With respect to the advanced courses, EURON takes the lead in organizing the course 'Drugs & the Brain: from Laboratory to Clinic', in September 2021, this time together with three other neuroscience graduate schools from Europe: the Graduate Programme in Neuroscience of the University of Crete (Heraklion, Greece), the PhD Programme in Neuroscience of the University College Cork (Ireland) and the Master and PhD Health Sciences Programme of the University of Minho (Braga, Portugal).

Indeed, EURON took the initiative to set up a cluster of four graduate schools to further develop and experiment with alternative teaching formats to improve the learning experience of PhD-level courses. For this, in January 2021 the EURON-lead cluster was awarded a grant from the FENS Committee for Higher Education and Training (FENS-CHET) aiming to stimulate and strengthen the cooperation among NENS schools.

We are also looking forward to the new format of the EURON PhD days. From now on, our annual symposium will be organized by a committee of PhD students, and will comprise plenary keynote lectures, parallel sessions and specific workshops. As such we aim to broaden the neuroscience scope of the symposium, and assure to include transferable knowledge and discussion of general science-related controversies.

Further, we aim to strengthen the scientific collaboration between EURON scientists. In 2021 an online EURON lectures series was initiated, where researchers that work on similar topics but from different approaches present and discuss their work.
In addition, we will organize symposia where researchers will be actively brought together based on their research interests. Finally, in the next period we will further stimulate the establishment of joint and double doctorates, in addition to bilateral Erasmus contracts to facilitate exchange of master students. Such exchange projects may form the seeds for new scientific collaborations between partners. As the Board is currently exploring the role of EURON as a backbone in diverse national and European funding schemes, we aspire that these initiatives will lead to joint grant applications. The EURON office will act as a subsidiary body in this respect.

In the prospect of reconnecting in a post-pandemic environment, we look forward to work together during the next four years, where EURON continues to unite, support and train neuroscience PhD students.

Dr. Gunter Kenis
Maastricht University
June 2021

# ANNEX 1
# ORGANISATIONAL STRUCTURE DETAILS

## EXECUTIVE BOARD

**Director:**
Harry Steinbusch (period 1995 – 2017)
Gunter Kenis (since Jan. 2018 – until now)

**Local coordinators:**
**Maastricht University**
Jörg Mey / Arjan Blokland

**RWTH Aachen University**
Felix Mottaghy / Björn Kampa (until 2020)

**University of Cologne**
Veerle Visser-Vandewalle / Ansgar Büschges / Thibaut Sesia / Sigrun Korsching (until 2020) / Natalia Kononenko (since 2020)

**Hasselt University**
Niels Hellings / Sven Hendrix (2019 – 2020) / Jean-Michel Rigo (since 2020)

**Université catholique de Louvain**
Aleksandar Jankovski

**Université de Lille**
Christophe Lefebvre / Sophie Halliez (since 2019)

**University of Luxembourg**
Serge Haan (until 2019) / Alexander Skupin / Paul Heuschling (since 2019)

**Université de Liège** (period 2017 – 2020)
Julie Bakker / Pierre Leprince (until 2020)

## EDUCATIONAL COMMITTEE

Alexander Jankovski (UC Louvain – Chairman)
Gunter Kenis (UM)
Thibaut Sesia (UKöln)
Tim Vanmierlo (UHasselt)
Pierre Leprince (ULg – until 2020)
Jörg Mey (UM – since 2021)
Nicole Senden (UM)

## EURON COORDINATING OFFICE

Gunter Kenis (Director)
Nicole Senden (Programme coordinator)
Peggy Bisschoff (Communication officer)
Damaris Kentgens (Secretary)

## PHD COMMITTEE

Dean Paes (UM)
Ellis Nelissen (UM)
Nina Possemis (UM – since 2021)
Melissa Schepers (UHasselt )
Assia Tiane (UHasselt)
Melina Overhoff (UKöln)
Alice Capuz (ULille)
Marie Tautou (ULille)
Guillaume Carey (ULille – since 2021)
Dominika Šulcová (UC Louvain)
Vincent Malotaux (UC Louvain)

# ANNEX 2
# PARTNERS UNIVERSITIES – FULL PARTNERS DETAILED INFORMATION

## MAASTRICHT UNIVERSITY


**Faculty of Health, Medicine and Life Sciences (FHML), School for Mental Health and Neuroscience (MHeNs)**

**Division 1: Cognitive Neuropsychiatry & Clinical Neuroscience**
Division leader: Frans Verhey
Division Deputies:
- Caroline van Heugten;
- Robert van Oostenbrugge.

*Aim and mission of Division 1*
Researchers in this division investigate both the effects of biological, neuropsychological and psychosocial factors, and the effects of ageing on cognition, and on the progression of neurological diseases itself. This division focuses particularly on late life event problems and ageing. Research of Division 1 is related to neuropsychiatric and neurological disorders studied in clinical cohorts (e.g. patients with Alzheimer's disease, stroke and brain injury) and in cohorts of healthy ageing subjects, focusing on cognitive functioning. Research and care are highly integrated in clinical research centers, such as the Alzheimer Centrum Limburg, the Brain Injury Center, and the Center for Movement Disorders. With respect to the core topics, the focus is upon:

- Neurodegeneration of the CNS: Alzheimer's disease: mechanisms, its prodromal phases, and prevention, other dementias (research staff: Sebastian Köhler: Frans Verhey, Walter Backes, Martin van Boxtel, Heidi Jacobs, Sebastian Köhler, Inez Ramakers, Pieter-Jelle Visser, Stephanie Vos, Ron Handels, Kay Deckers).
- Vascular Cognitive Impairment and Stroke (research staff: Robert van Oostenbrugge, Sébastien Foulquier, Caroline van Heugten, Harald Schmidt).
- Parkinson's disease (research staff: Yasin Temel, Ali Jahanshahi, Mark Kuijf, Mark Janssen, Sarah Hescham).
- Peripheral nervous system and neuromuscular diseases (research staff: Karin Faber, Janneke Hoeijmakers, Corinne Horlings).
- Acquired brain damage (research staff: Caroline van Heugten, Marcel Aries).
- Multiple Sclerosis (research staff[1]: Raymond Hupperts).
- Epilepsy (research staff: Rob Rouhl, Olaf Schijns, Jeroen Vermeulen).

**Division 2: Mental Health**
Division leader: Thérèse van Amelsvoort
Division Deputies:
- Sinan Gülöksüz;
- Wolfgang Viechtbauer.

*Aim and mission of Division 2*
The division Mental Health aims to understand the etiology of mental disorders by using dimensional and trans diagnostic approaches applied to ecological, psychological and biological systems. In addition, the work performed in division Mental Health offers opportunities to develop more individualized treatments and accurate predictive markers that could improve a patient's quality of life, taking into account the daily context of the patient. The mission of Division 2 is to promote mental health, prevent mental disorders and enhance its treatment by using state of the art research methodology in combination with clinical expertise and lived experience. Mental Health research in the division is organised around cross-disorder themes of research:

- Ecological momentary assessments through the experience sampling method (ESM) by using a tool which acquires data in real life allowing the study of real-time and real-world person-environment interaction patterns patterns (research staff: Philippe Delespaul, Machteld Marcelis, Therese van Amelsvoort, Marjan Drukker, Wolfgang Viechtbauer, David Linden).
- Risk and resilience prediction by employing large datasets of the general population, high risk and specific clinical samples, including those of rare genetic disorders; this work links with our longstanding interest in neuroimaging of psychiatric and population cohorts (research staff: Therese van Amelsvoort, Sinan Gülöksüz, Bart Rutten, David Linden, Maarten Bak, Gabriella Blokland, Dennis van der Meer, Jean-Paul Selten, Roos van Westrhenen, Machteld Marcelis).
- Experimental mechanistic approaches to study disease mechanisms and proof of concepts or efficacy of novel interventions, including drug treatments, neurofeedback and brain stimulation (research staff: Therese van Amelsvoort, Dennis Hernaus, Koen Schruers, Nicole Leibold, Jean-Paul Selten, David Linden, Peter van Harten, Richel Lousberg).

**Division 3: Translational Neuroscience**
Division leader: Jos Prickaerts
Division Deputies:
- Mario Losen;
- Mark Janssen.

*Aim and mission of Division 3*
The mission of the division Translational Neuroscience is to improve significantly the understanding of the mechanisms mediating normal and aberrant functioning of the nervous system, and to innovate clinical care at the levels of prevention, diagnosis and treatment for patients with disorders of the nervous system. We therefore aim to gain knowledge of physiological and pathophysiological mechanisms underlying diseases of the nervous system including mental and motor disorders and sensory system dysfunctions and to develop strategies for improving healthy living, as well as preventing and treating such diseases. In particular, we aim to gain insight into:

- (Epi)genetic, molecular and cellular mechanisms in disease areas of the central nervous system
  - Dementia, depression, psychosis, PTSD (research staff : Daniel van den Hove, Bart Rutten, Gunter Kenis, Laurence De Nijs, Mario Losen, Pilar Martinez, Ehsan Pishva, Tim Vanmierlo, Jos Prickaerts);
  - Epilepsy (research staff : Govert Hoogland, Christian Herff);
  - Movement Disorders (research staff : Ali Jahanshahi, Yasin Temel, Pieter Kubben, Sarah Hescham, Mark Janssen);
  - Multiple Sclerosis (research staff: Tim Vanmierlo, Raymond Hupperts)
- Mechanisms mediating central control of peripheral bodily functions:
  - Pain (research staff: Bert Joosten, Jan van Zundert);
  - (Auto)Immunity (research staff : P. Martinez, Mario Losen);
  - Ophthalmological (research staff: Tos Berendschot, Ronny Nuijts, Mor Dickman, Theo Gorgels, Marlies Gijs);
  - Vestibular (research staff: Raymond van de Berg);
  - Neuro-Urogenital functioning (research staff: Gommert van Koeveringe, J. Heesakkers).

- Developmental programming including prenatal and perinatal life (research staff: Boris Kramer, Danilo Gavilanes).
- To translate relevant scientific findings into biomarkers development as well as therapeutic applications including lifestyle interventions, pharmacological and antibody-based therapies, or neuromodulation (research staff: Jos Prickaerts, Tim Vanmierlo, Pilar Martinez, Mario Losen, Ali Jahanshahi, Christian Herff, Harald Schmidt).

**Faculty of Psychology and Neuroscience (FPN), Dept. Neuropsychology and Psychopharmacology (NP&PP)**

- Research line 1 Neuropsychology
  Main focus: fundamental and applied research on brain-cognition relationships in a developmental perspective (research staff: Sonja Kotz, Caroline van Heugten, Petra Hurks)
- Research line 2 Psychopharmacology
  Main focus: neurochemical basis of various behavioural functions (research staff[1]: Jan Ramaekers, Arjan Blokland, Rudy Schreiber, Kim Kuijpers, Rob Markus).

## HASSELT UNIVERSITY


**Faculty of Medicine & Life Sciences, Biomedical research institute (BIOMED)**

**The Departments involved in Neuroscience Research @ BIOMED UHasselt**

- Dept. Immunology & Infection (IMI)
- Dept. Neurosciences (NEUR)
- Dept. Cardiology and Organs Systems (COS)

**Dept. Immunology & Infection (IMI)**
*https://www.uhasselt.be/UH/(11574)-BIOMED-en-Research/(11574)-BIOMED-en-Research-research-domains/Immunology.html*
Within the capacity group immunology and infection we study the molecular and cellular pathways underlying the pathology of diseases involving the immune system such as multiple sclerosis, reumatoid arthritis and spinal cord injury. We apply the 'from bench to bedside' principle in which clinically relevent questions are addressed in cell culture models and are validated in animal models and patients. With our research we aim to improve the diagnosis, therapy or treatment of these diseases.

***Jerome Hendriks***
innate immunity – multiple sclerosis – neuroinflammation – remyelination – lipid metabolism

Our current research aims at elucidating the impact of disturbed lipid metabolism on inflammatory and repair processes within the central nervous system (CNS) with a focus on Multiple Sclerosis (MS). During MS macrophages infiltrate the CNS and degrade the myelin sheath surrounding axons which is called demyelination. As myelin is essential for nerve conduction, demyelination leads to conduction failure and clinical symptoms such as loss of vision and muscle weakness. Myelin consists for the major part of lipids, such as cholesterol and fatty acids, that also have important immune regulatory functions. In MS, a disturbed lipid metabolism is detected. However, little is known about the cause of this disturbance and the impact it has on disease progression.

We aim to:
1) determine the role of cholesterol and fatty acids in CNS inflammation, demyelination and repair of damaged myelin sheaths (remyelination).
2) study how dietary components affect CNS lipid metabolism and the function of resident brain cells.

***Niels Hellings***
neuroimmunology – T cells – immune aging – repair

The complex interplay between the central nervous system and the immune system is crucial for a long and healthy life, but disturbances in this delicate balance contribute to neurodegenerative diseases. Therefore, the NIC&R team investigates fundamental mechanisms in neuroinflammation, repair and aging, while implementing large scale data sciences, so that novel leads for future therapies are generated and validated.

***Joy Irobi***

extracellular vesicles – nanotherapeutics – small molecular chaperones – protein homeostasis

We are interested in the use of modified exosomes or extracellular vesicles (EV) as a next generation repair delivery cargo in the nervous system. EV are specialized nanosized vesicles released by many cell types with different biological effects. We are interested in mechanisms of how EV communications regulate protein homeostasis or 'proteostasis' pathways in multiple sclerosis (MS) disease. The development of engineered EV-based nanotherapy and nanomedicine for treating MS is lacking. The delivery of therapeutic targets via EV is an innovative approach in MS treatment, and could be developed to focus on both anti-inflammation and the stimulation of CNS repair.
To combat chronic neuroinflammation and the associated cellular stress response, we concentrate on small molecular chaperone mediated EV communications. This allows us to understand the mechanisms and biological processes that lead to disease and to identify potential anti-inflammatory biomarkers enriched in the modified EV cargos. To study these processes, we evaluate the effects of modified EV in human neural and immune cells, MS samples and in experimental MS mouse models using various functional genomics, molecular biology and neuroimmunology techniques. Although we have many hurdles to overcome, owing to the heterogeneity of EV populations, future clinical translation of engineered EV as nanomedicine may change the strategy used in treating neurodegenerative diseases.

