

Selected research topics in Biomedical Engineering: Developments in Dental Research

Location: Lecture room DBE 14.03.002, Gewerbestrasse 14, Allschwil

Date and time: Thursday, May 16, 2019, 14:00-15:30

## ***Mechanical engineering in oral health***

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**Abstract.** Ever since village blacksmiths provided extra services by performing dental extractions, there has been a close link between mechanical engineering and dentistry. This lecture will give an overview of how different branches of mechanical engineering are being employed in oral health. Of all, not only dental but medical specialities in general, it is perhaps orthodontics, where the treatment is fully driven by (bio)mechanical principles: by applying mechanical loads to the teeth using a variety of appliances, they will move through the jaw bones to their planned positions. Knowledge of the internal biomechanical and mechano-biological processes of this “black box” with a mechanical input and a biological output is crucial to obtain a good treatment result. But also other branches of mechanical engineering, like material science/metallurgy and applied mechanics are extensively used in the dental field. We only need to think of dental restorations, implantology or bite force analysis. Examples of these applications will be further presented and reviewed.

**Curriculum:** Michel Dalstra, originating from The Netherlands, holds a Master degree in Mechanical Engineering from Twente University and a PhD from the University of Nijmegen in orthopaedic biomechanics. Since 1993, he has been living in Denmark and is currently an associate professor in orthodontic biomechanics, 3D-imaging & metallurgy at the Department of Odontology and Oral Health of the University of Aarhus. Since 2014, he also holds a part-time position at the UZB, Basel University.

Prof. Dalstra is an active expert/advisor/member of numerous scientific boards and renowned scientific societies such as the European Society of Biomechanics, the Danish Biomechanical Society and the European Orthodontic Society. He is the author of around 80 peer-reviewed publications and 160 conference contributions. His research focus is finite element analysis of (dental) biomechanical systems, microCT-scanning of bone, 3D-imaging of medieval skulls and virtual maxillo-facial surgery planning. In 2010, he was the recipient of the Steno Award of the Danish Biomechanical Society for his contribution to biomechanics in Denmark.