PhD student: **Modeling and Assessment of Skill Acquisition in Microsurgery**

Microsurgery demands superior dexterity in combination with excellent visuospatial skills. Evidently, microsurgery is a technical skill with a very steep learning curve and where tiny mistakes can have fatal outcomes for patients. Today, our understanding of the learning process is rudimentary and microsurgical competence is assessed subjectively. The goal of this thesis is to improve our understanding of the acquisition of dexterous manual skills. This will require to carefully analyze hand position, force application and movements changes from data gathered over longitudinal studies conducted at the University Hospitals in Geneva. The PhD student will develop computation models, based on machine learning and optimal control, to explain the process by which humans learn to generate appropriate hand postures and to account for the evolution of the quantitative data over the observed training periods.

The PhD student will be affiliated to the EPFL **Learning Algorithms and Systems Laboratory** under the supervision of Prof. Aude Billard and to University of Geneva under the supervision of Prof. Torstein Meling. The position will be homed on the EPFL campus, but it is expected that the student spends half of the time at the University Hospitals in Geneva.

**Key responsibilities:**

- Participate in the conduct of the longitudinal studies
- Analyze, interpret, and present scientific results
- Integrate the literature in the field & propose new perspectives
- Interface with team members and collaborators
- Present at scientific conferences & publish scientific papers

**Required profile**

- Master’s degree in engineering, or equivalent.
- Strong knowledge in mechanics, control and signal processing, machine learning or equivalent
- Deep interest in neuroscience
- Passion for science with a collaborative mindset
- Enthusiasm, curiosity, and a pro-active attitude are essential
- Good time management and organizational skills
- Fluency in English & French would be a plus.

Candidates should contact: aude.billard@epfl.ch, torsteing.meling@hcuge.ch