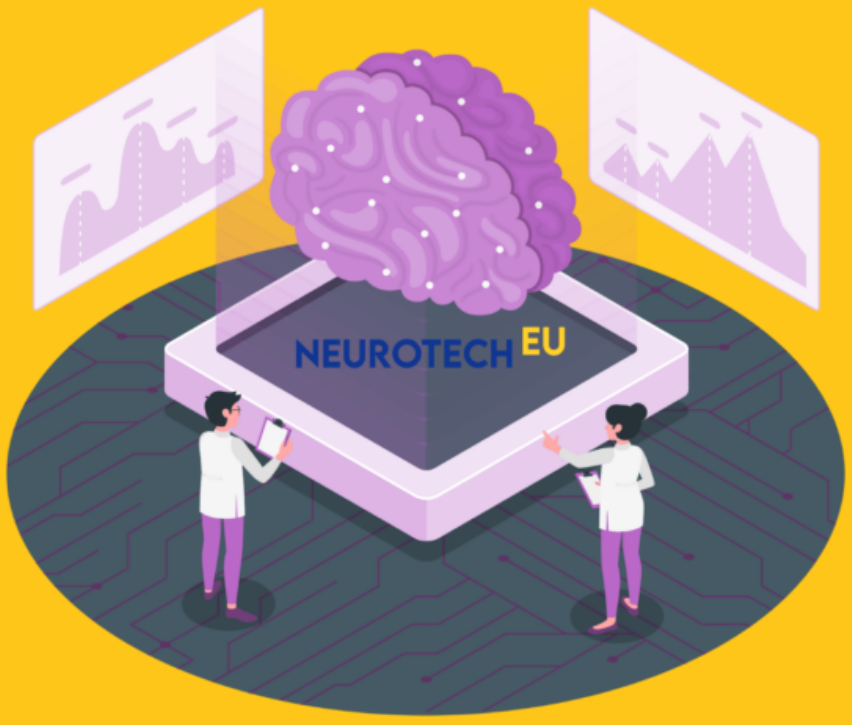
NeurotechEU Autumn School on

CLOSED LOOP NEUROTECHNOLOGIES: FROM SENSORS TO APPLICATION

BRAIN COMPUTER INTERFACES, NEUROFEEDBACK,COMPUTATIONAL NEUROSCIENCE, HYBRID INTERFACES, NEUROMORPHIC COMPUTING, EEG, MULTI-ELECTRODE ARRAYS, NEURONAL POPULATIONS

18-20 OCTOBER 2023

UNIVERSITE DE LILLE, FRANCE



FOR DOCTORAL STUDENTS, POST-DOCS AND YOUNG RESEARCHERS (UP TO 45 PEOPLE)
TO APPLY, CONTACT YOUR INTERNATIONAL OFFICE

Co-funded by the European Union

Université de Lille

IRCICA

Preliminary program

18/10 Introduction and sensors for neuronal populations

9.30 - 10.00 **Welcome coffee and Introduction**

Chair: P. Yger

10.00 - 11.00 Keynote speaker : François Vialatte *(Institut Pi|Psy)*
General Introduction to Neurotechnologies

11.00 - 11.45 ***Fabrication of microelectrode arrays for in vitro and in vivo electrophysiology***
Yannick Coffinier, Univ. Lille, IEMN

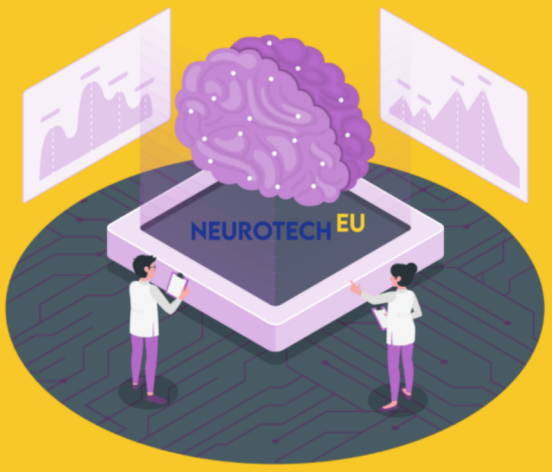
11.45 - 14.15 **Lunch & Poster Session** (2 parallel sessions)

