Summer Internship/Master Thesis
Interactive Shape Modeling of Human Bodies

Introduction
Fision (http://www.fision-technologies.com) is a Swiss-based company offering size-advising software for the clothing industry. Based on two or more photographs that the customer uploads on a webshop, the correct clothes size for a specific garment is recommended within a few seconds. The first software product will go online with its customers in September 2015.

Task Description
The current workflow by Fision relies on a database of 3D bodies that have a predetermined pose. In a first experiment, the 3D models of the database should be configured such that movements of different limbs/body parts are allowed as a means to simplify the matching with the possible postures of a person in a 2D photograph. This approach should be available as an on-the-fly algorithm as follows: Given a subset of database models that match the body provided by the 2D photo, can this subset of models be narrowed down to one or a few models that return the most accurate match by means of morphing the models? This project consists of the following steps:

- Define the necessary handles to modify the database models by physically possible movements.
- Given a reconstructed 3D shape from the picture in terms of several vertices, come up with an algorithm that is able to determine which parts of the body need to be adjusted.
- Finding an error measurement that is able to quantify the errors of the matching of these newly generated models with the 2D pictures.

Skills
- Experience in image processing/computer vision and 3D shape modeling
- Familiarity with the topics covered in the lecture „Shape Modeling and Geometry Processing“
- Sound mathematical background
- Good programming skills in C++ and/or Python

Remarks
This master thesis is overseen by Prof. Dr. Olga Sorkine-Hornung and is supervised by Ferdinand Metzler (Fision). A written report and an oral presentation conclude the thesis. For further information or application for the master thesis project, please contact Prof. Dr. Olga Sorkine-Hornung (sorkine@inf.ethz.ch) or Ferdinand Metzler (ferdinand.metzler@fision-technologies.com).