Currently we are working on:

- Bioreactor 3D-cell culture, EV mass production and detailed characterization of modified EV.
- Defining modified EV disease limiting activities in neural, immune cells and tissues.
- Determining the activities of modified EV in MS patient lymphoid cells.
- In vivo characterization of modified EV nanotherapeutic activities by using MS mouse models.

***Markus Kleinewietfeld***

immunology & inflammation – microbiology – molecular neurology

We are interested in mechanisms of how immune system imbalance leads to human disease.

multiple sclerosis – real-world data – big data – data science

Our mission is that one day every single person gets the treatment they deserve in a timely manner. Our healthcare system of today is not good enough. One of the main challenges of today's healthcare is that disease management is mainly focusing on insights gathered at population level. We believe that a "next-generation of management" can be achieved when we supercharge with insights gained from Big Data. We are convinced that Data Saves Lives. Therefore, we investigate new methods to handle and analyse Big Data, with a specific focus on the chronic disease multiple sclerosis (MS). Multiple Sclerosis (MS) is a progressive demyelinating and degenerative immune-mediated disorder of the central nervous system with symptoms depending on the disease type and the site of lesions. The disease course is unpredictable and heterogeneous. Not only physical (e.g. visual and cognitive function), but psychological and social aspects as well are affected in patients with MS. Therefore, MS should be featured by an individualized and intense clinical follow-up and multidisciplinary treatment.
High performance MS-specific decision support systems are needed to support treatment decision-making by neurologists and regulators (= the right disease modifying therapy (DMT) for the right patient). And we need these decision support systems to function well in what we call "a real-world" setting. To date, 14 DMTs have been approved for relapsing-remitting MS on the basis of their efficacy in randomized controlled trials (RCTs). RCTs are accepted as the gold standard for assessing the efficacy and safety of any new drug, and are conducted in a controlled setting with well-defined homogeneous patient populations selected through strict inclusion criteria. These cohorts do not necessarily represent MS in real life and conclusions made from these RCTs therefore do not always translate to the individual patient. Real-world data (RWD) are defined as data derived from a number of sources that are associated with outcomes in a heterogeneous patient population representing the real-world settings. To transform the care of PwMS, we need to speed-up diagnosis, prognosis and treatment. We are convinced that the key to accomplish this is to develop and implement new methodologies to handle and analyse real-world MS datasets.

***Veerle Somers***
biomarkers – B cells – multiple sclerosis – spinal cord injury – autoimmunity

Prof. Somers' research at the Biomedical Research Institute focuses on B cell analysis and biomarker discovery in neurologic and autoimmune diseases such as Autism Spectrum Disorders, Spinal cord injury and Multiple Sclerosis. Current projects focus on predictive biomarkers for autism spectrum disorders and novel biomarkers for diagnosis, prognosis and therapy response in multiple sclerosis. In these projects, we use cDNA phage display to identify novel antibody markers. Other projects focus on the role of age-associated immune cells in immune aging and multiple sclerosis pathology and progression, and on B cell self-reactivity in spinal cord injury. The Somers' lab has strong experience in translation of results to clinical applications.

***Piet Stinissen***
multiple sclerosis – T cells – autoimmunity

Piet Stinissen is a Full Professor of Immunology at Hasselt University. He holds a master's degree and PhD in sciences (biochemistry) from the University of Antwerp. He is Dean of the Faculty of Medicine and Life Sciences, Chairman of the Biomedical Research Institute (BIOMED) and head of the Immunology and Biochemistry laboratory at Hasselt University. His group focuses on the mechanisms involved in autoimmunity, the identification of new biomarkers and the development of new immunotherapeutic strategies for multiple sclerosis. He is co-chair of the Multiple Sclerosis Network Limburg and chairman of a Belgian FWO Study group on multiple sclerosis. He is (co)-author of more than 100 peer reviewed publications and 5 patent applications. He received several scientific awards including Methusalem and Charcot grants and an Award from the Royal National Academy of Science. His group started two spin-off companies and he serves as advisor to pharmaceutical and biotech companies. He is founding chairman of LifeTechLimburg and board member of NV Life Sciences Development Campus (BioVille), two organisations that promote and support regional biomedical life sciences and healthcare technology development. He is also a board member of the Flemish Centre for Medical Innovation (CMI), member of the steering committee of Flanders' Care, board member of the Euregional platform Biomedica, chair of the Limburg Clinical Research Program (a partnership with the hospitals ZOL and Jessa) and board member of the regional hospital cluster Hospilim.

***Bart Van Wijmeersch***
Bart Van Wijmeersch, MD, PhD (°1976) is a neurologist-immunologist with subspecialisation in Multiple Sclerosis. He completed his general medical training in 2001 at the University Of Leuven (KUL), after which he started his specialization in Neurology. During this residency he started a PhD in neuroimmunology at the lab of experimental transplantation and neuroimmunology at the KUL. He was promoted in 2008 with a thesis entitled: ' Graft-versus-autoimmunity after induction of mixed bone marrow chimerism in murine models of experimental autoimmune encephalomyelitis'. Since 2008, he is active as neurologist, specialized in Multiple Sclerosis (MS), at the Rehabilitation & MS-Centre in Overpelt, where he leads a multidisciplinary team for MS, and is the Medical Director of the Centre. He's an associate Professor at the University of Hasselt, where he's involved in pre-clinical as well as the clinical research on MS at the biomedical institute (BIOMED). He has a supporting role in all the immunological research on blood- and CSF samples of persons with MS and in EAE-animal models, as well as in the rehabilitation research at REVAL. Immunological, Biomaker, MRI, Electrophysiological and Rehabilitation research in MS come together in this way. He has an educational role in the faculty of medicine and physiotherapy. He's a member of the Belgian Study Group of Multiple Sclerosis and a member of advisory boards of different pharmaceutical companies with interest in Multiple Sclerosis.

**Dept. Neurosciences (NEUR)**
*https://www.uhasselt.be/UH/(11574)-BIOMED-en-Research/(11574)-BIOMED-en-Research-research-domains/Neurosciences.html*
The Neuroscience research group focuses on fundamental, translational and clinical research to gain insight in the (sub-)cellular mechanisms and pathogenetic processes of neurological disorders of the central or peripheral nervous system. These diseases include disorders related to neuronal development, disorders related to the enteric nervous system and neurodegenerative disorders. A 'bench-to-bedside' approach is used in which clinically relevant questions are investigated in cell culture models and validated in animal models, patients or patient material, in order to achieve better diagnosis, therapy and treatment. Finally, there is a strong focus on the development and application of biomedical imaging and other biophysical techniques to enable groundbreaking insights in this field.

***Werend Boesmans***
enteric nervous system – gut-brain axis

***Bert Brône (common lab with Jean-Michel Rigo)***
neurodevelopment – microglia – glycine receptor – cell imaging & electrophysiology

As principal investigator of the Laboratory of Neurophysiology at Hasselt University I focus on brain development and related psychiatric disorders. In collaboration with Prof. Dr. Jean-Michel Rigo, 5 PhD students and 2 technicians, I study neuronal and microglial aspects in the etiology of autism and schizophrenia. First, microglia are studied as immune mediators contributing to neurodevelopmental diseases. In a second research line the lab discovered the glycine receptor subunit alpha2 as an essential component for embryonic brain development and that its loss of function induces dysfunction of neuronal circuits involved in autism spectrum disorder.

The expertise is focused on cellular biology and electrophysiology, supplemented with animal experiments, imaging techniques, standard molecular biological techniques and animal behavior.

***Ilse Dewachter***
Alzheimer disease – tauopathies

***Jelle Hendrix***
single-molecule – fluorescence – structure-function – diffusion – FRET-FLIM

Protein structures are classically obtained via methods such as x-ray crystallography. However, these methods remove molecules from their natural environment and often lead to artifacts. Therefore, the Dynamic Bioimaging Lab explores single molecule fluorescence methods to investigate structure-function relations of biomolecules in a physiologically relevant context.

You can contact us for analysis of biomolecular:

- structure;
- conformational dynamics;
- homologous interactions (A + A);
- heterologous interactions (A + B).

***Jean-Michel Rigo (common lab with Bert Brône)***
neurodevelopment – microglia – glycine receptor – cell imaging & electrophysiology

Our brain is an intriguing organ that gradually becomes more active and refined during its development. It is not surprising that disruption of brain development through genetic and environmental factors leads to neurodevelopmental diseases such as autism spectrum disorder and schizophrenia. Since proper neurodevelopment is driven by the complex interplay between neurons and microglia, we focus on the impact of genetic and environmental factors on these cells. A genetic risk factor for autism spectrum disorder, directly acting at neuronal networks, is the impaired glycine receptor signaling in the brain.
Environmental factors impact the highly dynamic immune cells of the brain: microglia. Using molecular, cellular and behavioral approaches, we aim to understand the normal and pathological brain development in order to identify new targets with therapeutic potential for neurodevelopmental disorders.

***Tim Vanmierlo***
cognition – remyelination – phosphodiesterase – multiple sclerosis – Alzheimer's disease

Tim Vanmierlo (°1983) graduated as master in biomedical sciences (2006) at the transnational University Limburg (B). Next, he earned his PhD in 2010 on the role of the brain sterol metabolism in the prediction, progression and prevention of Alzheimer's disease (AD), first as a Marie Curie fellow (ITN) at Maastricht University (NL) followed by three years at the laboratory for special lipid diagnostics at the University Clinics of Bonn (D). This was followed by a postdoctoral research position in 2010 at Maastricht University on the role of neurotrophins and phosphodiesterase inhibitors (PDEi) in AD and depression and a position in 2012 at Hasselt University focusing on the brain sterol metabolism related to multiple sclerosis (MS). Since 2016, he is heading a research line on repair-inducing cognition enhancers in neurodegenerative disorders as part of the NIC&R

group (Neuro-Immune Connect & Repair, headed by prof. Niels Hellings). Since 2019, he is employed as a joint assistant professor at Hasselt University and Maastricht University. In this context, his group applies a battery of gene-editing approaches (e.g. CRISPR/Cas9, in vivo micro-electroporation) to modulate biological processes to enable CNS repair in neurodegeneration. The established cross-border initiative between UHasselt BIOMED with the school for mental health and neuroscience (MHeNs) at Maastricht University merges knowledge and expertise on cognition enhancers and gene-editing approaches. Tim Vanmierlo supervises 1 postdoc, 6 PhD students and 2 technicians and published over 65 international peer-reviewed papers (H-index: 26, >2000 cites). His work is mainly funded by FWO Flanders, The Belgian Charcot Foundation and Hasselt University.

**David Wilson**

DNA repair – disease susceptibility – neurodegeneration – premature aging

Damage to our genetic material is unavoidable, arising from spontaneous decay, reactions with intracellular reactive oxygen species, or exposure to numerous environmental agents, such as sunlight or chemicals in the food, water, or air. Persistent DNA damage can give rise to permanent mutations, chromosomal aberrations, or stalled DNA replication or RNA transcription events, leading to cell death, transformation, or senescence, fates that underlie disease and aging. Importantly, a suite of DNA repair mechanisms has evolved that collaborate to resolve genomic stress, thereby maintaining genome stability and preventing disease. The broad emphasis of the Wilson group is to define how DNA repair mechanisms work at a fundamental level, the extent to which the different DNA repair pathways operate to preserve nervous system cell function, and the role that DNA repair plays in degenerative pathologies. Insights from the ongoing studies will shed novel insights into disease mechanism and guide future therapeutic approaches. Employing a range of techniques, e.g., molecular biology and protein biochemistry, fluorescence microscopy, cell biology, and mouse models, the laboratory is pursing the following topics:

- Define the contribution of DNA repair mechanisms in protection against secondary neuronal loss following spinal cord injury.
- Examine the molecular mechanisms of aging (e.g., mitochondrial dysfunction, genomic damage, DNA repair, and senescence) in pathologies related to Tau aggregation, a process seen in Tauopathies and Alzheimer disease.
- Determine the role of DNA repair in the preservation of enteric nervous system structure and function.
- Elucidate DNA repair protein mechanism and coordination via reconstituted assays that integrate single molecule FRET and DNA origami platforms.

**Dept. Cardiology and Organs Systems (COS)**

*https://www.uhasselt.be/UH/(11574)-BIOMED-en-Research/(11574)-BIOMED-en-Research-research-domains/Cardiovascular-diseases.html*

The Cardiology and Organ Systems (COST) research group focuses on in vitro and in vivo cellular and animal models in different fields such as cardiovascular disease, oncology and neurological disorders. These include the use of different stem cell types (embryonal, iPSC, DPSC, CASCs) and animal models of diastolic and systolic heart failure, cancer, peripheral neuropathies and ischemic stroke. These models are used to design and develop therapeutic applications in e.g. cancer and myocardial infarction or to unravel underlying disease mechanisms e.g. the role of AGEs and extracellular vesicles in cardio- and cerebrovascular disease. In addition to (stem) cell-based therapies, the effect of exercise as a medicine to improve the cardiometabolic status in various neurodegenerative, cardiovascular and respiratory diseases as well as in diabetes is studied. In general, the underlying biomedical/biomolecular mechanisms are investigated in animal models and human subjects using proteomic, genomic and bionanotechnology approaches. This enables us to identify biomarker signatures (e.g. extracellular vesicles containing biomarkers) associated with the disease status or to monitor successful therapies. Thanks to the close collaboration with Reval, the Jessa Hospital and ZOL, we have the unique opportunity to combine basic research and clinical research and to translate acquired knowledge into clinical practice.

