MuSkLE
PhD programme
Building, maintaining and repairing the functional locomotor system

Co-funded by the European Union

PhD Position 16 job vacancy

Reference:	**PP16**
Title:	**Mathematical modelling and experimental cross species validation of a unified omic framework for muscle function**
Hiring institution:	**USMB**
Location:	University Savoie Mont Blanc, Chambéry, France.
Start date:	As from 1st September 2027
Duration:	36 months
Application deadline:	15th January 2027

Job description

Objective:	The recruited doctoral fellow (DF16) will participate to develop conceptually grounded mathematical models to characterize muscle force capacity across diverse contraction conditions including shortening velocity, length, fatigue/recovery and viscoelastic components. This fundamental research establishes a functional framework of muscle termed Muscle MechanOmics by integrating mechanical and biological variables into a unified theory. The focus will be on building parsimonious, mechanistic models where mathematical parameters have a direct and tangible physiological meaning. DF16 will refine established frameworks such as the Force-Velocity-Endurance (FoVE) model to analyse how contraction velocity impacts fatigue development. This work will follow a continuous iterative loop where in vivo experimental observations validate model predictions, and discrepancies drive mathematical evolution. Based at USMB, DF16 will not only lead theoretical development but also actively conduct in vivo human experiments on the *adductor pollicis* muscle with B. Morel and M. Bowen in Chambéry. These high-precision evaluations rely on the synchronization of electrical stimulation with motorized control using patented ergometers developed by our team to assess muscle function independently of subject cooperation. In collaboration with INMG in Lyon, DF16 will also perform hands-on experimental sessions leveraging a non-invasive ergometer designed for the longitudinal tracking of plantar flexor muscle function in anesthetized mice. This, dual-species approach—implying direct experimental data collection in both humans and mice, enables DF16 to verify and extend model applicability across different muscle groups, species, and scales. The project requires a strong commitment to interdisciplinarity as DF16 will interact with researchers in biophysics, biomechanics, physiology, and biology. While specific applied projects are led by other experts in the team, DF16 will actively participate in transferring fundamental insights to link organ-scale capacities with whole-organism locomotion in contexts ranging from elite sports and clinical health to evolutionary ecology. Joining our team offers the opportunity to work at the forefront of functional comparative physiology and biomechanics within an internationally recognized center for multi-scale muscle modelling.
Collaborations and co-supervisions:	The PhD project will be co-supervised by Baptiste Morel, Maximilien Bowen and Julien Gondin, and implemented in collaboration with INMG lab.
Supervisors:	Baptiste Morel – baptiste.morel-prieur@univ-smb.fr Maximilien Bowen – maximilien.bowen@univ-smb.fr Julien Gondin – julien.gondin@univ-lyon1.fr
Place of work:	USMB – LIBM – FoVE research group (www.fovelab.com) Campus Scientifique - 73376 Le Bourget-du-Lac, France In collaboration with INMG, CNRS 5261, INSERM U1315, UCBL1 Faculté de Médecine - 69008 Lyon, France

Required degree	Master's degree or equivalent in Biomechanics, Physiology, Biopysics, or Computational Biology.
Skills/Experience:	• Strong interest in mathematical modelling and the development of theoretical frameworks for biological systems. • Mandatory prior, hands-on experience in conducting in vivo experimental protocols (in human or animal models). Specific experience in neuromuscular function evaluation is considered a major asset. • Strong motivation to develop and master experimental competencies in both species to ensure proficiency across the dual-species validation framework. • Proficiency in programming for data analysis, signal processing, and numerical simulation using platforms like MATLAB or Python. • Strong aptitude for working across scientific disciplines including biology, biophysics, biomechanics, and physiology. • Interest in transferring fundamental insights to applied fields such as sports, clinic and/or ecology.
Keywords	Modelling; Muscle function; Ergometry; Electrostimulation; Multi-species

Mandatory requirements

Eligibility:	The doctoral fellow: - should not have resided or carried out his/her main activity (work, study) in the country where he/she is being recruited, i.e., France, **for more than 12 months in the 3 years before the application call deadline,** unless this time was part of a compulsory national service or a procedure for obtaining refugee status under the Geneva Convention, - **must be in possession of a master's degree** at the date of the call deadline. Applicants who have completed their cursus but not yet been awarded the formal master's degree by that date will not be considered eligible. - must be **a doctoral candidate** (not already in possession of a doctoral degree at the date of the application call deadline).
Languages:	Oral and written skills must meet the standards of academic English used in international research.

Job details

Type of contract:	Full time position
Gross salary:	The monthly living allowance, including employer and employees' social charges, is €3,500. This amount corresponds to a gross monthly salary estimated to €2,476,55, and to an estimated net monthly salary before income tax of €1,989,40. On top of the monthly salary, the candidate will receive a mobility allowance, including employer and employees' social charges of €4752 to cover relocation expenses.
Other benefits:	Social Protection: The candidate will benefit from full social security coverage, including health insurance, unemployment insurance, and pension contributions. He/she will also have access to occupational health services (médecine du travail), as required by French labour law. Additional Insurance: The fellow may choose to subscribe to complementary health insurance plans, at affordable rates (approximately €70 per month), of which 50% is paid by the employer. Paid Leave: The candidate is entitled to up to 25 days of paid leave annually, in accordance with national labour law, and will enjoy the same employment rights as other public-sector employees, including student union membership. Transport: The candidate benefits from significantly reduced fares on public transport, available in all partner cities. The reimbursement is set at 75% of the actual cost, up to a maximum of €104.04 per month.