

## **MASTER 2 Fundamental and Clinical Neurosciences**

### **Internship proposal 2022-2023**

*(internship from January to June 2023)*

**Host laboratory:** *Name + address*

Laboratory of Dr. Frederic Bretzner  
CHU de Québec-Université Laval  
CHUL, Neurosciences, P-09800  
2705, Blvd. Laurier  
Quebec City, QC  
CANADA, G1V 4G2

**Host team :** *team name + website*

Laboratory of Dr. Frederic Bretzner  
<http://www.crchudequebec.ulaval.ca/en/research/researchers/frederic-bretzner/>

**Internship supervisors :** *name + position + email*

Dr. Frederic Bretzner  
Professor  
frederic.bretzner.1@ulaval.ca

**Project title : Role of DSCAM in the development of motor circuits**

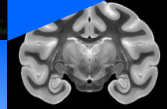
**Project summary :** *approx 10 lines*

Critical to motor functions is the formation of neuronal networks in the brain and spinal cord, which depends highly on signaling cues. Some of these signaling cues are thought to guide growing axons to their synaptic targets, while others contribute to the cell positioning across the central nervous system. The proposed project focuses on the role of one of these signaling cues, DSCAM, a cell adherence molecule associated to Down syndrome, in the normal development of neural motor networks. DSCAM could contribute to axonal guidance and/or cell positioning.

Using a combination of molecular, surgical, anatomical, and imaging techniques, the student will identify, localize and characterize how removal of DSCAM affects neurons and the neuronal circuitry related to motor control in DSCAM lacking mutant mice.

This neuroanatomical study in conjunction with on-going behavioral and neurophysiological studies will allow us to get a better understanding of the role of DSCAM in the normal development of neural circuits.

Please send your proposal to [marion.richard@univ-lyon1.fr](mailto:marion.richard@univ-lyon1.fr) for publication on the Master of Neuroscience website.



### 3-5 recent publications :

1. Laflamme, O. D., M. Lemieux, L. Thiry and F. Bretzner. "DSCAM mutation impairs motor cortex network dynamic and voluntary motor functions." *Cereb Cortex* (2018): 10.1093/cercor/bhy097. <https://www.ncbi.nlm.nih.gov/pubmed/29718256>.
2. Lemieux, M., O. Laflamme, L. Thiry, A. Boulanger-Piette, J. Frenette and F. Bretzner. "Motor hypertonia and lack of locomotor coordination in mutant mice lacking DSCAM." *J Neurophysiol* 115 (2016): 1355-71. 10.1152/jn.00556.2015. <http://www.ncbi.nlm.nih.gov/pubmed/26683069>.
3. Thiry, L., M. Lemieux and F. Bretzner. "Age- and speed-dependent modulation of locomotor gaits in DSCAM(2j) mutant mice." *J Neurophysiol* (2017): jn004712017. 10.1152/jn.00471.2017. <https://www.ncbi.nlm.nih.gov/pubmed/29093169>.
4. Thiry, L., M. Lemieux, O. Laflamme and F. Bretzner. "Role of DSCAM in the development of the spinal locomotor and sensorimotor circuits." *J Neurophysiol* 115 (2016): 1338-54. 10.1152/jn.00557.2015. <http://www.ncbi.nlm.nih.gov/pubmed/26655819>.
5. Thiry, L., M. Roussel, M. Lemieux and F. Bretzner. "Using mouse genetics to study the developing spinal locomotor circuit." In *The neural control of movement*. P. J. Whelan and S. A. Sharples. 11. Elsevier, 2020, 237-67.