***Annelies Bronckaers***

angiogenesis – ischemic stroke – stem cells – tissue regeneration – low- frequency electromagnetic stimulation

Stroke is a severe neurological disorder defined by loss of brain function caused by interrupted or severely impaired blood flow. Worldwide, stroke is classified as the second leading cause of death and is a major cause of permanent disability. Despite the high prevalence and devastating outcome, there are only few treatment options for ischemic stroke which are only available for a small subset of patients, highlighting the urgent need for new stroke therapies. The focus of my research group is to explore two possible new therapeutic strategies and investigate their mode of action. One strategy is to use genetically engineered dental pulp stem cells to enhance angiogenesis and neurogenesis, two important endogenous repair mechanisms of the brain. In another project we explore magnetic stimulation (MS) as a therapy for ischemic stroke. We hope that the insights obtained of these projects lead to new effective therapies against ischemic stroke.
Besides stroke, my lab has also a main interest in using (dental) stem cells for tissue regeneration, thereby focussing on enhancing blood vessel growth, which is key for successful tissue growth.

***Esther Wolfs***

stem cells – Charcot Marie-Tooth – oncology

Esther Wolfs started as an assistant professor in November 2018. She has a background in state-of-the-art stem cell imaging and stem cell research including pluripotent stem cell research and gene editing. She is working on Charcot-Marie-Tooth disease type 1A (CMT1A), the most common inherited demyelinating peripheral neuropathy. To this end, her team uses patient-derived iPSC models and dental pulp stem cells differentiated to Schwann cells to study the disease mechanism. Furthermore, animal models are used to further characterize the disease and to find potential new therapies. The team uses state-of-the art imaging modalities to gain an in-depth knowledge on CMT1A, hoping to develop a new therapy for these patients in the future.

## RWTH AACHEN UNIVERSITY

### Faculty of Mathematics, Computer Science and Natural Sciences, Institute of Biology

### Research groups:

- Chemosensory Research Group
  *https://sensorik.rwth-aachen.de*
  Research lines: mechanisms of pheromone signaling on the molecular, cellular and physiological levels, mammalian sperm chemotaxis (PI: Markus Spehr)
- Molecular and Systemic Neurophysiology Group
  *https://brain.rwth-aachen.de*
  Research lines: decision making in animals navigating in virtual reality, optophysiological dissection of neural circuits of behavior, technical development in two-photon imaging and optogenetics (PI: Björn Michael Kampa)
- Neuromodulation Group
  *https://www.neuromodulation.rwth-aachen.de*
  Research focus: research on top-down modulations using the olfactory system (sense of smell) as a model. In the olfactory system top-down inputs to the earliest stage of information processing, the olfactory bulb, seem to be particular important as they even outnumber direct synaptic sensory inputs (PI: Markus Rothermel)
- Functional Epigenetics Group
  *https://epigenetik.rwth-aachen.de*
  Research lines: Role of DNA methylation in synaptic transmission, cortical GABAergic system, neurodegeneration, IncRNAs in targeting DNA methylation (PI: Geraldine Zimmer-Bensch)
- Motor System Neuroscience Group
  Joint group of the Faculty of Medicine and the Faculty of Mathematics, Computer Science and Natural Sciences
  Research lines: development, physiology and pathology of motoneurons, movement control
  (PI: Till Marquardt)

**The following groups are affiliated with the Institute of Biology II and are located at the Forschungszentrum Jülich**

- Institute of Biological Information Processing (IBI)
  *https://www.fz-juelich.de/ibi/ibi-1//DE/UeberUns/ueberUns_node.html*
  Molecular and Sensory Physiology and Neurobiology
  Research line: structural dynamics of ion channels (PI: Frank Müller)

- Institute of Neuroscience and Medicine (INM), Computational and Systems Neuroscience
  *https://www.fz-juelich.de/inm/inm-6/EN/Forschung/Gruen/artikel.html*
  Research line: statistical neuroscience, analysis of multi-channel activity data (PI: Sonja Grün)

**Faculty of Medicine**

**Dept of Neuroanatomy**
*https://www.ukaachen.de/kliniken-institute/institut-fuer-neuroanatomie/forschung/*
Head: Cordian Beyer

The department of Neuroanatomy focusses on the following research topics:

- Amyotrophic lateral sclerosis (PI: Sonja Johann)
- Eating Disorder (PI: Stefanie Trinh)
- Multiple Sclerosis (PI: Tim Clarner)
- Oxidative Stress by Neurodegenerative Diseases (PI: Tim Clarner)
- Spinal Cord injuries (PI: Adib Zendedel)
- Stroke (PI: Cordian Beyer)
- Animal models
- Cell modelling

**Dept of Neurology**
*https://www.ukaachen.de/kliniken-institute/klinik-fuer-neurologie*
Head: Jörg Schulz

The department of Neurology consists of the following teams and focusses on the research topics:

- MR Physics, JARA-Brain (PI: N. J. Shah)
- Clinical Cognitive Research (PI: Ferdinand C. Binkofski)
- Neurobiological Research (PI: Till Marquardt)
- Imaging in Neurodegenerative Diseases (PI: Kathrin Reetz)
- Neuromuscular Diseases
  Vascular Diseases (PI: Arno Reich)
- Epilepsy
- Diseases of the autonomic nerve system
- Rehabilitation (PI: Cornelius J. Werner)
  Neurodegeneration in Drosophila (PI: Aaron Voigt)
- Gene and Molecular Mechanism Movement Disorders (PI: Judith Stegmüller)
- Neuromodulation and imaging (PI: Florian Holtbernd)

**Dept of Neuropathology**
*https://www.ukaachen.de/kliniken-institute/institut-fuer-neuropathologie/research.html*
Head: Joachim Weis

The department of Neuropathology is focused on diagnosis and research of diseases of the nervous system and skeletal muscles. The material removed during neurosurgical operations is examined, especially brain tumors, as well as nerve, muscle and skin biopsies, cerebrospinal fluid and autopsy tissue, and animal and cell culture models of neurological diseases. Histological, immunohistochemical, electron microscopic, biochemical, cell biological and molecular genetic methods are applied. Degenerative diseases of the peripheral and central nervous system and musculature as well as neuroregeneration are the main research areas. The department is particularly specialized in neuropathological diagnostics and research of diseases of the peripheral nervous system and musculature. The pathophysiological focus is on the role of endoplasmic reticulum pathology and of disturbed proteostasis and autophagy in hereditary neuromuscular and neurodegenerative disorders.

Research Lines:

- Neurodegeneration and neuromuscular pathology
- Alterations of proteostasis and autophagy
- CNS and PNS nerve regeneration

**Dept of Nuclear Medicine**
*https://www.ukaachen.de/en/clinics-institutes/klinik-fuer-nuklearmedizin/research.html*
Head: Felix Mottaghy

The Department of Nuclear Medicine provides the complete range of expertise in nuclear medicine. The past years the neuroscientific focus was on the pre- and postsynaptic dopaminergic system. The clinic has developed cooperations with the department of psychiatry and the Maastricht UMC in this regard.
The working group of Prof. Dr. Langen is a branch of the clinic at the research center Jülich and is engaged in the preclinical and clinical evaluation of new radiopharmaceuticals for the diagnosis of brain tumors. The work focuses on the evaluation of intratumoral accumulation of radioactively labelled amino acids in brain tumors, therapy planning and therapy control in patients with brain tumors.
In the field of clinical and preclinical research, the Department of Nuclear Medicine is an active partner of the Helmholtz Institute for Biomedical Engineering, the DWI-Leibnitz-Institute for Interactive Materials e.V. and the Research Center Jülich as well as Euregionally of the Universities of Maastricht and Leuven. Next to the neuroscientific research focus the preclinical research focuses on the development of new tracers for diagnosis and therapy of oncologic diseases, utilizing a complete radiochemistry, molecular biology as well as a small animal imaging lab.

Research Lines:

- Circulation and metabolism of the CNS, neurotransmitter receptors and transporters (especially dopamine)
- Molecular imaging using PET and PET-CT
- Selective Internal Radiotherapy (SIRT)
- peptide receptor radiotherapy (PRRT)
- 177Lutetium prostate specific membrane antigen radioligand therapy (177Lu-PSMA-RLT)
- Preclinical imaging
- Radiolabeled nucleoside analogues in tumor therapy
- New therapy approaches in breast cancer

**Dept of Physiology**
*https://www.ukaachen.de/en/clinics-institutes/institute-of-physiology/research/*
Head: Stefan Gründer

The Department of Physiology is responsible for teaching and research in physiology. They teach students of human medicine, dentistry, the master's program "Biomedical Engineering" and the natural and engineering sciences in the subject of physiology.
There are currently three research groups at the institute, which have their research focus on:

- Molecular physiology
  Research lines: Ion channels of the DEG/ENaC gene family; Ion channels in brain tumors
  (PI: Gründer)
- Cellular physiology
  Research line: Regulation mechanisms and molecular structures of cation channels
  (PI: Lückhoff)
- Neurophysiology
  Research lines: Molecular basis of peripheral pain development; Voltage-gated Na+ channels
  (PI: Lampert)

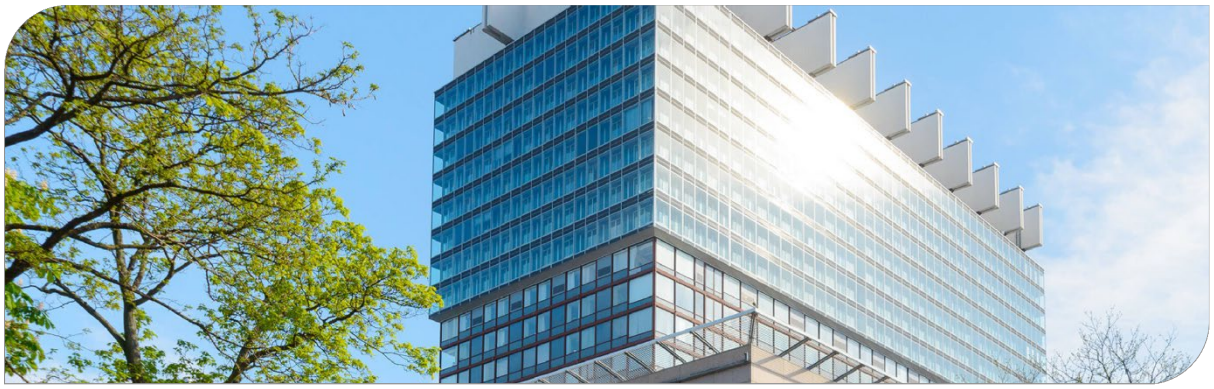
**Department of Psychiatry, Psychotherapy and Psychosomatics**
*https://www.ukaachen.de/en/clinics-institutes/department-of-psychiatry-psychotherapy-and-psychosomatics/research.html*
Head: Irene Neuner

The Department of Psychiatry, Psychotherapy and Psychosomatics is home to psychologists, psychiatrists, computer scientists, physicists and PhD students from other fields that use brain imaging techniques (MRI, fMRI, PET, MEG, Brain Mapping) to learn more about the neurobiological mechanisms of pathological aggression and impulsiveness and the influence of several factors such as gender, environment and personality. The Department works closely with Forschungszentrum Jülich. Within the framework of the Jülich Aachen Research Alliance (JARA), JARA-BRAIN is one of six divisions. Further, the department provides all heads of department (Habel, Diesmann) for the „JARA-BRAIN Institute: Structure Function Relationship“. The aim is to harness technical and methodological expertise and apply basic and clinical research to identify new strategies for the prevention, diagnosis and treatment of psychiatric and neurological disorders of the brain.

Research topics and working groups:

- Computational Neuroscience (Head: Markus Diesmann)
- Experimental Neuropsychiatry (Head: Natalia Chechko)
- Experimental Psychopathology (PI: Tim Pöppl)
- Experimental Behavior Psychobiology (Head: Klaus Mathiak)
- Functionality of Cortical Circuits (Head: Dirk Feldmeyer)
- Multimodal Neuroimaging in Clinical Neuroscience (Head: Irene Neuner)
- Social and Affective Neuroscience
- Structure of Cortical Functional Units (Head: Joachim Lübke)
- Translational Brain Medicine in Psychiatry and Neurology

## UNIVERSITY OF COLOGNE



**Faculty of Medicine**

**Department of Neurology**
*https://neurologie.uk-koeln.de/klinik/direktor-team*
Director: Gereon R. Fink
- Neuromodulation & Neurorehabilitation
- Experimental Neuroimmunology
- Neural Stem cells
- Neuroimaging & Neuroengineering
- Neuropsychology

**Department of Psychiatry**
*https://psychiatrie-psychotherapie.uk-koeln.de/klinik/direktor-team/*
Director: Frank Jessen
Social Cognition, Neurobiology & Neuromodulation Psychiatric diseases

**Department of Nuclear Medicine**
*https://nuklearmedizin.uk-koeln.de/klinik/direktor-und-team/*
Director: Alexander Drzezga
Multimodal Imaging neural networks, Pre-clinical imaging

**Department of Stereotactic and Functional Neurosurgery**
*https://stereotaxie.uk-koeln.de/klinik/direktorin-team/*
Director: Veerle Visser-Vandewalle
Neuromodulation and Behavioural neuroscience (PI: Thibaut Sesia)
Imaging Lab
Deep Brain Stimulation Alzheimer Disease

**Institute for Molecular and Behavioral Neuroscience,** DZNE & Univ. Cologne
Experimentelle Neurophysiologie
*https://www.dzne.de/isbrandt*
Molecular mechanisms underlying disease-associated changes in cellular excitability using transgenic mouse models (PI: Dirk Isbrandt)

**Translational pain research**
*https://painsignaling.uni-koeln.de*
Molecular and cellular mechanisms altering pain sensitivity (PI: Tim Hucho)

Other departments: Center for Anatomy, Institute of Human Genetics, Department of Child and Adolescent Psychiatry, Department of Paediatrics, Institute for Vegetative Physiology, Institute for Medical Statistics, Informatics and Epidemiology, Center for Ophtalmology, Center for Biochemistry, Klinik und Poliklinik für Hals-Nasen- und Ohrenheilkunde, Center for Pharmacology.

