

# 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](mailto:ilse.jonkers@kuleuven.be) or Prof. dr. ir. Jos Vander Sloten, tel.: +32 16 32 70 99, mail: [jos.vandersloten@kuleuven.be](mailto: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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