

COMPUTATIONAL BIOMECHANICS

T. CHRISTIAN GASSER¹, MIGUEL CERROLAZA^{2,3}, ELLEN KUHL⁴, MICHAEL W. GEE⁵, YOMAR GONZALEZ³, SIMONE DEPARIS⁶ AND THOMAS FRANZ⁷

¹ Department of Solid Mechanics, The Royal Institute of Technology (KTH), Stockholm Sweden
(corresponding author).

² International Center for Numerical Methods in Engineering, (CIMNE) Barcelona, Spain.

³ National Institute of Bioengineering (INABIO) Caracas, Venezuela.

⁴ Department of Mechanical Engineering, Stanford University, Stanford, US.

⁵ Munich School of Engineering (MSE) & Mechanical Engineering Faculty, Technische Universität München, Germany.

⁶ Mathematics Institute of Computational Science and Engineering (MATHICSE), EPFL Lausanne, Switzerland.

⁷ Chris Barnard Division of Cardiothoracic Surgery, Centre for Research in Computational and Applied Mechanics & Programme for the Enhancement of Research Capacity, University of Cape Town, South Africa.

gasser@kth.se | mcerrolaza@cimne.upc.edu | ekuhl@stanford.edu | gee@lnm.mw.tum.de |
yomar.gonzalez@inabio.edu.ve | simone.deparis@epfl.ch | thomas.franz.uct@gmail.com

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ABSTRACT

Computational mechanics plays prominent roles in the study of biological systems and processes. It may advance our understanding of physiological and pathological mechanisms of organs, interaction between medical devices and biological material, drug delivery pathways, the interplay between structure and function of tissues, mechanotransduction and many others. Although to some extent traditional applied mechanics concepts are directly applicable to solve biomechanical problems, the inherent property of biological tissue to adapt to mechanical and biochemical environments, remains a challenging modeling task. Likewise, in order to investigate entire biological organs adequately, i.e., to gain a comprehensive view of a biological process, sophisticated and robust numerical schemes are needed to couple among structural, fluid, chemical and electrical fields. On the other hand, the inter-patient variability of input parameters such as loading conditions or constitutive properties weakens the patient-specific predictability, and hence the clinical benefit, of numerical simulations. Finally, laboratory testing of biological materials is constraint, where ethical aspects of material harvesting and maintaining an adequate testing environment are mentioned specifically.

For this minisymposium, we solicit contributions that address challenges directly related to bioengineering, i.e., solving structural, hemodynamical, chemical and electrical life science problems. This includes investigations at the organ, tissue and cellular levels. Contributions that consider

- novel numerical concepts
- coupled and multiscale analyses

- novel constitutive models that account for non-linearities and/or multiscale approaches
- applications with potential clinical relevance
- physiological and pathological mechanisms
- active/growth/remodeling properties of biological tissues
- non-linear rheological models
- clotting and thrombus formation modeling
- inverse and in-vivo parameter estimation
- medical image-based studies

are particularly welcome.

Deadline for submitting abstracts: November 29, 2013.