**Faculty of Mathematics and Natural Sciences**

**Institute of Zoology – Neurobiology**
See the different research groups on: *https://zoologie.uni-koeln.de/en/*
Some of them are listed below:

- Active locomotion and understanding its neural control
  *https://zoologie.uni-koeln.de/en/research-groups-divider/bueschges-group*
  (Head: Ansgar Buschges)
- Computational Systems Neuroscience
  *http://computational-systems-neuroscience.de/research*
  (Head: Martin Nawrot)
- Neuromodulation and plasticity of the nervous systems; biophysical mechanisms of neuronal excitability and synaptic plasticity
  *https://zoologie.uni-koeln.de/en/research-groups-divider/kloppenburg-group*
  (Group leader: P. Kloppenburg)
- Molecular and neural basis of addictive behaviour, in particular alcohol addiction – drosophila models
  *https://neuroscience.uni-koeln.de/neuroforum/ag-scholz*
  (Group leader: Henrike Scholz)
- Modeling neural network dynamics underlying motor control
  (affiliated with the Department of Animal Physiology)
  *https://zoologie.uni-koeln.de/en/research-groups-divider/daun-group*
  (Head: Silvia Daun)

**Institute for Genetics**
Sensation, perception and behavior in vertebrate olfaction
*http://www.uni-koeln.de/math-nat-fak/genetik/groups/Korsching/index.html*
(PI: Sigrun Korsching)

**CECAD Research Center**

- Bergami lab
  *https://bergami-lab.com/*
  Synaptic integration and connectivity of new neurons in the adult brain
  Regulation of cellular plasticity by the mitochondrial network
  Glial cells and neuroinflammation
- Natalia Kononenko Lab
  *http://kononenko.cecad-labs.uni-koeln.de/Home.736.0.html*
  Molecular and cellular processes underlying neurodegeneration
- Elena Rugarli Lab
  *http://rugarli.cecad-labs.uni-koeln.de/Home.425.0.html*
  Mechanisms underlying axonal degeneration
  Regulatory mechanisms of mitochondrial function

## UNIVERSITÉ CATHOLIQUE DE LOUVAIN


**Institute of Neuroscience (IoNS)**

### Cellular and molecular division (CEMO)

*https://uclouvain.be/en/research-institutes/ions/cemo*

The Cellular and Molecular Neuroscience division comprises nine research groups that use molecular and cell biology, biochemistry, pharmacology, transgenesis, imaging and electrophysiology to investigate the fundamental bases of development, physiology and pathologies of the nervous system.
Research interests include the characterization of mechanisms involved in neural differentiation, neuronal migration, axon guidance and synaptogenesis, in neuronal, glial or muscular physiology, in the alterations of nervous activity in chronic pain and in the degeneration of neuronal, glial or muscle cells in the course of degenerative disorders.
The long term objective of this research is to improve diagnosis and treatment of neurodevelopmental disorders, of neurodegenerative pathologies including Alzheimer's disease, Parkinson's disease and multiple sclerosis, and of neuromuscular diseases such as Duchenne muscular dystrophy and Amyotrophic Lateral Sclerosis.

Research groups:

- **Alzheimer's Dementia**
  *https://uclouvain.be/en/research-institutes/ions/cemo/alzheimer-s-dementia-cellular-and-molecular-mechanisms.html*
  Research focus: AD: cellular & molecular mechanisms – how molecular interactions can affect APP processing/function and NFT formation
  (PI's: Jean-Noël Octave and Pascal Kienlen-Campard)
- **Cell physiology**
  *https://uclouvain.be/en/research-institutes/ions/cemo/cell-physiology.html*
  Research focus: role of TRP channels in cell physiology
  (PI's: Philippe Gailly and Nicolas Tajeddine)
- **Developmental neurobiology**
  *https://uclouvain.be/en/research-institutes/ions/cemo/developmental-neurobiology-group.html*
  Research focus on genes and proteins implicated in neural development, with a particular emphasis on planar cell polarity (PCP) genes Celsr1-3, and on Formins
  (PI: Fadel Tissir)
- **Mammalian Development and Cell Biology**
  *https://uclouvain.be/en/research-institutes/ions/cemo/mammalian-development-and-cell-biology.html*
  Research focus: cellular and molecular mechanisms controlling neural cells proliferation, migration and differentiation during the development of the cerebral cortex
  (PI: Yves Jossin)
- **Neural differentiation**
  *https://uclouvain.be/en/research-institutes/ions/cemo/neural-differentiation.html*
  Research focus: cellular and molecular mechanisms controlling neuronal differentiation and migration in the developing spinal cord and after adult spinal cord injury
  (PI: Frédéric Clotman)

- **Neuroimmunology and CFS neurochemistry**
  *https://uclouvain.be/en/research-institutes/ions/cemo/neurochemistry-unit.html*
  Research focus: immune response and cytokine network in Multiple Sclerosis and other neurological disorders
  (PI: Vincent Van Pesch)
- **Neuropharmacology**
  *https://uclouvain.be/en/research-institutes/ions/cemo/neuropharmacology.html*
  Treatments of neurological disorders/trauma and psychiatric diseases: modulation of synaptic transmission by drugs acting on diverse receptors and transporters – focus on glial glutamate targets (Research staff: Emmanuel Hermans, Jean-Marie Maloteaux, Patricia Lavand'Homme), Bernard Le Polain de Waroux, Riem El Tahry)
- **Physiology and biochemistry of exercise**
  *https://uclouvain.be/en/research-institutes/ions/cemo/physiologie-et-biochimie-de-l-exercice.html*
  Research focus on: molecular mechanisms induced by physical activity that lead to muscle hypertrophy and remodeling or, conversely, to muscle atrophy during a prolonged physical inactivity or during aging
  (PI's: Marc Francaux and Louise Deldicque)

### System and cognition division (COSY)

*https://uclouvain.be/en/research-institutes/ions/cosy*

Researchers within the Systems and Cognitive Neuroscience division (COSY) of the Institute seek to understand the neural mechanisms underlying perceptual, cognitive and motor functions in humans. About 24 senior scientists and a total of 72 researchers are affiliated to COSY. Our research interests include the neural mechanisms of numerical and social cognition, executive functions, sensori-motor coordination, motor control, spatial perception, representation of time and expectation, sensory plasticity, impact of early visual defects on late development of cognitive functions, language and gesture understanding and production, semantics, somatosensory perception including pain, visual perception of complex naturalistic images (faces, objects and scenes), the dynamics of object grasping, psychometry, neuro-rehabilitation, biomechanics of locomotion, rhythm perception, and neural interfaces.
Our research relies on a wide range of methods and techniques available locally or through national and international collaborations: psychophysics and mental chronometry, functional magnetic resonance imaging (fMRI), scalp and intracerebral electroencephalography (EEG), transcranial magnetic stimulation (TMS), recording of eye movements, and electromyography. These methods are complemented by neuropsychological studies of patients with lesions of the peripheral or central nervous system.

Research groups:

- **Anticipation and its troubles**
  *https://uclouvain.be/en/research-institutes/ions/cosy/anticipation-and-its-troubles.html*
  Research focus on anticipatory eye movements
  (PI: Marcus Missal)
- **Cognition and actions**
  *https://uclouvain.be/en/research-institutes/ions/cosy/cognition-and-actions.html*
  Research focuses on the neural correlates of complex motor behavior in humans
  (PI: Julie Duque)
- **Touch and Grip**
  *https://uclouvain.be/en/research-institutes/ions/cosy/touch-and-grip.html*
  Research focus: studying the sense of touch and its role in dexterous manipulation – investigations of the biomechanical properties of the fingertips and its role in tactile perception and dexterous manipulation. In addition, research in the domain of the complex interactions between feed-forward and feedback mechanisms in the control of dexterous manipulations in patients with neurological disturbances as well as in normal subjects under unusual environmental conditions, such as microgravity.
  (PI: Jean-Louis Thonnard)
- **Neural mechanisms of human face recognition**
  *https://uclouvain.be/en/research-institutes/ions/cosy/human-face-perception.html*
  Research focus in healthy humans (children and adults) as well as in brain-damaged patients, at multiple levels:
  - behavioral responses and eye movements,
  - hemodynamic brain responses (techniques: functional Magnetic Resonance Imaging, fMRI),

- neurophysiological responses (techniques: intra- and extra-cerebral electroencephalogram),
- brain stimulation (techniques: intracerebral electrical stimulation and transcranial magnetic stimulation, TMS).
  (PI's: Bruno Rossion and Valérie Goffaux)

http://www.face-categorization-lab.webnode.com
https://sites.uclouvain.be/goffauxlab/index.html

- **Motor skill learning & intensive neurorehabilitation (MSL-IN)**
  https://uclouvain.be/en/research-institutes/ions/cosy/motor-skill-learning-and-intensive-neurorehabilitation-lab-msl-in.html
  Research focus: investigation of the optimal parameters of intensive rehabilitation for patients with brain damage. The measurement of this optimum is embodied both through functional assessments in the 3 areas of the ICF and through the measure of associated cortical changes with functional magnetic resonance imaging (fMRI), diffusion imaging (DTI) or transcranial magnetic stimulation (TMS).
  (PI's: Yannick Bleyenheuft and Anne De Volder)
- **Algology**
  https://uclouvain.be/en/research-institutes/ions/cosy/algology.html
  **NOCIONS: pain research**
  http://nocions.webnode.com/
  Research focus on: non-invasive functional neuroimaging techniques such as electroencephalography (EEG) and functional magnetic resonance imaging (fMRI), the research activity of our laboratory aims at a better understanding of the physiology and pathophysiology of pain in humans
  (PI's: André Mouraux, Valéry Legrain, Anne Berquin)
- **Physiology and biomechanics of locomotion**
  physiology and the biomechanics of terrestrial locomotion and the analysis of movements in sports (particularly in gymnastics and in track and field)
  (PI: Bénédicte Schepens)
- **PSY-NAPS**
  https://www.psy-naps.org/
  The group is in the Psychological Sciences Research Institute and affiliated to the Institute of Neuroscience and Louvain Bionics
  Research focus and objectives: 1.To measure, interpret and further understand the neural processes underlying perception and action behaviour
  2.To develop perception and action diagnosis measures and treatment exercises using technology (e.g., serious games, robotics, virtual reality)
  3.To investigate brain-technology interfaces
  (Head: Martin Edwards)
- **Crossmodal Perception and Plasticity (CPP-lab)**
  https://cpplab.be/
  Cognitive neuroscience of sensory deprivation
  Multisensory Integration (MSI)
  (PI: Olivier Collignon)
- **Numerical cognition Lab**
  https://uclouvain.be/fr/instituts-recherche/ipsy/numerical-cognition.html\
  Research on functional aspects of calculation and numerical processing and to find their neuroanatomical correlates:
  (1) by the study of brain-damaged patient performance, of children with mathematical disabilities, and mental chronometric studies in healthy children and adults.
  (2) by the study of cerebral activation with functional imaging techniques
  (PI: Marie-Pascale Noel)
- **Social Perception, Reasoning and Interaction Neuroscience Group (SpringLab)**
  https://www.springlab.org/
  - Research in Social and Cognitive Neuroscience Theory of Mind, Perspective Taking and Moral Cognition which we investigate with: 1) The classical neuropsychological approach; 2) Brain stimulation (tDCS); 3) Brain activity measurements (fMRI, EEG); 4) Mental chronometry; 5) Eye movement recordings;
  - Research in Clinical Neuropsychology: we look at improving the diagnosis and rehabilitation of cognitive deficits following brain damage, especially deficits of social cognition.

**Clinical Neuroscience division (NEUR)**
*https://uclouvain.be/en/research-institutes/ions/neur/*
The Clinical Neurosciences division of the IoNS is composed of nine research groups from the Cliniques Universitaires UCLouvain Saint-Luc, the CHU Dinant-Godinne UCLouvain and the CPS Louvain-la-Neuve UCL. Research conducted in the NEUR division is closely interconnected with the clinical activities and utilizes a broad repertoire of techniques. NEUR aims at understanding clinical, physiopathological, biochemical, inflammatory, cognitive and social-cognitive, emotional, brain structural and functional dimensions, and neuropharmacological aspects of various nervous/mental disorders. It mainly focusses on studies in humans, but these are also sometimes complemented by preclinical studies.
Neurological diseases: stroke (acute management, brain plasticity, non-invasive brain stimulation for therapeutic purpose), inflammatory diseases (in relation with the CSF analysis), neuromuscular disorders, Parkinson's disease (deep brain stimulation), Alzheimer's disease (early diagnosis by cognitive evaluation and biomarkers), refractory epilepsy, chronic pain, childhood neurometabolic disorders)

- Neuro-otology (cochlear implant induced plasticity, tinnitus) and the chemosensitive platform (neurophysiology, imaging, psychophysics)
- Neurosurgical aspects in neurooncology , neurovascular disorders, epilepsy surgery (including invasive EEG)
- Eye movement, oculomotor as well as neurosensory disorders
- Emotional, visual and musical recognition, cognitive, biological aspects in various psychiatric disorders: schizophrenia, bipolar disorder, alcohol dependency, anxious disorders, depression, eating disorders, gambling.
- The neuroimaging group occupies a central position to many research projects including: brain perfusion imaging, preoperatory MRI in neuro-oncology, functional MRI, thermography, cerebral pathophysiology of stroke, etc.

**Neurology Department** (Saint-Luc Hospital)
*https://uclouvain.be/en/research-institutes/ions/neur/neurology-department-saint-luc-hospital.html*
The members of the Neurology Dept. are working both as clinicians in the University hospital and as research clinicians in the IoNS Institute. Areas of specialty include (amongst others):
Neuromuscular Reference Center (Head: Prof. Van den Bergh), the Neuropsychology Center (Head: Prof. Ivanoiu), the clinical neuro-linguistics (Head: Prof. de Partz) and Epilepsy reference Center (Dr. Santos & Dr. El Tahry).
Head: Jean-Marie Maloteaux

**Neurosurgery**
*http://www.saintluc.be/services/medicaux/neurochirurgie/index.php*
*https://uclouvain.be/en/research-institutes/ions/neur/neurosurgery.html*
Research focus: new modalities of diagnosis and surgical treatment of neurological diseases: vascular, refractory epilepsy, oncology, pituitary surgery and spine.
Head: Christian Raftopoulos

**Neuro-Imaging**
*https://uclouvain.be/en/research-institutes/ions/neur/neuro-imaging.html*
*www.rdgn.ucl.ac.be*
The Radiodiagnostic Unit (IMAG ) aims at participating to the technological run-up in Magnetic Resonance Imaging (MRI) and computing methods to advance the medical research and improve the practice in Radiology. Research aims: to develop new methods in signal processing to better highlight the anatomy or physiology of SNC and to study a disease or a specific brain function by using the techniques we master (the domain of expertise also includes the head and neck sphere). PI's: Thierry Duprez, Nicolas Michoux, Frank Peeters.