14.15 - 15.15 Keynote speaker : Lionel Rousseau *(ESIEE-Paris)*
Implantable sensors trends and challenges, focus on neuro prosthesis

15.15 - 16.00 **TBA** Virginie Hoel, Univ. Lille, IEMN

17.00 **Guided visit of Lille's old town**

19.00 **Lunch together in Lille town center**



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19/10 Signal processing and machine learning approaches

9.00 - 9.15 **Welcome coffee**

Chair: F. Cabestaing

9.15 - 10.00 **Neuromorphic Computing: Brain-Inspired Information Processing**
Pierre Boulet, Univ. Lille, CRIStAL

10.00 - 11.00 Keynote speaker Valerie Ego-Stengel (*NeuroPsy, Saclay)*
Title TBA

11.00 - 11.15 **Coffee break**

11.15 - 12.00 ***Online and accurate spike sorting algorithms for dense microelectrode arrays***
Pierre Yger, Univ. Lille, Lille Neuroscience & Cognition

12.00 - 12.45 ***Brain-Computer Interfaces in Immersive Environments***
Hakim Si-Mohammed, Univ. Lille, CRIStAL

12.45 - 14.00 **Lunch**

14.00 - 17.00 **Hands-on tutorials** in parallel, with mandatory registration:

- Closed loop EEG (Hakim Si-Mohammed and François Cabestaing)
- Extracellular recordings: from sensors to signal processing (Pierre Yger, Yannick Coffinier and C. Vanbesien)
- Neurofeedback & Computational Psychiatry (Renaud Jardri and Pantelis Leptourgos)
- Neuromorphic computing and neuronal network simulations (Marcel Stimberg and Pierre Boulet)

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20/10 Closed loop Applications

9.00 - 9.15 **Welcome coffee**

Chair: R. Jardri

9.15 - 10.00 ***Modulating subjective experiences: towards applications in psychiatry***
Pantelis Leptourgos, Univ. Lille, Lille Neuroscience & Cognition

10.00 - 11.00 Keynote speaker: Paul Allen (*King's College London*)
Modulating cortical activity using real-time fMRI neurofeedback in psychiatric disorders

11.00 - 11.15 **Coffee break**

11.15 - 12.00 ***Exploring the potential of closed-loop systems for improving communication impairments***
Anahita Basirat, Univ. Lille, Scalab

12.00 - 12.45 ***Continuous dopaminergic stimulation by intracerebroventricular administration of anaerobically conserved dopamine in Parkinson's disease with two potential closed-loop models: control of cerebral dopamine and/or motor activity***
David Devos & Caroline Moreau, Univ. Lille, Lille Neuroscience & Cognition

12.45 - 14.00 **Lunch**

14.00 - 16.00 ***Neurotechnologies: ethics and neuroprosthesis (round tables)***
David Doat and Eric Fourneret, Ethics lab, Université Catholique de Lille

16.00 - 18.00 **Visit of Xperium LILLIAD Lille Learning Centre, optional booths :**

- Discovering the pleasure of physical effort - Sensory aids to boost motivation - SCALab (Psychology and neuroscience)

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- Connected T-shirt for sport and health - Comfort, performance and interactivity - gemtex (Electronics, materials and data science)
- Sensors for more efficient swimming - Improved performance thanks to data - CRIStAL (Electronics and data science)
- Preventing concussion in rugby players - New tools to detect and anticipate its severity - PSITEC / URePSSS (Neuroscience and data science)

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21/10 Cultural visits

10.00 - 16.00 **Cultural visit : Excursion by bus to visit Bruges in Belgium**

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