

## PhD student position in Biomechanics / Musculoskeletal modelling

Earliest start: September 01, 2024

Workplace: Basel (Switzerland)

### The project

Anterior knee pain, notably due to patella-femoral joint instability (PFJ) is a very common orthopaedics issue, particularly in adolescent girls. The causes for the instability are multi factorial and there is a knowledge gap on what are the most important factors and the patho-mechanics of the instability. Three main factors may contribute: abnormal shape of the femur and patella bones, laxity of the medial patella femoral ligament (MPFL), and the orientation of the knee extensor mechanism. Clinical decision-making process requires to evaluate the relative contribution of each factor to the overall instability to address the principal cause(s) and help the patient. We hypothesise the relative contribution of each factor varies from one patient to another, and between groups of increasing level of instability.

The objective of this project is to develop and implement a patient-specific musculoskeletal modelling platform to evaluate the relative contribution of each factor to the PFJ instability. Three-dimensional magnetic resonance imaging (MRI) will be utilised to create patient-specific detailed model of the knee joint while bi-plane radiographs (EOS) will be utilised to create patient-specific models of the entire lower limbs and provide accurate markers to bone registration.

Musculoskeletal simulations will utilise the OpenSim musculoskeletal modelling platform.

### Your assignments

The PhD project is fully funded for up to four years. The student will be working among a multidisciplinary team of orthopaedic surgeons, physiotherapists, human movement scientists, and biomedical engineers at the University Children's Hospital Basel (UKBB). The PhD student will oversee data collection for the project at UKBB. The candidate will be registered as a PhD student at the University of Basel, and work under the supervision of Dr. Morgan Sangeux (UKBB and [Department of Biomedical engineering](#)).

In addition, the PhD student will help organize – jointly with the team – workshops and conferences, participate in outreach activities of the project, and present her/his research at scientific meetings.

### Your profile

Applicants should hold a master's degree in Biomechanics or related fields and possess excellent, demonstrated, programming skills (Matlab/python). The student should have good command of German (to interact with patients and families) and English and be able to work autonomously within an internationally and institutionally diverse environment.

### We offer you

The project is based at UKBB and in the department of biomedical engineering at the University of Basel. The multidisciplinary nature of the project ensures the successful candidate will be immersed in a stimulating clinical and research environment, with cutting edge medical imaging infrastructure. The salary and the conditions of employment will be those of PhD students at the University of Basel. Salary: approx. 50'000 Swiss francs / year.

### Contact

Applicants should contact Dr. Morgan Sangeux ([morgan.sangeux@unibas.ch](mailto:morgan.sangeux@unibas.ch)) with a motivation letter and a current CV.