The Berlin School of Movement Science (BSMS), graduate school of the Humboldt-Universität zu Berlin, is offering a

PhD position with focus on the human neuromuscular function during perturbed movement

for a period of 3 years hosted at the Department of Training and Movement Sciences of the same university starting in February 2018.

Project description

The purpose of the research project focuses on the neural control of the lower limb muscle-tendon unit function during perturbed motion in humans. According to daily life situations, perturbation paradigms may be continuous and/or acute as well as unexpected and/or predictable. Different perturbations will be induced electro-mechanically by drops in surface height during contact phases of cyclic locomotion and acyclic movements (e.g. jumping) to challenge the system in different configurations of loading and muscle intrinsic properties (force-length-velocity relationship).

To investigate how the central nervous system organizes and uses specific muscle activation patterns (the so-called muscle synergies) to control the muscle-tendon unit behaviour and, thus, global stability, three techniques will be used. First, the electromyographic activity of relevant lower limb muscles will be measured and using a non-negative matrix factorization algorithm the muscle synergies will be extracted. Second, ultrasonography and kinematic analysis will be combined to assess vastus lateralis and gastrocnemius medialis muscle fascicles as well as respective muscle-tendon unit length. Lastly, the local dynamic stability will be estimated using the concept of the Lyapunov exponents.

We are looking for a PhD candidate interested in investigating the neurophysiological and muscle mechanical aspects underlying human motor control of perturbed movements.

Qualifications

- Candidates should hold an MSc or equivalent in Biomechanics, Engineering, Mathematics or Sport Engineering
- A very good mathematics and physics background, together with direct experience in signal processing are required.
- Previous work on measurements of surface electromyographic activity, muscle/tendon ultrasonography and/or dynamic stability will constitute an important reason for preference.
- Strong experience in the use of programming languages such as R or MATLAB.
- Very good knowledge of the English language in speaking and writing is required.

Eligibility

- With the beginning of the scholarship the Master or equivalent studies must be completed.
- The latest degree may not date back longer than 6 years.
- At the time of the nomination the candidate may not be in Germany for more than 15 months.
- During the scholarship period, staying abroad is limited to 9 months in total and no longer than 3 months per year.

The position is funded with a DAAD scholarship (Graduate School Scholarship Programme) and it includes:

- Monthly scholarship of 1000.00 €.
- Health, accident and liability insurance.
- Funding of a German language course (2, 4 or 6 months).

Application procedure

The application can only be submitted electronically. It should be written in English and must contain the following:

- Letter of motivation
- Detailed curriculum vitae
- Letter of recommendation by two university professors from the home university, issued during the last 2 years (see the DAAD form attached)
- Copies of certificates or copies of translated documents:

    - Copy of the school leaving certificate qualifying for admission to higher education in your own country
    - Copies of certificates of annual examinations taken at the home university (transcripts of records)
    - Copies of certificates of any academic degrees or advanced qualifications showing grades and explain the home's grading system
- Certificates of internships (when available)
- The master thesis (or equivalent) and any publications or manuscripts

Contact information for this position

Dr. Sebastian Bohm (sebastian.bohm (at) hu-berlin.de, +49 (0) 30 2093 46010)

We invite you to apply before the **30th September 2017**. Applications must be submitted as one pdf file containing all materials to be given consideration. Please send your application document via email to: sebastian.bohm (at) hu-berlin.de

The Department of Training and Movement Sciences at the Humboldt-Universität zu Berlin provides basic and applied research in the areas of training and movement sciences as well as biomechanics. Our main research fields include adaptation mechanisms of mechanical and morphological properties of muscles and tendons, plasticity of movement control and interaction between the neuronal and musculoskeletal systems in order to increase human performance and improve life quality.