

Happy Feet - Multi-scale models of the ankle-foot complex

Ref. BAP-2021-492

At KU Leuven, a multidisciplinary ankle-foot biomechanics research group, is active with the aim of understanding ankle-foot dysfunction in orthopedic populations and to optimize orthopedic and rehabilitation approaches.

We have a long-standing tradition in quantifying musculoskeletal loading using in vivo 3D motion capture data in combination with medical-imaging based musculoskeletal and finite element models. More recently, 4D CT scanning techniques have been developed in combination with a foot manipulator to measure in vivo bone kinematics. Furthermore, our group developed a unique gait simulator for cadaveric experimentation allowing in vitro experimental measurements of foot bone kinematics and ankle pressure.

Within our research team, we offer a unique opportunity to collaborate with biomechanical engineers, specialists in motion analysis as well as clinicians and industrial partners. The group is a collaboration between Prof Jos Vander Sloten (department mechanical engineering – biomechanics group) and Prof Ilse Jonkers (department of human movement science – human movement biomechanics group). We also collaborate with The Institute for Orthopaedic Research and Training (IORT), headed by Prof. Lennart Scheys, a multidisciplinary group associated with KU Leuven and the University Hospitals Leuven (department of Orthopaedics) that houses our in vitro simulator. There is a strong connection with the Belgian society of foot-ankle surgeons.

This research is also aligned with the activities of the Horizon2020 project In Silico World - <https://insilico.world> Project where Bryce Killen is the leading postdoctoral researcher.

<https://gbiomed.kuleuven.be/english/research/50000737/groups/HMB>

Responsibilities

Today, we are looking for a motivated postdoctoral researcher to further advance the development and validation of our image-based musculoskeletal and finite element (FE) ankle-foot models.

To this end, historical data from the group's in vitro simulator and dynamic imaging set-ups can be used as well as the potential to collect new data.

We expect you

- to conduct scientific research activities on the loading in the foot-ankle complex, more specific to
 - (1) further develop our suite of musculoskeletal models and solidify the personalization workflows available within the team
 - (2) design and conduct in vitro and in vivo experiments for validation of the musculoskeletal modeling workflow
 - (3) develop an FE modeling workflow for the foot-ankle complex and
 - (4) liaise with clinical and industrial partners to further enhance the impact of our modeling work through applied proof-of-concept studies.
- to assist in further developing this research line and writing of research proposals in this area, also together with our clinical partners.
- to supervise master student projects of biomedical engineering, human movement science and rehabilitation science in this research area.
- to contribute to teaching elective classes in the biomedical engineering and human movement science program.
- to provide administrative and technical support of activities within the research group, department or faculty.

Key words: Biomechanics, image-based modeling, foot, medical imaging, finite element, in vitro, validation

Profile

This position is open for interested postdoc candidates with an interest in the use, design, and validation of modeling workflows to elucidate ankle-foot function and to optimize treatment in relevant orthopaedic patients.

- The postdoc candidate holds a doctoral degree in biomedical/mechanical engineering or movement/biomedical sciences.
- The candidates should be able to demonstrate expertise in image-based musculoskeletal modelling or finite element modelling.
- Interest in conducting in vivo and in vitro experimental work is mandatory. Experience in either of these areas – particularly in-vitro will be looked on favourably.

Candidates planning to finish their PhD in summer or fall 2021 are encouraged to apply.

The candidate should be highly interested in working in a multi-disciplinary environment consisting of engineers, physical therapists and medical doctors.

Offer

- Position is granted for 1 year
- Type of Position: Scholarship
- Timing: Applications should be received by August 15th, 2021. Interviews are planned during second half of August, 2021. Start date is negotiable but preferably October 2021.
- Duration of the Project: The position will be assigned initially for 1 year – as is standard practice. The candidate will be supported to apply for personal funding.

Interested?

For more information please contact Prof. dr. Ilse Jonkers, tel.: +32 16 32 91 05, mail: ilse.jonkers@kuleuven.be or Prof. dr. ir. Jos Vander Sloten, tel.: +32 16 32 70 99, mail: jos.vandersloten@kuleuven.be.

You can apply for this job no later than August 15, 2021 via the online application tool :

<http://www.kuleuven.be/eapplyingforjobs/light/60035284>

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