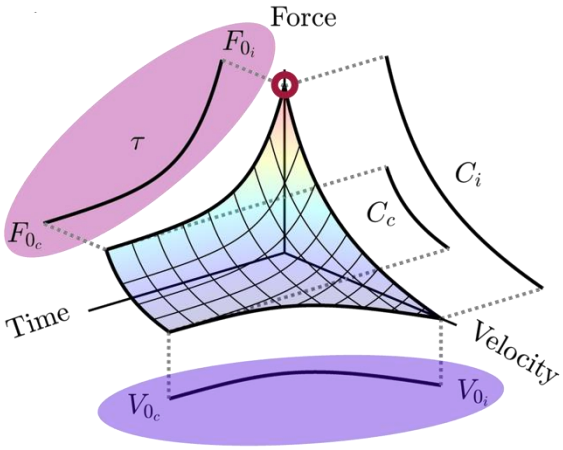
Internship offer
M2 Musculo-Skeletal system, Locomotion, Exercise (MuSkLE)

Title of the Internship: Evaluation of isolated muscle functional capabilities under environmental stress using the innovative FOVE ergometer.

Laboratory: LIBM (Interuniversity Laboratory of Human Movement Sciences), Univ Savoie Mont-Blanc, EA 7424, Chambéry, France, https://libm.univ-st-etienne.fr/en/index.html

Research team: FOVE is a young and dynamic team working on a new model combining Force-Velocity profile and Intensity-Duration relationship to obtain a global model of muscle capacity prediction: the FOrce-Velocity-Endurance (FOVE) model (see illustration below). No website yet, see #FOVE on X.com for more information.



Supervisor to contact: Baptiste Morel, head of the FOVE team, baptiste.morel-prieur@univ-smb.fr

Project description: The FOVE model [1] is a groundbreaking theoretical framework developed to provide an exhaustive evaluation of skeletal muscle function [2]. Environmental stressors such as hypoxia, heat, and cold significantly impact muscle function and performance [3]. Understanding these effects is crucial for optimizing athletic performance and mitigating risks in extreme conditions. Recently, our lab has developed an innovative ergometer for evaluating the adductor pollicis muscle, enabling us to measure the whole muscle function (i.e. FOVE model) under various environmental stresses. The primary aim of this project is to investigate the impact of environmental stressors (localized hypoxia, heat, cold) on the functional capabilities of isolated muscle using the newly developed FOVE ergometer. This project provides a unique opportunity to apply advanced experimental techniques and data analysis methods to a cutting-edge research question in sports science and muscle physiology. The findings will contribute to a deeper understanding of how environmental factors affect muscle performance, with implications for both athletic training and clinical applications. The student will be involved in all steps of the research process, from collaborating with us to design the protocol, through data collection and analysis, to writing and preparing the final scientific paper.

References:

[1] M. Bowen et al. (2024) Mathematical modeling of exercise fatigability in the severe domain: A unifying integrative framework in isokinetic condition. J Theor Biol.
[2] C. Y. Seow. (2013) Hill's equation of muscle performance and its hidden insight on molecular mechanisms. Journal of General Physiology.
[3] D. Mcguire et al. (2022) Physiological Function during Exercise and Environmental Stress in Humans—An Integrative View of Body Systems and Homeostasis. Cells.

Skills required: The candidate should have solid knowledge in muscle physiology and biomechanics, experience in handling experimental devices and data analysis, proficiency with data processing tools such as Matlab, strong writing and scientific communication skills, scientific rigor and analytical mindset, autonomy and initiative, and the ability to work effectively in a team and communicate clearly.