



**PhD scholarship – Call for application**  
**University Savoie Mont-Blanc, F-Le Bourget-du-Lac**  
**Inter-university Laboratory of Human Movement Biology (LIBM)**

***Fatigue, force production and turn path during alpine skiing.***

A 3-year fully funded PhD scholarship is proposed by the PhD school (ED SISEO) at the University Savoie Mont Blanc (USMB) in Chambéry (73 Savoie France) under the supervision of **Frédérique Hintzy** (PhD, Locomotion and Sports Biomechanics), **Pierre Samozino** (PhD, Locomotion and Sports Biomechanics) and **Baptiste Morel** (PhD, Exercise Physiology).

The successful applicant will become part of an energetic training and research environment within the multidisciplinary Inter-university Laboratory of Human Movement Biology (LIBM: <http://www.libm.fr>) within both Sport Performance and Injury Prevention (SPIP) and Physical Ability and Fatigue (PAF) teams. It also benefits from privileged relations with the sporting and economic mountain environment.

As PhD student, you will be responsible for:

- Independently carrying out research and completing a PhD dissertation within three years;
- Collecting and analyzing biomechanical and neuromuscular data, including ground reaction forces, kinematics parameters, EMG signals;
- Reporting the results in international peer-reviewed scientific journals and conferences.

Tentative start date: October 1<sup>st</sup>, 2021 (to September 2024).

Net remuneration around 1400€ monthly.

### **PROJECT SUMMARY**

Although the course in alpine skiing racing is imposed by gates behind which the skier must pass, different paths can be followed for the same objective to cross the finish line with the smaller possible time. The PhD project focuses on the analysis and understanding of the choice of these paths. Does a path involve too high mechanical requirement, which would require too high levels of force and/or muscle contraction?



To answer this, the first objective will be to study the link between the neuromuscular capacities of the skier (force production and neuromuscular coordination) and the path during a turn in alpine skiing. This will be done by studying the relationship between kinetics of the ski-snow interaction and the muscle activation dynamics in-situ during a race.

From this knowledge, the second objective will be to extend this question over the duration of a race (and between the two runs of a race), by studying the influence of neuromuscular fatigue on the skier's path and on the kinetics of the ski-snow interaction. A race in alpine skiing lasts between 50 sec (slalom) and 2 min (downhill), is carried out at very high intensity, with high metabolic expenditure and eccentric and isometric

muscular work. Such intensities and durations inevitably induce the appearance of fatigue during a race. However, no study, to our knowledge, explains how fatigue changes the way to ski, the way to produce force and the way to use the muscles for this force production. Our hypothesis is that the decrease in the capacity to produce force implies that the force produced on snow will be different (altered and/or modified), as well as the muscle activation dynamics (in terms of intensity and/or coordination) and the path strategies.

### **APPLICANT PROFILE**

Applicants should have (or anticipate having) a MSc and research background in exercise and locomotion biomechanics. Knowledge in neuromuscular function assessment and analysis will be valued. A good mastery of alpine skiing (theoretical and practical) is not required. But the candidate will still need to be able to ski and understand the activity since experiments will be performed in situ. French is not mandatory but the candidate must be willing to learn French during her/his PhD and she/he must be able to communicate in English

Applications should include a cover letter discussing your interest in the position, detailed CV, academic results (evaluation, average and ranking of the candidate during the initial course and Msc) and two reference letters. Please see information below. You can complete these documents in French or in English.

### **Two steps:**

**First - selection of the applicant who will then apply to the PhD funding proposed by the doctoral school of the USMB (ED SISEO: <https://www.siseo.univ-smb.fr/siseo/>): application must be sent in pdf format (gathered in one file) to the PhD supervisor and Cc to the co-supervisors. Deadline is May 25<sup>rd</sup>, 2021. The application must include the application form (see attached document), a detailed CV, one academic reference letter and a motivation letter. Interviews will be conducted by videoconference until May 31<sup>th</sup> to select the applicant for the doctoral school.**

**Second – ED SISEO application: the applicant selected at the 1<sup>st</sup> step by the PhD supervisors will apply to the PhD funding proposed by the doctoral school of the USMB. This application will be prepared by the candidate and the supervisors and the candidate will be interviewed by the PhD school at the university the June 14-15<sup>th</sup>, 2021.**

### **CONTACT**

Frédérique HINTZY

University Savoie Mont-Blanc, Le Bourget-du-Lac, France

frederique.hintzy@univ-smb.fr

T: +33. 689723993

*APPLICATION FORM, PhD Contract. Session 2021*

*Please do not overcome the number of pages indicated for each section.*

*Additional documents (academic results, copies of academic degrees, letters of recommendation) should be added*

*This form needs to be addressed to the PhD supervisor, in PDF format*

**CV**

*(2 pages front maximum)*

**a) Civil status**

Family Name:

First name:

Nationality:

Date and place of birth:

Age:

Postal address:

Phone:

**b) Bachelor (Licence in France):**

University:

Year of diploma

Speciality:

Supervisor:

Academic transcript (please give a copy)

**b) Master (first year) :**

University:

Year:

Name of the master:

Academic transcript (please give a copy)

Ranking / Number of students: (**the document has to be testified**)

**c) Master (second year)**

University:

Year:

Name of the master:

Academic transcript (please give a copy)

Ranking / Number of students: (**the document has to be testified**)

*If the 2<sup>nd</sup> year of Master is in progress, please give information related to the completed semesters  
(generally september – february)*

**e) Final training period during the master**

Supervisor:

Laboratory:

University:

Dates of beginning and end of the final training period:

Scientific title of the training period:

Publications, participation to scientific meetings:

**Keywords defining your skills and knowledge in the context of your application.**

---

- 1.
- 2.
- 3.
- 4.
- 5.

**Cover letter discussing your interest in the position.**

---

*(1 page front maximum)*