Fracture Reconstruction

This project has been proposed by and would be conducted in collaboration with the UMCG.

**Problem description:** When reconstructing complex fractures (e.g. in the hip), the surgeon wants to be able to reposition the different fragments virtually to prepare for the surgery and set up a plan to perform the reconstruction in real life. To support this, this project examines two different aspects:

1. **Computer aided positioning**
   - This can start by having the user define the ‘common points’ between two fragments and have the computer find the optimal positioning. First by a lot of manual interaction, later by a more automated routine.

2. **User interaction**
   - Methods to provide haptic or other feedback when repositioning fragments should be explored.

**Expected outcomes:** A tool with a user interface supporting the above described positioning and interaction. Several variants with increasing level of automation should be implemented. At the end of the project, the student should recommend the best variant according to some well-specified (haptic and/or mathematical) criteria.

**Prerequisites:** The tool is expected to be implemented in C++ using OpenGL and Qt, although other frameworks may be considered. The interested student should be familiar with basic graphics algorithms (at the level of the Bachelor Computer Graphics course), have some experience with OpenGL and C++, and ideally be familiar with human-computer interaction.