**PhD Position on neuromuscular and predictive modeling of cycling**

The Rehabilitation Engineering and Robotics laboratory at UCD has an opening for an outstanding individual interested in pursuing a PhD on neuromuscular and predictive modeling of cycling, under the supervision of Dr. Giacomo Severini. The PhD project is funded by SFI as part of the ReHapt project and will be run in collaboration with the activities of the Insight Centre for Data Analytics.

**Background.** Neuromuscularmodelling is useful for estimating unmeasurable physical quantities, such as muscle and joint forces or the activation of deep muscles, during the execution of different tasks. Recently, Optimal Control problems applied to neuromuscular models have been used to predict motor behaviors based on specifically designed goals and constrains. This latter field is commonly referred to as *predictive modelling*. Predictive models are used to synthesize movement patterns and the relative controls when experimental data are not available, basing on high-level specifications, such as achieving a certain target speed while minimizing metabolic cost by applying optimization principles under physiological constrains. The aim of this PhD project is that of developing predictive neuromuscular models of cycling able to predict the changes in muscular activations associated with changes in specific biomechanical characteristics of the cycling task.

The proposed PhD project aims at increasing our understanding of lower limb control in humans, with the aim of using this knowledge for developing novel training strategies for impaired individuals. The PhD position is funded for 4 years and the start date for this position will be as soon as possible after January 2023.

**Who Should Apply.** Applicants should have, or expect to obtain before the beginning of the position, a first or upper second class honours Masters degree in Computer Science, Electrical, Electronic or Biomedical Engineering (or a related discipline). Suitable candidates will have a strong interest in modelling, biomedical engineering and computational neuroscience. Excellent analytical, computer programming (Matlab, Python, Labview, C/C++…) and communications skills are essential. Self-motivation, an inquiring mind, ability to work independently are necessary for the position. Previous experience in neuromuscular modeling is a plus.

**Funding.** This position is funded by the Science Foundation Ireland Frontiers for the Future Project “ReHapt”. Studentship includes a tax-free stipend of €18,500 per year, coverage of tuition fees, funds for conference travel, and equipment allowance. The student will also have the opportunity to earn extra income through teaching activities.

**How to Apply**. Application to this position can be made by sending an email with subject: "Applying PhD Position on neuromuscular and predictive modeling of cycling" to [giacomo.severini@insight-centre.org](mailto:giacomo.severini@insight-centre.org)  Candidates are requested to submit (in pdf format):

* 1 page cover letter detailing relevant experience and motivation behind the application
* CV
* Transcripts (courses with grades)
* Contact of one referee