**Pediatric Neurology**
*https://uclouvain.be/en/research-institutes/ions/neur/pediatric-neurology.html*
*https://www.saintluc.be/services/medicaux/neuropediatrie/index.php*
Research:

- Study the impact of injuries on the child's cognitive development: C Bonnier;
- Molecular mechanisms of mental retardation of unknown aetiology: MC Nassogne, MF Vincent, E Van Schaftingen, E Wiame, M Vikkula;
- Effects of early sensory development and synaptic activity of the human brain: neuroanatomical study and functional brain plasticity: AG De Volder;
- Recording of eye movements (close collaboration with D. Yüksel, P. Lefevre, NEFY and CESAME).
  PI's: Marie-Cécile Nassogne, Florence Christiaens, Bouchra El M'Kaddem.

**Neuropsychiatry**
https://uclouvain.be/en/research-institutes/ions/neur/neuropsychiatry.html
Main research interest: brain correlates of alcohol-related problems by means of a multidisciplinary approach combining neuropsychological, electrophysiological neuroimaging and biological tools. Two themes:
- Social cognition – social and psychiatric disorders: schizophrenia, unipolar depression, bipolar disorder, and among deaf people with cochlear implants (PI's: Eric Constant, Pierre Cole);
- Alcoholism and Psychology of Health and Emotions (PI: Philippe de Timary).

**Neurophysiology of visual system development**
https://uclouvain.be/en/research-institutes/ions/neur/ophtalmology.html
The research group aims at studying the neurophysiological basis of the visual system development, with a focus on amblyopia and strabismus.
PI: Demet Yüksel

**Oto-rhino-laryngology**
https://uclouvain.be/en/research-institutes/ions/neur/oto-rhino-laryngologie.html
Research focus:
- Development of implantable hearing devices;
- Rehabilitation of patients with cochlear implants and tinnitus;
- Study of the vestibular functioning in children with developmental delays; Chemosensory function (taste, smell and trigeminal functions).

Main Investigators: Philippe Rombaux, Caroline de Toeuf, Monique Decat, Naima Deggouj, Gauthier Desuter, Cloé Hupin, Caroline Huart.

**Neurology Dept CHU UCLouvain Dinant Godinne**
https://uclouvain.be/en/research-institutes/ions/neur/neurology-department-chu-ucl-dinant-godinne.html
The Neurology Department of the CHU UCLouvain Mont-Godinne hosts several research programs, either as internal projects or has collaborative projects with other Departments / Institutes. The clinical and neuroscience research aspects are integrated within the Neuro-Vascular Unit (Stroke Unit: P. Laloux & Y. Vandermeeren), the Epileptology Unit (M. Ossemann), the Multiple Sclerosis Unit (P. Laloux, S.Dorban & M. Ossemann) and the Memory Clinic (E. Mormont & L. Robaye. Head: Patrice Laloux. Focus:
- Neuro-vascular pathology (acute stroke treatment, stroke prevention);
- Epilepsy;
- Cognitive disorders and dementia;
- Hemineglect and recovery of motor disability in physiotherapy after stroke;
- Multiple Sclerosis;
- Plasticity after stroke: study with fMRI and therapeutic modulation with non-invasive brain stimulation.

**Physical Medicine and Rehabilitation service**
https://uclouvain.be/en/research-institutes/ions/neur/physical-medicine-and-rehabilitation-service.html
Spasticity - patients with upper motor neuron lesion such as stroke, traumatic brain injury; spinal cord lesion and multiple sclerosis. Research aim: interdisciplinary approach of the spasticity treatment by means of practical guidelines.
PI's: Philippe Hanson, Thierry Deltombe.

**Chronic Pain and bio-psycho-social approach in rehabilitation**
https://uclouvain.be/en/research-institutes/ions/neur/chronic-pain-and-bio-psycho-social-approach-in-rehabilitation.html
Research focus: Development of new psycho-physical assessment and therapeutics aspects of patients with neuropathic pain, chronic regional pain syndrom (crps) and chronic widespread pain with a bio-psycho-social lecture.
PI's : Etienne Masquelier, Anne Berquin, Valérie-Anne De Wilde.

## UNIVERSITÉ DE LILLE


**Faculty of Sciences and Technologies (FST) and Faculty of Medicine (FM)**

***Research groups***

**U1172 Inserm / LilNCog** (Lille Neuroscience & Cognition)
http://lilncog.eu/en/lille-neuroscience-and-cognition/|
Director of the Jean-Pierre Aubert research centre : Luc Buée.

**Degenerative and vascular cognitive disorders**
http://lilncog.eu/en/team-degenerative-and-vascular-cognitive-discorders/
Research focus: Cognitive decline: AD, neurovascular and other neurodegenerative disorders

- A new organizational model for the management of cognitive disorders freed from current nosographic frameworks by identifying common pathophysiological processes;
- Use of biomarkers and algorthims for better nosographic typology and optimization of pharmacological development;
- A reflection on what those cognitive disorders represent at the individual and social level.

Head: Régis Bordet.

**Alzheimer & Tauopathies**
*http://lilncog.eu/en/team-alzheimer-and-tauopathies/*
Research focus:

- MAPT regulation: epigenomics, transcriptional and post-transcriptional;
- New insights on Tau functions;
- Modulating Tau pathology;
- Translational research: diagnostic and therapeutic applications

Head: Luc Buée.

**Plasticity and SubjectivitY – PSY**
*http://lilncog.eu/en/team-psy/*
Research aim: to determine the impaired mechanisms involved in subjective and intersubjective experiences in psychiatric addictions conditions and more generally along a continuum from normal to pathology (pathophysiology of hallucinations, familiarity disorders, post-traumatic flashbacks, affective and cognitive biases etc.) Methods used (amongst others): EEG/MRI and computational modeling.
PI's: Renaud Jardri, Delphine Pins, Pierre Thomas, Guillaume Vaiva, Olivier Cottencin, Ali Amad, Fabien D'Hondt.

**Brain Biology and Chemistry**
*http://lilncog.eu/en/team-brain-biology-and-chemistry/*
Research focus: Drug discovery process from fundamental biology to the discovery of drug candidates.
Head: Patricia Melnyk.

**Development and Plasticity of the Neuroendocrine Brain**
*http://lilncog.eu/en/team-development-and-plasticity-of-the-neuroendocrine-brain/*
Research focus: how chemotropic factors and peripheral hormones (estrogen, leptin, AMH…) impact hypothalamic development and function, as well as the importance of non-neuronal cells (tanycytes, astrocytes and endothelial cells) in this dialogue between the periphery and the central nervous system and how pathological conditions (obesity, diabetes etc.) affect these neurobiological events.
Lead: Vincent Prévot.

**Neuroinflammation and multiple sclerosis (NEMESIS team)**
*http://lilncog.eu/equipe-emergente-nemesis-neuroinflammation-multiple-sclerosis/*
Field of research: inflammatory diseases of the CNS, clinical trials, biomarkers, fundamental research
Head: Lennart Mars.

**U1192 Inserm PRISM: Proteomics, Inflammatory Response, Mass Spectrometry**
*https://laboratoire-prism.fr/*
Director: Michel Salzet.

PRISM is based on state-of-the art molecular imaging and multi-OMICs technologies to give deep analyses for clinics biomarkers diagnosis and prognosis hunting. The mission of PRISM is to better understand the physiopathology in oncology and neurology and discover new mechanisms to treat them

- Basic and clinical mechanisms in neuroinflammatory balance;
- Molecular imaging of brain and spinal cord;
- Molecular diagnosis and classification of brain tumors.

**U8576 CNRS UGSF: Structural and Functional Glycobiology Unit**
*http://ugsf-umr-glycobiologie.univ-lille1.fr/Members-Contacts-235*
Head: S. Maccari, PI: S. Morley-Fletcher.

- Glycobiology of stress-related disorders

**U9193 CNRS SCALAB: Cognitive & Affective Sciences**
*https://www.scalab.cnrs.fr/index.php/en/*
Director: Yann Coello

- Action, Vision and Learning. This team is involved in the study of visual perception, the relations between perception and action and behavioral changes induced by the modification of visual inputs. Applications are developed in the domains of virtual reality, interactive robotics and pathologies related to vision (AMD, glaucoma, Alzheimer disease).
  Coordinators : Yvonne Delevoye & Muriel Boucart;
- Emotional Dynamics and Pathologies;
- Language.

**U 1167 Inserm RID-AGE: Risk factors and molecular determinants of age-related diseases**
*https://www.pasteur-lille.fr/5/research/units/public-health-and-molecular-epidemiology-of-age-related-diseases/*
This unit studies cardiovascular diseases and neuro-degenerative diseases with an emphasis on cardiac arrests, strokes, and Alzheimer disease.

- Neurodegenerative disease molecular determinants (Lead: Jean-Charles Lambert)

**UREPSSS:**
*http://urepsss.com/*

- Adaptations and dysfunctions of the neuromuscular function (Lead: Marie-Hélène Canu)

## UNIVERSITY OF LUXEMBOURG

LCSB - Luxembourg Centre for Systems Biomedicine

***Research groups (a selection of the 16 research groups):***

**Bioinformatics Core** (R. Schneider Group)
*https://wwwen.uni.lu/lcsb/research/bioinformatics_core*
Has a central role in the LCSB, as it enables the researchers to efficiently manage, analyse and interpret their data. The group ensures the efficient data flow within and between experimental, theoretical-computational and medical-oriented groups.

- Improving knowledge management and data sustainability;
- Organising Knowledge about Neurodegenerative Disease Mechanisms for the Improvement of Drug Development and Therapy (AETIONOMY);
- Data integration across disease and disciplines;
- Text and data mining;
- Genomic Analysis.

**Biomedical Data Science** (Glaab Group)
*https://wwwen.uni.lu/lcsb/research/biomedical_data_science*
The Biomedical Data Science group works on the development and application of software tools to identify diagnostic biomarker signatures, investigate pathway and network activity alterations in omics data for drug target prioritisation, and screen drug-like molecules for selected targets.

- Gender differences in neurodegenerative diseases (GenderND project);
- Mitochondrial endophenotypes of Parkinson's disease (MitoPD project);
- Multi-dimensional stratification of Parkinson's disease patients for personalized interventions (PDStrat project);
- Comparing alterations in neuroprotective and neurotrophic genes in age-related diseases (NeuroProDB project).

**Computational Biology** (Del Sol Group)
*https://wwwen.uni.lu/lcsb/research/computational_biology*
The main goal of the Computational Biology Group is to understand how molecular networks (e.g. gene regulatory, protein-protein interactions and signalling networks) mediate cellular processes involved in cellular differentiation and reprogramming.

- Network-based approach to design new strategies for cellular reprogramming: Clinical Applications;
- Development of computational strategies for efficient cell conversions based on single cell RNA-sequencing;
- Computational approach to directing cellular reprogramming into multiple cell types;
- Integrative gene regulatory network reconstruction for reverting the pathologic phenotype of Alzheimer's Disease.

**Developmental & Cellular Biology** (Schwamborn Group)
*https://wwwen.uni.lu/lcsb/research/developmental_and_cellular_biology*
Research aim: to understand, model and treat PD; particularly in the developmental processes that contributes to the susceptibility to suffer from PD. Human stem cells, either neural stem cells or pluripotent stem cells, are in the centre of all of our research approaches. We use these cells to generate advanced in vitro disease models, including three-dimensional brain organoids (so called “mini-brains”). Concerning the molecular processes we are particularly interested in linking the molecular function of PD-associated proteins with cell cycle progression, protein aggregation and mitochondrial / lysosomal function. Additionally to PD, we are also working on Battens disease / Neuronal Ceroid-Lipofuscinosis (NCL), which is a childhood neurodegenerative disease.

**Gene Expression & Metabolism** (Williams Group)
*https://wwwen.uni.lu/lcsb/research/gene_expression_metabolism*
Research focus on how variation in populations’ genetic profiles and their differing environments leads to diverging incidence and severity of metabolic diseases. Multi-omics approach to analyze tissue samples collected from diverse ageing mammalian populations across their lifespans to observe how gene expression connects to metabolic activity and the development of (or resistance to) disease states. That is: how do DNA sequence variants impact mRNA transcription, protein translation, and how do their interactions all causally lead to a gradual spectrum of disease phenotypes? This approach has two main goals. The first goal is to understand the aetiology of complex metabolic diseases: to identify earlier biomarkers, risk factors, protective factors, and potential treatment pathways. The second goal is to model the fundamental relationships between DNA, RNA, and protein and to understand how and when these measurements may be used as a proxy for cellular activity, and to what extent each “layer” of cell metabolism reveals unique information

**Integrative Cell Signalling** (Skupin Group)
*https://wwwen.uni.lu/lcsb/research/integrative_cell_signalling*
The general approach is to combine state-of-the-art imaging and single cell techniques with mechanistic modelling and bioinformatics analyses to investigate how the emergent behaviour of cells, organs and organisms originates from molecular entities. To understand the underlying cell signalling mechanisms, we focus on live cell imaging and multi-scale simulations with consideration of (epi)genetic constrains. Our major interests are signalling pathways related to Parkinson’s disease (PD) with a particular focus on mitochondrial dysfunction and dynamic coupling between energy metabolism and cell signalling such as Ca2+ dynamics. Therefore, we use diverse cell lines and phenotyping assays including sophisticated image analysis and information theory based methods to reveal the dynamic consequences of disease-related perturbations at single cell resolution.

- Dissecting cellular heterogeneity dynamics;
- Brain energy metabolism in neurodegeneration;
- Mitochondrial dynamics;
- Identifying genetic interactions;
- The role of intercellular interaction in neurodegeneration.

