**Neuroscience**

25th-29th November 2019

**Target group:** PhD candidates in the first half (year 1 or 2) of their PhD trajectory. Group is limited to 14 participants

**Prerequisites:** Working knowledge of English

**Location:** GIGA

**Duration of the course and workload:** 5 full days

**Coordinators:** Bakker Julie (GIGA Neurosciences), Thibaut Aurore (GIGA-Consciousness), Nikita Beliy (GIGA- CRC in vivo imaging)

**Educators**

Bahri Mohamed Ali - GIGA-CRC In vivo Imaging; Bakker Julie - GIGA Neurosciences; Bastin Christine – GIGA-CRC in vivo imaging; Becker Guillaume – GIGA-CRC in vivo imaging, Bettendorff Lucien – GIGA Neurosciences, Collette Fabienne – GIGA-CRC in vivo imaging, Cornil Charlotte - GIGA Neurosciences, Delacroix Laurence – GIGA Neurosciences; Demertzi Athena - GIGA Consciousness; Depierreux Frederique - GIGA-CRC in vivo imaging; Engel Dominique – GIGA Neurosciences; Garraux Gaëtan – GIGA-CRC in vivo imaging; Leprince Pierre – GIGA Neurosciences; Malgrange Brigitte – GIGA Stem cells; Nguyen Laurent – GIGA Stem cells; Plenevaux Alain - GIGA-CRC in vivo imaging; Raimondo Federico - GIGA-Consciousness; Schmidt Christina - GIGA-CRC in vivo imaging; Thibaut Aurore - GIGA-Consciousness; Vandenbosch Renaud - GIGA Neurosciences; Vandewalle Gilles – GIGA-CRC in vivo imaging

**Course program**

**Day 1. 25th November: The normal brain, from development to adult**

Location: GRANDE SALLE GHUYSEN, B34, +5

**08:30 – 09:30** Neuron organization and function (Gilles Vandewalle)

**09:30 – 10:30** Brain development: focus on the cortex  (Laurent Nguyen)

**10:30 – 11:00** Break

**11:00 – 12:00** Glial cells (Pierre Leprince)

**12:00 – 13:00** The Peripheral Nervous System (Brigitte Malgrange)

**13:00 - 14:30** Lunch break

**14:30 – 17:30** Workshops – Two groups of students would take turn between two workshops:

Visit and demonstration at the GIGA imaging platform: Light-sheet microscopy, confocal microscopy and time-lapse (Brigitte Malgrange, Laurence Delacroix, Renaud Vandenbosch)

How to plan and conduct animal behavior analysis? Visits of facilities, illustration of behavior test using movies, practical’s about experimental design (Charlotte Cornil, Julie Bakker)

**Day 2. 26th November: Chemical actors in the brain**

Location: GIGA Neuroscience meeting room, B36, +1

**08:30 – 09:30** How do hormones modulate brain and behavior? (Charlotte Cornil)

**09:30 – 10:30** Sexual differentiation of the human brain (Julie Bakker)

**10:30 – 11:00** Break

**11:00 – 12:00** Voltage-gated ion channels activated during sodium action potentials (Dominique Engel)

**12:00 – 13:00** Structure and function of voltage-gated cation channels (Lucien Bettendorff)

**13:00- 14:30** Lunch break

**14:30 – 17:30** Workshops -  Preclinical and clinical electrophysiology. Two groups of students will take turn between 2 workshops :

* Pre-clinical studies  - Electrophysiology unit at the GIGA Neurosciences (Dominique Engel) - GIGA Neuroscience meeting room, B36, +1
* Clinical studies - Visit of the neurophysiology unit at the GIGA Consciousness (Federico Raimondo, Jitka Annen) - GIGA Consciousness, B34, +5

**Day 3. 27th November: Cognitive Neurosciences**

Location GIGA CRC in vivo imaging, B30, big meeting room

**08:30 -- 09:30** Multivariate pattern analysis in neuroimaging and their contribution to cognitive neuroscience (Steve Majerus)

**09:30 -- 10:30** Fluorine-18 labeling for PET applications (Sylvestre Dammicco)

**10:30- 11:00** Break

**11:00 – 13:00** Cognition, Alzheimer’s disease, animal models (Fabienne Collette)

**12:30 – 14:00** Lunch break

**14:00 – 18:00** Workshops - Clinical brain imaging. The group is divided in two subgroups – they rotate for the first two hours and then all together for the last hour (Christine Bastin, Gaetan Garraux, Maxime Van Egroo)

MRI, PET-Scan: CRC visit

* IRM demonstration and data analyse (1h)
* TMS and EEG demonstration (1h)
* PET visit and discussion of the paper (1h)

**Day 4. 28th November.: Sleep, Memory & Consciousness + Preclinical Imaging**

Location: GIGA CRC in vivo imaging, B30, big meeting room

**8:30 – 10:30** Consciousness and memory (Christine Bastin)

 Sleep & Memory (molecular and cellular aspects, sleep cycles, sleep troubles, dreams (Gilles Vandewalle et Christina Schmidt)

**10:30- 11:00** Break

**11:00 – 13:00** Clinical situations with conscious modifications: trauma, anesthesia, hypnosis

* Neural correlates of consciousness (Aurore Thibaut)
* Therapeutic interventions in brain injured patients (Aurore Thibaut)
* Detecting consciousness beyond the brain (Federico Raimondo)
* Hypnosis (Athena Demertzi)

**13:00 – 14:30:** Lunch break

**14:30 – 15:00** In vivo models (Alain Plenevaux)

15:00-17:00: Workshops  - Preclinical Brain Imaging (Alain Plenevaux, Mohamed Ali Bahri)

* Lab visit
* Image manipulation on computers
* Q&A

**Day 5: 29th November. Stem Cells & Global Presentation of the different Neurosciences-URT GIGA.** Location: GRANDE SALLE GHUYSEN, B34, +5

**08:30- 10:00** Stem cells (Brigitte Malgrange, Laurence Delacroix, Renaud Vandenbosch)

**10:00- 10:30** Break

**10:30 – 12:00** Analysis of a seminal paper in the field (Brigitte Malgrange, Laurence Delacroix, Renaud Vandenbosch)

**12:00 – 12:30** Visit of the iPS platform

**12:30 – 14:00** Lunch break

**14:00 – 14:30**Neuroscience UTR’s PhD students presentations: “my thesis in 180 seconds”