

Master Thesis in Biomechanics

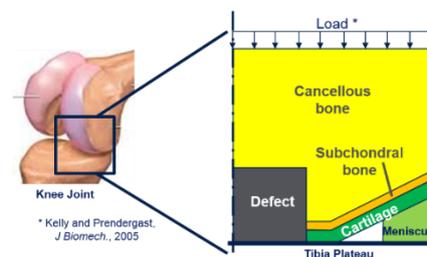
COMPUTER MODELING OF MECHANICS-DEPENDENT TISSUE HEALING IN OSTEOCHONDRAL DEFECTS

The Julius Wolff Institute is within the university structure of the Charité - Universitätsmedizin Berlin. As a research institute we run applications and basic research in the fields of orthopaedics and trauma surgery. Our main research field is the regeneration and biomechanics of the musculoskeletal system as well as the improvement of joint replacement.

Your Responsibilities

Osteochondral defects are wounds that comprise cartilage and the underlying bone. Due to the lack of spontaneous regenerative potential in cartilage, such defects undergo impaired healing. Tissue with non-optimal mechanical properties (fibrocartilage) is formed, leading to pain and eventually triggering the degeneration of the neighbouring healthy cartilage. Scaffolds with proper mechanical properties may support tissue regeneration, guiding wound healing towards the production of healthy, functional tissue. However, the optimal scaffold properties still need to be defined.

In this context, the Julius Wolff Institute is looking for a highly motivated individual for an internship or Master thesis. You will develop finite element models of an osteochondral defect to determine the local mechanical strains within the wound. These strains would then be used to predict healing progression using computer models (see figure). You will simulate different scaffolds, varying properties such as elastic modulus and porosity.



Investigations of the effects of different scaffold properties on tissue formation will be part of your goals. You will work in a friendly and collaborative environment, having the opportunity to discuss your project in a multidisciplinary team.

Your Profile

- Student of Mechanical Engineering, Computer Science, Mathematics or a related discipline
- Knowledge of finite element modelling
- Knowledge of Matlab
- Team player and strong communicator
- Work on own initiative
- Quick learner and willing to share knowledge
- Excellent grades are expected

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