Post-doctoral or PhD Position for the development of a neuroprosthesis that supports the production of complex movements

A PhD position is available in the laboratory of Dr. Numa Dancause at the Université de Montréal, Department of Neurosciences. Our group investigates the mechanisms underlying movement control, neural plasticity involved in motor recovery post-brain injury, and the effects of neuromodulation techniques such as repetitive transcranial magnetic stimulation (rTMS) on the brain. We employ rodent and macaque monkey models, and benefit from collaborations with human-focused research groups through our Canadian platform Can-Stim. Here is a full list of our published work.

The project: The PhD candidate will develop a flexible neuroprosthesis for the motor cortex capable of supporting the production of complex movements. This project is part of a multidisciplinary collaborative effort with the labs of Dr Benoit Gosselin (Université Laval), Guillaume Lajoie (UdeM) and Marco Bonizzato (Polytechnique). It integrates the use of machine-learning approaches to optimize neurostimulation, automation of behavioral data collection and wireless stimulation and electrophysiological data recording technologies. The project will involve:

- Help design the neuromodulation platform, integrate the different components and improve performance
- Conducting neural recordings and stimulation in behaving monkeys.
- Programming in MATLAB or Python for data analyse
- Adapt and improve the machine-learning algorithm to the new platform
- Collaborating with interdisciplinary neuroscience, engineering, applied maths and data science, computational and clinical rehabilitation teams.

Your profile:

- Training in neuroscience, biomedical engineering or a related field.
- Strong programming skills, particularly in MATLAB or Python for analyses of neural signals are strong assets
- Previous experience with animal models using electrophysiological techniques AND/OR neuromodulation techniques
- Background knowledge in electronics and experience in signal processing.
- Background knowledge of machine-learning, AI, and computational neuroscience.
- Motivation to pursue innovative research in biomedical engineering and motor rehabilitation.
- Excellent communication skills and ability to work collaboratively in a research team.
- Different roles in the project, with varying degrees of experimental versus theoretical/algorithmic focus are possible. Candidates with diverse skills and career objectives will be considered.

Why UdeM?: The Université de Montréal offers a stimulating research environment with access to state-of-the-art facilities and international collaborations. Montréal is renowned for its vibrant neuroscience community. The lab is part of multiple research groups with research interest in fundamental biomedical research (Centre d'innovation biomédicale; CIB), bridging neurosciences and artificial intelligence (Union Neurosciences et Intelligence Artificielle – Québec; UNIQUE), and brain function and learning (Centre Interdisciplinaire de Recherche sur le Cerveau et l'Apprentissage; CIRCA).

Application Process: Interested candidates should submit a cover letter outlining their research interests and career goals, a detailed CV, academic transcripts, and contact information for two references to Numa.Dancause@umontreal.ca.

Applications will be reviewed until the position is filled.