**Interventional Neuroscience** (Hertel Group)
*https://wwwen.uni.lu/lcsb/research/interventional_neuroscience*
Translational research unit that transfers innovative neurosurgical methods form bench to beside and back. The main focus is on applied computational science for clinical practice in Neurosurgery. Researchers and clinicians develop methods that use artificial intelligence and machine learning algorithms as well as tools used in image-guided procedures and biomedical modelling in Neurosurgery and Systems Biomedicine.

- COVID-19 - Diagnosis tool based on artificial intelligence and medical imaging.
- Integrated neurosurgical perioperative imaging (INSITU® study);
- Deep brain stimulation planning and postoperative analysis with deep learning methods;
- Sensor-based analysis of patients with movement disorder patients and feedback steering for DBS;
- Projects in Neuromodulation for Pain;
- EPIPULSE-projects.

**Medical Translational Research** (J. Schneider Group)
*https://wwwen.uni.lu/lcsb/research/medical_translational_research*
Many chronic diseases often share common underlying mechanisms such as inflammation, disturbed signalling or polyclonal proliferation. The interplay between chronic disease mechanisms are currently underexplored. The Medical Translational Research group is interested in exploring the nature of these common mechanistic features by employing next generation sequencing (NGS) or omics methods to sample material from cell culture, mouse models and human clinical trials. Major foci of research are metabolism disorders, microbiome, cancer, inflammation and comorbidities, in addition to sequencing both familial and nonfamilial.

**Molecular & Functional Neurobiology** (Grünewald Group)
*https://wwwen.uni.lu/lcsb/research/molecular_functional_neurobiology*
The Molecular and Functional Neurobiology Group employs molecular, 'omics' and single-cell approaches to decipher the genetic and non-genetic origins of Parkinson's disease (PD).

- The role of the mitochondrial genome in idiopathic Parkinson's disease;
- Exploring the involvement of the Parkinson's disease-associated protein Parkin in mtDNA maintenance, replication and transcription;
- Patient-derived cortical neurons as a model system to study the disease mechanisms underlying Myoclonus- Dystonia;
- Markers and mechanisms of reduced penetrance in LRRK2 mutation carriers of Parkinson's Disease;
- Mitochondrial DNA as a trigger of neuroinflammation in Parkinson's disease.

**Neuropathology** (Mittelbronn Group)
*https://wwwen.uni.lu/lcsb/research/neuropathology*
The overarching goal is to translate clinico-pathological findings into cell culture- and animal-based experimental laboratory models and to validate basic research findings in patient cohorts. With this approach, we aim at deciphering the pathogenesis of neurological disorders as well as translate basic laboratory findings into diagnostic and therapeutic applications.

- Neurodegeneration: Our aim is to understand the pathological causes and processes of Parkinson's disease (PD) with the help of mouse models.

## UNIVERSITÉ DE LIÈGE


**GIGA Neurosciences**

**Laboratory of Neuroendocrinology** (Head : Julie Bakker)
*https://www.giganeuroendo.uliege.be/cms/c_4241824/en/giganeuroendo*
The neuroendocrinology laboratory consists of three different research teams studying how hormones influence the developing and adult brain and how this regulation impacts reproductive physiology and behavior from fish to humans.

**Laboratory of Developmental Neurobiology** (Head : Brigitte Malgrange)
*https://www.gigaldn.uliege.be/cms/c_4226711/en/gigaldn*
The developmental neurobiology laboratory aims at studying the molecular mechanisms regulating cell proliferation, differentiation, neuritic outgrowth and apoptosis during the development and regeneration of the inner ear and brain. Two main axes: 1/ -Differentiation, protection and regeneration of the auditory portion of the inner ear; 2/ Deciphering the role of the cell cycle machinery in neuronal death and neurogenesis.

**Laboratory of Molecular Regulation and Neurogenesis** (Head: Laurent Nguyen)
*https://www.giganeurogenesis.uliege.be/cms/c_4241430/en/giganeurogen*
The goal of the research conducted at the laboratory of Molecular Regulation and Neurogenesis is to identify fundamental mechanisms that regulate cerebral neurogenesis. The team uses distinct animal models (mouse, fly) and a combination of genetic, molecular and cellular techniques to : 1/ untangle the regulatory mechanisms of cerebral cortex neurogenesis and, 2/ to shed some light on the pathological mechanisms that affect neurogenesis in neurological disorders.

**Laboratory of Neurophysiology** (Head : Vincent Seutin)
*https://www.giganeurophy.uliege.be/cms/c_4242093/en/giganeurophy*
The main goal of the laboratory is to better understand the factors controlling the activity of brain monoaminergic neurons, with an emphasis on dopaminergic and serotoninergic neurons. Given the implication of these cell types in various CNS disorders, including Parkinson's disease, drug abuse and depression, our research may help understand some pathophysiological processes and validate new therapeutic targets.

**Laboratory of Nervous System Disorders and Therapy** (Head : Bernard Rogister)
*https://www.gigalnsdt.uliege.be/cms/c_4241625/en/gigalnsdt*
The laboratory of Nervous System Disorders and Therapy investigates how stem cell migration and invasion are controlled during the development of the nervous system and in pathological condition like in glioblastoma. In parallel, another part of this research group focuses on Multiple Sclerosis (MS), aiming at deciphering molecular mechanisms driving the differentiation of the precursors of myelinating cells from de CNS, the oligodendrocytes.

**Laboratory of Cellular and Tissular Biology** (Head : Marc Thiry)
*https://www.gigalbct.uliege.be/cms/c_4226486/en/gigalbct*
The research activity of the laboratory of Cellular and Tissular Biology concerns two organizational level of cells: morphogenesis of the auditory organ in mammals and functional organization in eukaryotic cells of the nucleus and in particular of the nucleolus. When and how is the auditory organ being put in place? What is the relationship between the structure and the functions of the nucleolus? Is the change in nucleolar structure related to evolution of species?

**GIGA-Cyclotron**
**Laboratory of Sleep and Chronobiology** (Pierre Maquet, Christina Schmidt, Gilles Vandewalle)
The main interests consist in the exploration of brain mechanisms underlying sleep-wake regulation and its impact on cognition through neuroimaging techniques. They also focus on clinical neurology issues such as multiple sclerosis and glioblastoma in humans.

**Laboratory of Aging and memory** (Eric Salmon, Fabienne Collette, Christine Bastin)
The team « Aging & Memory » in the GIGA CRC in vivo imaging Research Unit has got 3 Labs. Molecular Imaging (Head Eric Salmon) is dedicated to positron emission tomography studies of neurodegenerative diseases, with a particular interest in Alzheimer's disease and frontotemporal dementia. The Lab « Successful Aging » (Head Fabienne Collette) is dealing with executive functions, their neural and genetic correlates and their relationships with symptoms of aging. The Lab « Memory in normal and pathological aging » is testing memory models with neuropsychological designs and neuroimaging.

# ANNEX 3

## LIST OF AWARDED EURON CERTIFICATES (PERIOD 2017 – 2020)

**Marion Levy**
Maastricht University / Paris Descartes
Joint PhD Degree
*Evaluation of BDNF/TrkB signaling as a common target in the treatment of major depression and Alzheimer's disease*
Supervisors: Prof.dr. H. Steinbusch / Prof. dr. L. Lanfumey / Dr. G. Kenis / Dr. D. van den Hove
April 5, 2017

**Kay Deckers**
Maastricht University
*The role of lifestyle factors in primary prevention of dementia; an epidemiological perspective*
Supervisors: Prof.dr. F. Verhey / Dr. M. van Boxtel / Dr. S. Köhler
May 11, 2017

**Pim Heckman**
Maastricht University
*Targeting phosphodiesterase type 4 for improving cognitive frontostriatal function: a translational approach*
Supervisors: Prof.dr. J. Ramaekers / Dr. J. Prickaerts / Dr. A. Blokland
July 4, 2017

**Roy Lardenoije**
Maastricht University
*A venture into the epigenetics of aging and Alzheimers's Disease*
Supervisors: Prof.dr. B. Rutten / Prof.dr. H. Steinbusch / Dr. D. van den Hove / Dr. C.Lemere, USA
September 7, 2017

**Iris Lange**
Maastricht University
*Should I stay or should I go ? Brain mechanisms underlying fear and safety learning, and explosure therapy outcome*
Supervisors: Prof.dr. K.R.J. Schruers / Prof.dr. T.A.M.J. van Amelsfoort / Dr. L. Goossens
November 9, 2017

**Melinda Barkhuizen**
Maastricht University / North-West University, Potchefstroom, South Africa
Double PhD Degree
*Genetic and perinatal risk factors for movement disorders*
Supervisors: Prof.dr. B. Kramer (Maastricht University) / Prof.dr. Steinbusch (Maastricht University / Prof.dr. A. Grobler (North-West University, South Africa) / Dr. A. Gavilanes-Jimenez (Maastricht University)
December 4, 2017

**Stijn Michielse**
Maastricht University
*Road work ahead; cerebral pathways mediating Psychologival mechanisms underlying the psychosis spectrum*
Supervisors: Prof.dr. J. van Os / Dr. M. Marcelis
October 19, 2018

**Dmitrii Pavlov**
Maastricht University
*The contribution of CNS inflammation and Glycogen Synthase Kinase-3 (GSK-3)-cascades on adverse memory learning on mouse models of emotional stress*
Supervisors: Prof.dr. K. Lesch (University of Wurzburg) / Dr. T. Strekalova (Maastricht University / Prof.dr. L. Bettendorff (Université de Liège)
March 5, 2020

# ANNEX 4
# OVERVIEW PHD DAYS

## List of EURON partner universities that have organized the EURON PhD Days in the past:

2000: Maastricht University
2001: Katholieke Universiteit Leuven
2002: University of Cologne
2003: Université de Liège
2004: Saarland University, Homburg
2005: Université de Liège
2006: Maastricht University
2007: Université catholique de Louvain
2008: RWTH Aachen
2009: Radboud University Nijmegen
2010: Hasselt University
2011: University of Bonn
2012: Maastricht University
2013: Université de Liège
2014: Not organized
2015: Maastricht University
2016: Lille University
2017: Maastricht University
2018: Université catholique de Louvain
2019: 21th EURON PhD Days, University of Luxembourg
2020: no PhD Days

# ANNEX 5
# JOINT PAPERS

## 2017

Nelissen, Ellis ; De Vry, Jochen ; Antonides, Alexandra ; Paes, Dean ; Schepers, Melissa ; van der Staay, Franz Josef ; Prickaerts, Jos ; Vanmierlo, Tim. **Early-postnatal iron deficiency impacts plasticity in the dorsal and ventral hippocampus in piglets.** International Journal of Developmental Neuroscience (2017); 59: 47-51

Schönfeld, Lisa-Maria ; Dooley, Dearbhaile ; Jahanshahi, Ali ; Temel, Yasin ; Hendrix, Sven. **Evaluating rodent motor functions : Which tests to choose?** Neuroscience and Biobehavioral Reviews (2017); 83: 298-312

Schönfeld, Lisa-Maria ; Jahanshahi, Ali ; Lemmens, Evi ; Schipper, Sandra ; Dooley, Dearbhaile ; Joosten, Elbert ; Temel, Yasin ; Hendrix, Sven. **Long-Term Motor Deficits after Controlled Cortical Impact in Rats Can Be Detected by Fine Motor Skill Tests but Not by Automated Gait Analysis**. Journal of Neurotrauma (2017); 34, No. 2: 505-516

Schönfeld, Lisa-Maria ; Jahanshahi, Ali ; Lemmens, Evi ; Bauwens, Matthias ; Hescham, Sarah-Anna ; Schipper, Sandra ; Lagiere, Melanie ; Hendrix, Sven ; Temel, Yasin. **Motor cortex stimulation does not lead to functional recovery after experimental cortical injury in rats**. Restorative Neurology and Neuroscience (2017); 35, No. 3: 295-305

Crivelli, Simone M. ; Paulus, Andreas ; Markus, Jozef ; Bauwens, Matthias ; Berkes, Dusan ; De Vries, Helga E. ; Mulder, Monique T. ; Walter, Jochen ; Mottaghy, Felix M. ; Losen, Mario ; Martinez-Martinez, Pilar. **Synthesis, Radiosynthesis, and Preliminary in vitro and in vivo Evaluation of the Fluorinated Ceramide Trafficking Inhibitor (HPA-12) for Brain Applications**. Journal of Alzheimer's Disease (2017); 60, No. 3: 783-794

Kasanova, Zuzana ; Ceccarini, Jenny ; Frank, Michael J. ; van Amelsvoort, Therese ; Booij, Jan ; Heinzel, Alexander ; Mottaghy, Felix ; Myin-Germeys, Inez. **Striatal dopaminergic modulation of reinforcement learning predicts reward-oriented behavior in daily life**. Biological Psychology (2017); 127: 1-9

Moonen, Anja J. H. ; Wijers, Anke ; Dujardin, Kathy ; Leentjens, Albert F. G. **Neurobiological correlates of emotional processing in Parkinson's disease : A systematic review of experimental studies**. Journal of Psychosomatic Research (2017); 100: 65-76

Lopes, Renaud ; Delmaire, Christine ; Defebvre, Luc ; Moonen, Anja J. ; Duits, Annelien A. ; Hofman, Paul ; Leentjens, Albert F. G. ; Dujardin, Kathy. **Cognitive Phenotypes in Parkinson's Disease Differ in Terms of Brain-Network Organization and Connectivity.** Human Brain Mapping (2017); 38, No. 3: 1604-1621

Vignisse, Julie ; Sambon, Margaux ; Gorlova, Anna ; Pavlov, Dmitrii ; Caron, Nicolas ; Malgrange, Brigitte ; Shevtsova, Elena ; Svistunov, Andrey ; Anthony, Daniel C. ; Markova, Natalyia ; Bazhenova, Natalyia ; Coumans, Bernard ; Lakaye, Bernard ; Wins, Pierre ; Strekalova, Tatyana ; Bettendorff, Lucien. **Thiamine and benfotiamine prevent stress-induced suppression of hippocampal neurogenesis in mice exposed to predation without affecting brain thiamine diphosphate levels.** Molecular and Cellular Neuroscience (2017); 82: 126-136

