# PATIENT SPECIFIC BIOMECHANICS MODELING AND SIMULATION

## 400, 700, 1800, 1900

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## ABSTRACT

Human diseases can be defined as a condition, state or process occurring in the body that not only impairs the bodily structures and functions but also threatens the health and well-being. A disease not only causes biological and functional alterations but also results in abnormalities in the physical and structural characteristics of cells or physiological systems. Currently the human health sustainability is mainly achieved through innovation and implementation into practice of novel methods.

This symposium aims at discussing and presenting researchers works as well to create new connections within the international community.

The main technical research directions include:

- Real-time simulation in biomedicine and acceleration techniques
- Contact mechanics and fracture mechanics of soft tissue
- Data-driven model selection and parameter identification (Bayesian, artificial intelligence and stochastic approaches)
- Image registration
- Uncertainty quantification: forward and inverse stochastic problems
- Model order reduction for non-linear problems
- Multi-scale modeling of biological tissues
- In vivo experimental methods in biomechanics
- Microscopy and micro-structurally faithful modeling

- Middle-ware and open source software to accelerate
- Bone remodeling.

The main application areas include:

- Hip biomechanics
- Dental biomechanics
- Spinal biomechanics
- Biodegradable implants and new Magnesium-based alloys
- Breast cancer and treatment
- Cardiovascular device optimization
- The fusion of intraoperative data for surgical guidance
- Patient-specific simulation of cutting
- Design of phantoms
- Biomechanics of the meniscus and the knee.

With this Symposium, we focus at works on envisions next-generation biomechanics simulation or optimization tools for a personalized clinical design that is rapidly set up for an individual patient, in particularly we focus at the researchers works from RAINBOW ITN (https://rainbow.ku.dk) as well as the partners from the H2020 TWINNING DRIVEN Project (https://2020driven.uni.lu), and will include presentations from the FNR DRIVEN PRIDE DTU Project on Data-Driven Modelling and Simulation (https://driven.uni.lu) with the goal to disseminate research results, create new links with other projects and with the wider research community.

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