

PhD position in Developmental Biology (Lyon, France)

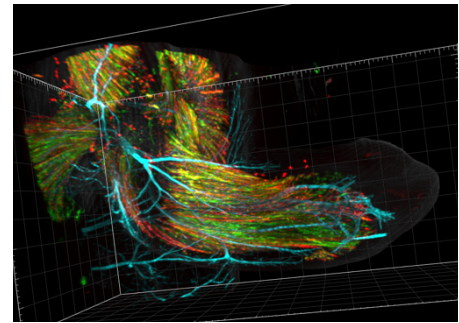
Regulation of secondary myogenesis by motor neuron activity

Supervisor: Dr Emilie Delaune

Host laboratory: *Myogenesis in Development and Repair* team (Christophe Marcelle & Fabien Le Grand)

Institute: MeLiS (Lyon 1 Université – CNRS UMR 5284 – INSERM U1314), 8 avenue Rockefeller, 69008 Lyon.

Project: Skeletal muscles are built through two successive waves of myogenesis during embryonic development. Primary muscle fibers establish the initial architecture of each muscle, whereas secondary myogenesis subsequently generates most muscle fibers present at birth. Remarkably, these two phases differ fundamentally in their requirement for functional neuromuscular activity. While primary myogenesis proceeds independently of functional neuronal activity, secondary myogenesis is severely impaired when neuromuscular transmission is blocked. Although this phenomenon was demonstrated nearly four decades ago, the cellular and molecular mechanisms underlying this developmental transition remain unknown.



Recent work from our laboratory has established genetic tools to distinguish primary and secondary myogenic lineages *in vivo* (Toulouse *et al.*, 2025), making it possible to revisit these classical observations with modern experimental approaches. Combining avian embryology, quantitative 3D imaging, transcriptomics and functional perturbations in the developing limb, this project will determine how motor neuron activity selectively regulates secondary myogenesis and contributes to muscle morphogenesis.

The student will receive training in state-of-the-art approaches in developmental biology, such as:

- Chicken and quail embryology, *in ovo* electroporation and lineage tracing
- Functional perturbation of motor neurons, muscle contractility and mechanotransduction
- Advanced imaging (confocal, light-sheet) and 3D image analysis
- snRNA-seq and spatial transcriptomics (depending on project progression)

Research environment: MeLiS (<https://melis-lyon.fr/>) is an interdisciplinary research institute dedicated to understanding the fundamental mechanisms underlying development, tissue homeostasis and disease. The PhD student will join the *Myogenesis in Development and Repair* team, led by Christophe Marcelle and Fabien Le Grand, which combines complementary expertise in embryonic muscle development, muscle stem cell biology and regeneration. The project will benefit from the team's expertise in advanced imaging and transcriptomics, within a highly collaborative research environment.

Funding: Fully funded 3-year PhD position (French doctoral contract, Lyon 1 Université)

Preferred start date: October 2026, with some flexibility (up to December 2026).

Salary: €2,300 gross/month (≈ €1,850 net/month)

Candidate profile: We are looking for a student with a strong interest in developmental biology and morphogenesis. Applicants should hold a Master's degree (or equivalent) in biology or a related discipline. Previous research experience in developmental biology or 3D imaging is particularly welcome.

Application: Please send a CV, a cover letter describing your research experience and your motivation for this project, and the names and contact details of 2 referees. Applications should be sent to Emilie Delaune (emilie.delaune@univ-lyon1.fr). Please apply by July 31, 2026; applications will be reviewed as they are received, and the position may be filled before this date.

Relevant publication: Toulouse G., Jarassier W., Jagot S., Morin V., Le Grand F., Marcelle C. *Early lineage segregation of primary myotubes from secondary myotubes and adult muscle stem cells.* Nature Communications 16, 7858 (2025).