Markova, Nataliia ; Bazhenova, Nataliia ; Anthony, Daniel C. ; Vignisse, Julie ; Svistunov, Andrey ; Lesch, Klaus-Peter ; Bettendorff, Lucien ; Strekalova, Tatyana. **Thiamine and benfotiamine improve cognition and ameliorate GSK-3β-associated stress-induced behaviours in mice**. Progress in Neuro-Psychopharmacology & Biological Psychiatry (2017); 75: 148-156

## 2018

Montes Diaz G., Fraussen J., Van Wijmeersch B., Hupperts R. and Somers V. **Dimethyl fumarate induces a persistent change in the composition of the innate and adaptive immune system in multiple sclerosis patients**. Scientific reports (2018); 8(1): 8194

Montes Diaz G., Hupperts R., Fraussen J.*, Somers V.* * Equally contributing authors. **Dimethyl fumarate treatment in multiple sclerosis: recent advances in clinical and immunological studies.** Autoimmunity reviews (2018); 17(12): 1240-1250

Vanmierlo T*, De Vry J*, Nelissen E, Sierksma A, Roumans N, Steinbusch H W M, Wennogle L. P., van den Hove D., and Prickaerts J. **Gestational stress in mouse dams negatively affects gestation and postpartum hippocampal BDNF and P11 protein levels.** Mol Cell Neurosci. (2018); 88: 292-299

Santiago A., Soares L., Schepers M., Milani H., Vanmierlo T., Prickaerts J., Weffort Oliveira R. **Roflumilast promotes memory recovery and attenuates white matter injury in aged rats subjected to chronic cerebral hypoperfusion.** Neuropharmacology (2018); 138: 360-370

Andrade, P., Cornips, E. M. J., Sommer, C., Daemen, M. A., Visser-Vandewalle, V., & Hoogland, G. **Elevated inflammatory cytokine expression in CSF from patients with symptomatic thoracic disc herniation correlates with increased pain scores.** The Spine Journal (2018); 18(12), 2316-2322

Smeets, A. Y. J. M., Duits, A. A., Leentjens, A. F. G., Schruers, K., van Kranen-Mastenbroek, V., Visser-Vandewalle, V., ... Ackermans, L. **Thalamic Deep Brain Stimulation for Refractory Tourette Syndrome: Clinical Evidence for Increasing Disbalance of Therapeutic Effects and Side Effects at Long-Term Follow-Up.** Neuromodulation (2018); 21(2): 197-202

van Duin, E. D. A., Kasanova, Z., Hernaus, D., Ceccarini, J., Heinzel, A., Mottaghy, F., ... van Amelsvoort, T. **Striatal dopamine release and impaired reinforcement learning in adults with 22q11.2 deletion syndrome.** European Neuropsychopharmacology (2018); 28(6): 732-742

Morelli G, Even A, Gladwyn-Ng I, Le Bail R, Shilian M, Godin JD, Peyre E, Hassan BA, Besson A, Rigo JM, Weil M, Brone B and Nguyen L. **P27(kip1) modulates axonal transport by regulating alpha-tubulin acetyltransferase 1 stability**. Cell Reports (2018); 23 (8): 2429-2442

## 2019

Schepers M., Tiane A., Paes D., Sanchez S., Rombaut B., Piccart E., Rutten B.P.F., Brône B., Hellings N., Prickaerts J., Vanmierlo T. **Targeting phosphodiesterases – towards a tailor-made approach in multiple sclerosis treatment.** Front Immunol. (2019); 24, 10: 1727

Tiane A., Schepers M., Rombaut B., Hupperts R., Prickaerts J., Hellings N., van den Hove D., Vanmierlo T. **From OPC to oligodendrocyte – an epigenetic journey**. Cells (2019); 11;8(10)

Blokland A., Heckman P., Vanmierlo T., Schreiber R., Paes D., Prickaerts J**. Phosphodiesterase type 4 inhibition in CNS diseases.** Trends Pharmacol Sci. (2019); 40(12): 971-985.

Foulquier S, Caolo V, Swennen G, Milanova I, Reinhold S, Recarti C, Alenina N, Bader M, Steckelings UM, Vanmierlo T, Post MJ, Jones EA, *van Oostenbrugge RJ, *Unger T. **The role of receptor MAS in microglia driven retinal vascular development**. Angiogenesis (2019); Jun 20

Bogie J.*, Hoeks C.*, Schepers M, Tiane A., Cuypers A., Leijten F., Chintapakorn Y, Suttiyut T, Pornpakakul S., Struik D., Kerksiek A., Liu H.B., Hellings N., Martinez-Martinez P., Jonker J.W., Dewachter I., Sijbrands E., Walter J., Hendriks J., Groen A.K., Staels B. , Lütjohann D., Mulder M.* & Vanmierlo T.* **Dietary Sargassum fusiforme improves memory and reduces amyloid plaque load in an Alzheimer's disease mouse model**. Sci Rep. (2019); 20;9(1):4908

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Koulousakis, P., Andrade, P., Visser-Vandewalle, V., & Sesia, T. **The Nucleus Basalis of Meynert and Its Role in Deep Brain Stimulation for Cognitive Disorders: A Historical Perspective.** Journal of Alzheimer's Disease (2019); 69(4): 905-919

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Even A, Morelli G, Broix L, Scaramuzzino C, Turchetto S, Gladwyn-Ng I, Le Bail R, Shilian M, Freeman S, Magiera MM, Jijumon AS, Krusy N, Malgrange B, Brone B, Dietrich P, Dragatsis I, Janke C, Saudou F, Weil M and Nguyen L. **ATAT1-enriched vesicles promote microtubule acetylation via axonal transport** Sci Adv. (2019); 5 (12): eaax2705

## 2020

Roggeri A, Schepers M, Tiane A, Rombaut B, van Veggel L, Hellings N, Prickaerts J, Pittaluga A, Vanmierlo T. **Sphingosine-1-Phosphate Receptor Modulators and Oligodendroglial Cells: Beyond Immunomodulation.** Int J Mol Sci. (2020); 13;21(20):7537

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Koulousakis, Philippos; van den Hove, Daniel; Visser-Vandewalle, Veerle; Sesia, Thibaut. **Cognitive Improvements After Intermittent Deep Brain Stimulation of the Nucleus Basalis of Meynert in a Transgenic Rat Model for Alzheimer's Disease : A Preliminary Approach.** Journal of Alzheimer's Disease, (2020); 73, No. 2: 461-466

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Simone M Crivelli, Daan van Kruining, Qian Luo, Jo A A Stevens, Caterina Giovagnoni, Andreas Paulus, Matthias Bauwens, Dusan Berkes, Helga E de Vries, Monique T Mulder, Jochen Walter, Etienne Waelkens, Rita Derua, Johannes V Swinnen, Jonas Dehairs, Felix M Mottaghy, Mario Losen, Erhard Bieberich, Pilar Martinez-Martinez. **Ceramide analog [ 18 F]F-HPA-12 detects sphingolipid disbalance in the brain of Alzheimer's disease transgenic mice by functioning as a metabolic probe**. Sci Rep . (2020); 9;10(1): 19354.

Betrouni, Nacim; Lopes, Renaud; Defebvre, Luc; Leentjens, Albert F. G.; Dujardin, Kathy**. Texture features of magnetic resonance images : A marker of slight cognitive deficits in Parkinson's disease.** Movement Disorders (2020); 35, No. 3: 486-494

Wolters, Amee F.; Moonen, Anja J. H.; Lopes, Renaud; Leentjens, Albert F. G.; Duits, Annelien A.; Defebvre, Luc; Delmaire, Christine; Hofman, Paul A.; van Bussel, Frank C.; Dujardin, Kathy. **Grey matter abnormalities are associated only with severe cognitive decline in early stages of Parkinson's disease.** Cortex (2020); 123: 1-11

Guillaume Carey, Renaud Lopes, Romain Viard, Nacim Betrouni, Gregory Kuchcinski, Quentin Devignes, Luc Defebvre, Albert F.G. Leentjens, Kathy Dujardin. **Anxiety in Parkinson's disease is associated with changes in the brain fear circuit.** Parkinsonism & Related Disorders (2020); 80: 89-97

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# ANNEX 6
## AWARDED MOBILITY GRANTS

**An Ning**
Maastricht University (home) - RWTH Aachen University (host)
*Investigation of the neurobiology of susceptibility to traumatic stress and the role of different serotonergic projections in the mouse brain using optogenetic techniques*
Dec. 2018 - June 2019

**Muhammad Ali**
University of Luxembourg (home) – Maastricht University (host)
*The development of network-based approaches for modelling human diseases*
Dec. 2018 - June 2019

**Dimitrii Pavlov**
Maastricht University (home) – Université de Liège (host)
*Behavioural, molecular and biochemical changes during neuropsychiatric conditions associated with stress and neurodegeneration*
Dec. 2018 - June 2019

**Assia Tiane**
Hasselt University (home) – Maastricht University (host)
*Unravel which genes are differentially methylated in lesions of progressive MS patients and whether this signature is mirrored in their blood samples to be applied as a biomarker for impaired remyelination.*
Dec. 2018 - June 2019

**Renzo Riemens**
Maastricht University (home) - Hasselt University (host)
*To conduct additional experiments at the level of both pyrosequencing and epigenetic editing*.
Dec. 2018 - June 2019

**Philippos Koulousakis**
University of Cologne (home) – Maastricht University (host)
*Investigates Deep Brain Stimulation of the NBM and its' potential role in treating dementia, specifically AD.*

**Melissa Schepers**
Hasselt University (home) - University of Luxembourg (host)
*Identify phosphodiesterase (PDE) 4D isoforms that need to be targeted to promote repair in progressive multiple sclerosis.*
June 2019 - Dec. 2019

**Guillaume Carey**
University of Lille (home) - Maastricht University (host)
*Anatomo-functional basis of anxiety disorders in Parkinson's disease.*
June 2019 - Dec. 2019

**Chris Choe**
Maastricht University (home) – Hasselt University (host)
*Research on the tryptophan-kynurenine pathway in the BioBank Alzheimer Center Limburg (BB-ACL) longitudinal cohort study (n=850+).*
Dec. 2019 - June 2020

**Assia Tiane**
Hasselt University (home) – University of Luxembourg (host)
*Isolate methylation patterns related or? poor remyelination capacity cells from the post mortem tissues, using laser captured microdissection (LCM), and perform targeted DNA methylation analysis.*
Dec. 2019 - June 2020

**Aleksandra Lecei**
KU Leuven (home) – Maastricht University (host)
*To learn about the different neuroimaging techniques and softwares.*
Dec. 2019 - June 2020

**Sylvana Pol**
Maastricht University (home) – KU Leuven (host)
*Set up a new technique and a collaboration with the Experimental Oto-rhino-laryngology group.*
Dec. 2019 - June 2020

**Daan van Kruining**
Maastricht University (home) – Université de Liège and KU Leuven (hosts)
*Practical experience with different lipid investigation methods: hands-on imaging MS and LC-MS of brain samples.*
Dec. 2020 – June 2021

# ANNEX 7
## An OVERVIEW OF THE WORKSHOP DRUGS AND THE BRAIN

**2002: EURON Workshop "Psychoimmunology, Psychoendocrinology & Psychopharmacology"** November 28-29, 2002, Maastricht University; Veneu: Rolduc Conference Center, Kerkrade, NL
**Organizers:** Brian Leonard (Galway, Ireland; visiting professor UM and founder of the workshop Drugs and the Brain), Harry Steinbusch, Nicole Senden.
**Speakers from EURON**: Julie Bakker (ULg), Lucien Bettendorff (ULg), Nancy Nicolson (UM), Michael Maas (UM), Arjan Blokland (UM), Brian Leonard; *Invited speakers*: Stephan Claes (Antwerp, Belgium), Herman Westenberg (Utrecht, NL), Ben Westerink (Groningen, NL).
**Topics:** The impact of stress on the immune and endocrine systems in animal and man; Pharmacological treatment strategies for modulating the impact of stress.

**2003: EURON course "Psychopharmacology: from laboratory to clinic"**
November 20-21, 2003, Maastricht University
**Organizers:** Brian Leonard, Harry Steinbusch, Wim Riedel, Nicole Senden.
*Invited speakers*: Hans den Boer (Groningen, NL), Trevor Robbins (Cambridge, UK), Bill Deakin (Manchester, UK).
**Topics:** Human models in disease understanding and drug discovery; Depression – from neurotransmitters to symptoms; From neuroimaging to molecular biology; Glutamate and the pathogenesis and treatment of schizophrenia; Chemical modulation of fronto-executive function: neuropsychiatric implications.

**2005**: **EURON course "Psychopharmacology: from bench to bed"**
April 7-8, 2005, Maastricht University; Venue: Rolduc Conference Center, Kerkrade, NL
**Organizers:** Brian Leonard, Wim Riedel, Harry Steinbusch, Nicole Senden
**Speakers from EURON:** Koen Schruers (UM), Eric Griez (UM), Jos Prickaerts (UM), Jan Ramaekers (UM), Brian Leonard, Wim Riedel, Christoph Schmitz (Aachen); *Invited speakers*: Nicol Ferrier (Newcastle upon Tyne, UK), Herman Westenberg (Utrecht, NL).
**Topics:** Psychobiology of major psychiatric disorders; Recent research on the neurobiology and treatment of bipolar disorders; Serotonergic modulation of experimental panic; Depression as a neurodegenerative disorder; Animal models of anxiety and depression; Models and measures of cognition in human psychopharmacology; Cognitive dysfunction in drug users; Psychobiology of Alzheimer Disease.

**2006**: **EURON course "Psychopharmacology: from laboratory to clinic"**
May 23-24, 2006, Maastricht University (in the framework of the Research Master program of the Master Cognitive and Clinical Neuroscience, Faculty of Psychology and Neuroscience, UM).
**Organizers:** Wim Riedel, Brian Leonard, Harry Steinbusch, Nicole Senden.
**Speakers from EURON:** UM: Wim Riedel, Jos Prickaerts, Jim van Os, Koen Schruers, Jan Ramaekers, Brian Leonard.
**Topics:** Human psychopharmacology, Models and measures; Animal models of anxiety and depression; Depression as a neurodegenerative disorder; Serotonergic modulation of experimental panic; Schizophrenia, Cognition, Antipsychotics; Cognitive dysfunction in drug users.

