PhD Research Proposal Form
China Scholarship Council (CSC) - ENS Group

FIELD: Genetic and Neurodevelopment

Bridging the gap between development and maintenance of the locomotor system: from genes to function.

Name of the French doctoral school: BMIC

Team: Development and function of the neuromuscular system

Website: http://igfl.ens-lyon.fr/

Name of the Supervisor: Jonathan Enriquez

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Lab Language: English/French

Research Proposal Abstract: Locomotion is a stereotyped behavior used by animals to find food, mates or to escape from predators. As Michel De Montaigne said: '*life is only movement'*. The rhythmic pattern of locomotion is directly linked to the sophisticated architecture of the locomotor system. Its architecture is built during development and maintained during adulthood. The long-term project of my team is to understand how locomotor systems acquire and maintain their specific architecture.

Our multiscale project encompasses the fields of molecular, cellular and developmental biology and physiology. Our project integrates experiments from molecules to cells and from system architecture to behavior. Our favorite animal model is Drosophila melanogaster.

The lab is organized around 3 objectives:

Objective 1: **Development of Motoneurons.** We want to understand how a stem cell generate motoneurons with different morphologies during development.

Objective 2: Development of muscle innervation. We want define how two tissues communicate during development to construct a system.

Objective 3: Development and Maintenance of muscle innervation. We want to discover if the gene networks necessary for the establishment and maintenance of muscle innervation are the same.

If you want to learn molecular biology, transgenesis, Fly genetic, smFISH, image analysis and behavior please contact us! To learn more about our lab and our research projects do not hesitate to contact me (Jonathan Enriquez: jonathan.enriquez@ens-lyon.fr) or to contact Wenyue Guan, a postdoc in the lab from China who did a similar program (wenyue.guan@ens-lyon.fr) .

Selected publications:

1. Babski, H., Jovanic, T., Surel. C., Yoshikawa, S., Zwart, MF., Valmier, J., Thomas, JB., **Enriquez, J.,** Carroll P, Garcès, A. A GABAergic Maf-expressing interneuron subset regulates the speed of locomotion in Drosophila. **Nat Commun**. 2019 Oct 22;10(1):4796.

2. Guan, W., Venkatasubramanian, L., Baek, M., Mann, R.S., and **Enriquez, J**. (2018). Visualize Drosophila Leg Motor Neuron Axons Through the Adult Cuticle. **Corresponding author. J. Vis. Exp. JoVE.**

3. **Enriquez, J.,** Rio, L.Q., Blazeski, R., Bellemin, S., Godement, P., Mason, C., and Mann, R.S. (2018). Differing Strategies Despite Shared Lineages of Motor Neurons and Glia to Achieve Robust Development of an Adult Neuropil in Drosophila. **Co- corresponding author. Neuron** *97*, 538–554.e5.

4. **Enriquez, J.,** Venkatasubramanian, L., Baek, M., Peterson, M., Aghayeva, U., and Mann, R.S. (2015). Specification of individual adult motor neuron morphologies by combinatorial transcription factor codes. **Co- corresponding author. Neuron** *86*, 955–970.

Type of PhD :

Full PhD : Regular PhD (leading to a single French diploma)