

Formulaire de stage (sur une page maximum)  
Parcours M2 GGBS 2019-2020

**Laboratoire:** INSERM UMR 1235

**Équipe:** TENS

**Nom-Prénom de l'encadrant:** Maxime Mahe

**Courriel de l'encadrant:** maxime.mahe@inserm.fr

**Candidat pressenti:** -

**Titre du stage:** Inferring neuro-glial differentiation and patterning using single cell sequencing in human fetal intestine.

**Résumé du projet proposé:**

Co-development of neuronal cells and endoderm is a key element in the development and maturation of the digestive tract. However, the effect and trophic mechanisms of the enteric nervous system in the development of the digestive tract are poorly known. In this context, we propose to study the enteric nervous system development in man to understand cell lineages and transition kinetics. In collaboration with Jason Spence's lab, we have generated a single cell atlas using single cell RNA sequencing from human fetal intestine throughout the gestational period. This dataset will help us understand how neuronal cells develop and differentiate in the developing gut. In addition, we developed a model of human intestinal organoids derived from stem cells pluripotent (Workman, Mahe et al., Nature Med, 2017). This model allows us to study the stages of intestinal development with neuronal cells.

During this internship, we propose:

- (1) To analyze and compare human fetal intestine and organoids single cell datasets to characterize neuro glial cells during development (Python and R Packages: CellRanger, Seurat, CCA...)
- (2) To analyze neuronal progenitor cell fate transition across the development timeline (Python and R Packages: Monocle, STREAM...)
- (3) To identify pathways involved in neuroglial differentiation and validate candidates using human organoids with neuronal cells (Utilization of qPCR and immunostaining)

**The team:** the candidate will join an interdisciplinary team that uses innovative approaches to study the role of the enteric nervous system in physiology and physiopathology ([www.inserm-tens.com](http://www.inserm-tens.com)). The research unit is part of the Digestive Diseases Institute of Nantes (IMAD).

**The candidate** will be motivated to explore new experimental and bioinformatic approaches. Feel free to contact Maxime Mahe for more of information.