**2007**: **EURON workshop "Drug treatment of Psychiatric and Neurological disorders"**
November 26-29, 2007, Maastricht University; Venue: Bad Honnef, Germany
**Organizers:** Brian Leonard, Harry Steinbusch, Nicole Senden, Anja de Bruin.
**Speakers from EURON:** Jos Prickaerts (UM), Brian Leonard*; Invited speakers*: Ben Westerink (Groningen, NL), Bill Deakin, (Manchester, UK), John Waddington (Dublin, Ireland), Herman Westenberg (Utrecht, NL), Thomas Arendt (Leipzig, Germany), Thomas Steckler (Beerse, Belgium), Charles Marsden (Nottingham, UK), Lucianne Groenink (Utrecht, NL), Norbert Müller (München, Germany), Laurence Lanfumey (Paris, France).
**Topics:** Basic mechanisms of how do psychotropic drugs work; Receptors, ion channels, enzymes of importance

in psychopharmacology; problems and pitfalls in modeling psychiatric and neurological disorders; difficulties in translational research: extrapolating from animals to man and from man to animals; The application of psychotropic drugs to psychiatric and neurological disorders (psychopathology, mechanism of action of drugs, their limitations and possible developments): psychotic, bipolar, affective and anxiety disorders, dementia with emphasis on Alzheimer's Disease and Parkinson's disease; Cannabis and the possible links with mental disease and cognitive impairments; The hypothalamic-pituitary adrenal axis, stress and vulnerability to psychiatric illness; Disrupted Brain-Immune interactions as a cause of physical and mental illness; Mechanisms of neuroregeneration and neurodegeneration of possible relevance in psychiatric and neurological disorders.

**2009: EURON Workshop "Drugs and the Brain: an update in Psychopharmacology"**
February 9-13, 2009, Maastricht University in collaboration with the University of Minho, Braga, Portugal; Venue: University of Minho
**Organizers:** Brian Leonard, Harry Steinbusch, Joana Palha, Nuno Sousa, Nicole Senden, Anja de Bruin **Speakers from EURON:** Jos Prickaerts, Brian Leonard, Harry Steinbusch; *Invited speakers*: Charles Marsden (Nottingham, UK), Bill Deakin, (Manchester, UK), Melanie Föcking (Dublin, Ireland), Herman Westenberg (Utrecht, NL), Thomas Arendt (Leipzig, Germany), Nicol Ferrier (Newcastle upon Tyne, UK), Laurence Lanfumey (Paris, France), Thomas Steckler (Beerse, Belgium), Onno Meijer (Leiden, NL), Nuno Sousa and Joana Palha.
**Topics:** Basic mechanisms of action of psychotropic drugs; Neurotransmitters, receptors, ion channels and their importance in our understanding of how psychotropic drugs act; Problems and pitfalls in modelling psychiatric and neurological disorders; Translational to-and-fro on the functions of 5HT; Application of Psychotropic drugs to psychiatric and neurological disorders (psychopathology and drug treatment): psychotic, bipolar, affective, anxiety disorders and dementia; Drug-abuse basic mechanisms and possible treatments; How are psychotropic drugs discovered and developed? The role of the pharmaceutical industry; The HPA axis, its role in stress and psychiatric disorders; Mechanisms of neurodegeneration and neuroregeneration in psychiatric and neurological disorders; Inflammation: how the periphery triggers the central nervous system; Morphological basis for inflammatory induced neurodegeneration in psychiatric diseases; Depression and neurogenesis.

**2010: EURON Workshop "Drugs and the Brain: an update in psychopharmacology"**
March 21-26, 2010, Maastricht University in collaboration with the University of Minho, Braga, Portugal; Venue: University of Minho
**Organizers:** Brian Leonard, Nuno Sousa, Joana Palha, Harry Steinbusch, Nicole Senden, Anja de Bruin
**Speakers from EURON:** Jos Prickaerts (UM), Jan Ramaekers (UM), Tatjana Strekalova (UM), Brian Leonard; *Invited speakers*: Charles Marsden (Nottingham, UK), Bill Deakin (Manchester, UK), Gavin Reynolds (Sheffield Hallam University, / Queens University Belfast, UK), Jaanus Harro (University of Tartu, Estonia), Herman Westenberg (Utrecht,The Netherlands), Ian Jones ( Cardiff University, UK), Onno Meijer (Leiden, The Netherlands), Thomas Steckler (Beerse, Belgium), Nuno Sousa, Joana Palha.
**Topics:** Basic mechanisms of action of psychotropic drugs; Neurotransmitters,receptors, ion channels and their importance in our understanding of how psychotropic drugs act; Problems and pitfalls in modelling psychiatric and neurological disorders; Behavioural toxicity of psychotropic drugs and how they are investigated; Translational to-and-fro on the functions of 5HT; Application of Psychotropic drugs to psychiatric and neurological disorders (psychopathology and drug treatment): psychotic, affective, bipolar, anxiety disorders and dementia; Pharmacology of anti-anxiety drugs and clinical applications; Mechanisms of neurodegeneration and neuroregeneration in psychiatric and neurological disorders; Drug-abuse basic mechanisms and possible treatments; The HPA axis, its role in stress and psychiatric disorders; How are psychotropic drugs discovered and developed? The role of the pharmaceutical industry; Industry versus academia : drug versus disorder; Brain diseases: what's important, environment or genes?; Inflammation: how the periphery triggers the central nervous system; Depression and neurogenesis.

**2012: EURON Workshop "Drugs and the Brain: an update in Psychopharmacology: from experimental to clinic" acknowledged as an organiser of a FENS-IBRO European Neuroscience School**

April 15-20th, 2012, Maastricht University in collaboration with the University of Minho, Braga, Portugal; Venue: University of Minho

**Organizers:** Brian Leonard, Nuno Sousa, Joanna Palha, Harry Steinbusch, Nicole Senden

**Speakers from EURON:** Jos Prickaerts (UM), Harry Steinbusch, Brian Leonard; Alexandra Sulcova (Masaryk University, Czech Republic; associated partner EURON); *Invited speakers*: Marina Bentivoglio (University of Verona, Italy), Charles Marsden (Nottingham, UK), Liesbeth Reneman (Amsterdam, NL), Bill Deakin, (Manchester, UK), Thomas Steckler (Beerse, Belgium), Gavin Reynolds (Sheffield Hallam University, / Queens University Belfast, UK), Nicol Ferrier (Newcastle upon Tyne, UK), David Baldwin (University of Southampton, UK), Anne Lingford-Hughes (Bristol University, UK), Carmen Cavada (Madrid, Spain), João Cerqueira, Nuno Sousa, Joana Palha, João Rodrigues (University of Minho, Portugal), Paul Lucassen (University of Amsterdam, NL), Carmen Sandi (Lausanne, Switserland), Onno Meijer (Leiden, NL).

**Topics:** Basic Mechanisms of action of psychotropic drugs: an overview; The neurotransmitter and receptor basis of drug discovery: new approaches and developments; Behavioural toxicity of psychotropic drugs and how they are investigated; Problems and pitfalls in modelling psychiatric and neurological disorders: with a focus on animal models of major depression; Application of Psychotropic drugs to psychiatric and neurological disorders: Affective, anxiety, bipolar disorders; Neurobiology of addiction: focus on alcohol dependence; Cannabinoids; Inflammation: how the periphery triggers the central nervous system; Introduction to behaviour rodent models; Stress and its importance in Psychopharmacology; Structural plasticity in relation to stress, depression and dementia; modulation by antidepressive drugs and exercise; Neural mechanisms translating stress effects on brain and behavior

- Stress, the HPA axis and psychiatric disease: drug targets old and new; Programming effects of prenatal exposure to glucocorticoids in adult seeking behavior; The present European legal frame of the use of animal models in research; Translational to and fro in the pathogenesis of depression; Depression and neurogenesis; Morphological basis for inflammatory induced neurodegeneration in psychiatric diseases.

**2014: EURON Workshop "New targets in Neurodegenerative diseases: emphasis on advances in Alzheimer's Disease research"**

Aug. 31 – Sept. 5, 2014, Maastricht University in collaboration with the University of Minho, Braga, Portugal; Venue: University of Minho

**Organizers**: Harry Steinbusch, Brian Leonard, Jörg Mey, Nuno Sousa, Ana João Rodrigues, Fernanda Marquez, Nicole Senden

**Speakers from EURON:** Brian Leonard, Harry Steinbusch, Jörg Mey, Jos Prickaerts; *Invited speakers:* John Cryan (Cork, Ireland), Maria L. de Ceballos (Madrid, Spain), Javier DeFelipe (Madrid, Spain), Heinz Grunze (Newcastle, UK), Tobias Hartmann (Homburg, Germany), Joe Herbert (Cambridge, UK), Elly Hol (Utrecht, The Netherlands), Gwenaël Labouebe (Lausanne, Switzerland), Laurence Lanfumey (Paris, France), Brian Leonard (Galway, Ireland), Julio Licinio (Adelaide, Australia), Fernanda Marques, Ana Joâo Rodrigues, Nuno Sousa, Gavin Reynolds (Belfast, UK), Joaquim Alves da Silva (Lisbon, Portugal), David Wilkinson (Southampton, UK).

**Topics:** Neurodegenerative diseases: from bench to bedside: introduction to the main themes of the workshop; Drugs in development for AD; Glia activation in Alzheimer mice and in Alzheimer patients – from molecules to function; Clinical perspective: metabolic aspects and treatment strategies; The link between chronic depression and dementia; Glucose regulation of motivated feeding; Metabolic disorders in depression and schizophrenia; Developments in Alzheimer Disease clinical research; Impact of environment on brain function and dysfunction; Gut-brain axis as a new target; Neuroinflammation: a novel target for psychotropic drugs; Impact of nutritional lipids on neuronal and cognitive performance in Alzheimer's disease and vascular dementia; Vitamins and neurodegenerative diseases; Neuroplasticity and neurodegeneration; Epigenetics related to depressive and degenerative disorders; Is depression a risk for Alzheimer's disease ? If so, why?; Stressed brain and neurodegeneration; Endocannabinoids in the brain, effects on neuroplasticity in AD; Looking at the future-problems and solutions?; Barriers of the brain in health and disease; Substantia nigra dopaminergic neurons and the initiation of self-paced actions; Leptin: From satiety to cognition. Summary of a 19-year longitudinal project.

**2017**: **EURON workshop "Psychopharmacology: from laboratory to clinic"**
October 7-11, 2017, Maastricht University in collaboration with the University of Crete, Heraklion, Greece (associated partner EURON)
**Organizers:** Arjan Blokland, Kyriaki Thermos, Domna Karagogeos, Jos Prickaerts, Wim Riedel, Harry Steinbusch, Nicole Senden
**Speakers from EURON:** Arjan Blokland, Harry Steinbusch, Kim Kuypers, Jos Prickaerts, Wim Riedel; *Invited speakers:* Harald Schmidt (UM), Ioannis Zaganas (Crete), George Panagis (Crete), Panagiotis Bitsios (Crete); Brian Leonard (Galway, Ireland), Martien Kas (Groningen, NL), Barbara Biemans (Roche, Basel, Switzerland), Judith Homberg (Nijmegen, NL), Tomas Palenicek (NIMH, Czech Republic), Jordi Riba (Barcelona, Spain), Massimo Bani (UCB, Brussels) and John Bothmer (Grünenthal, Germany).
**Topics:** The future of depression research: the search for a new generation of antidepressants; Neurodegeneration – Alzheimer's Disease; Treating cognition in AD; Alzheimer's disease: Are we treating patients too little too late?; mTOR in developmental disorders; Vasopressin 1a receptor antagonism as a treatment for autism; Early SSRI exposure and Neurodevelopmental Disorders; Drugs versus Deep Brain Stimulation; Drugs of abuse and reward systems; Animal models and risk factors for schizophrenia; Drugs of abuse: a therapeutical potential?; Acute and long term effects of classical drugs of reward and abuse on cognition and social behavior (e.g. alcohol, MDMA, cannabis, cocaine); Acute and long-term effects of the 'new kids on the block' (novel psycho-active substances) on physiological and behavioral parameters/receptors profile; Acute and long-term effects of psychedelics and their therapeutic potential; Drug Development in Stroke; CNS drug development: towards mechanistic predictions; Drug development in Pain; Drug Development and Neurohealth.

**2019: EURON Workshop "Drugs and the Brain: from Laboratory to Clinic"**
October 1-5, 2019 Maastricht University in collaboration with the University of Crete, Heraklion, Greece (associated partner EURON) and with the Hellenic Society for Neuroscience
**Organizers:** Arjan Blokland, Gunter Kenis, Kiriaki Thermou-Katerinopoulou; Kiki Sidiropoulou, Niki Mastrodimou, Nicole Senden, Jos Prickaerts, Damaris Kentgens.
**Speakers from EURON**: Arjan Blokland, Jos Prickaerts, Bernard Hanseeuw (UC Louvain), Tim Vanmierlo (UHasselt), Kim Kuypers (UM), Wim Riedel (UM).
*Invited speakers:* Brian Leonard (National University of Galway, Ireland), Martien Kas (Groningen University, NL), Barbara Biemans (Roche, Basel, Switzerland), Jocelien Olivier (Groningen University, NL), Dr. Tomas Palenicek (NIMH, Czech Republic); David Erritzoe (Imperial College London, UK), John Bothmer (Grünenthal GmbH, Aachen, Germany).
**Topics:** The future of depression research: the search for a new generation of antidepressants; Cognitive Aging: insights from functional and molecular neuroimaging; Do we need to eat Seaweed to prevent Alzheimer's disease?; Novel treatments for cognition in Alzheimer's Disease; mTOR in developmental disorders; Vasopressin 1a receptor antagonism as a treatment for autism; Early SSRI exposure and neurodevelopmental disorders; MDMA: neurotoxin of promising therapeutic aid? Acute and long-term effects of the 'new kids on the block' (novel psychoactive substances) on physiological and behavioral parameters/receptor profiles; Psychedelics and their potential clinical applications; Drug development in pain; CNS drug development: Alzheimer's disease.