Master thesis

“Automatization of the VICON pipeline for processing kinematic measurements acquired in a VICON motion capture system”

Introduction:
Gait analysis (GA) is the systematic study of the human motion and, in a strictly clinical point-of-view, it can be described as the process of determining what is causing the patients to walk the way they do. GA is composed by two main steps: quantification and interpretation. Whilst quantification refers to the measurement, processing and feature extraction of the subject’s gait, interpretation is the process of discussing findings and drawing conclusions. In a clinical context, interpretation is sometimes referred as diagnosis but it is mainly an assessment process intended to help the medical staff to plan optimal treatment.

GA is, for the vast majority of clinicians, an observational process, but nowadays, instrumented GA is becoming common practice. Several kinds of measurements might be made using a number of different devices, such as motion capture (MoCap) systems, cameras, force plates, goniometers, EMG, calorimetry systems, and others.

In this study, the Master student will become familiar with the acquisition of kinematic measurements using a MoCap system and the processing of the raw data using the gait lab software, Vicon Nexus®. Furthermore, an algorithm including marker labelling, gap filling, filtering, and event detection will be designed and implemented using the Vicon plug-in Software Development Kit (SDK) and Matlab. The algorithm will be tested by comparing the automatic and manually processed measurements.

Tasks:
- Process raw gait lab measurements.
- Development and implementation of the automatization algorithm in Matlab.
- Algorithm validation.

Training Contents:
- Gait analysis.
- Marker placement protocol and kinetostatic measurements in a gait lab.
- Matlab and C++ programing.

Contact:
Philippe Ferreira - Room: MB227 - E-mail: ferreira@itbb-biotec.de