

Structural Integrity, Failure and Initiation and Propagation of Discontinuities in Soft Biological Tissues

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The field of Biomechanics is in the most exciting state of transition from the theoretical subject of the 20th century to a practical discipline providing patient-specific solutions in the 21st century. Computational biomechanics is becoming instrumental in enabling a new era of personalised medicine based on patient-specific scientific computations.

In this lecture I will focus on selected aspects of structural integrity assessment, failure risk prediction and mathematical modelling and computer simulation of the initiation and propagation of discontinuities in human soft organs, for prognosis, diagnosis and treatment planning for an individual patient. A special emphasis will be placed on practical methods with a prospect of being implemented in clinical workflows.

My lecture will be illustrated by examples from the areas of vascular and neurosurgery as well as surgical robotics.