

Finite Element modeling (FEM) of vertebrae, Wear Testing of Implant Material, and Mosaicplasty

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I'm a 4th year Bio-Mechanical Engineer working in the HMRC for Leone Ploeg. I am assisting with a few research projects; Finite Element modeling (FEM) of vertebrae, wear testing of implant material, and Mosaicplasty. The FEM project requires data collection of the mechanical properties of Sawbone through indentations and compression testing with various densities of Sawbone and loadings. The data will enable a computer model to be created from densities obtained from CT scans. The wear testing of implants requires the measurement of velocity, which is not directly provided by the testing machine. The easiest way to measure the moderately complex motions of the tester is through optical tracking of the moving parts. My main project though is on Mosaicplasty, which is a surgical operation used to replace damaged areas of cartilage on the articular surface of the distal femur. Currently the study has completed In Vivo studies of sheep using conventional, patient specific guides, and opto-electronic tracking surgery techniques. The research has progressed to the human phase of testing and I have been designing some of the surgical tools associated with the motion tracking trials. These three projects, although not as in depth as some other interns might experience with just a single focus, are a good introduction to many different aspects of where a career in Bio-Mechanical engineering could take me.