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COMPUTATIONAL BIOMECHANICS: ADVANCED METHODS AND EMERGING AREAS

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ABSTRACT

Computational methods play a key role in current research and discovery in biology and medicine, as they enable in-silico experimentation under controlled conditions and resolution that are otherwise impossible in the laboratory. Computational simulations of the biomechanical and mechanobiological responses are fundamental to enhance our understanding of the different systems of the human body in health and disease, as well as they are the basis of computer-guided therapy and surgery. This is even more urgent when addressing the development of novel in silico approaches for physiological systems which are less explored compared to the mainstream research in biomechanics. The aim of this mini-symposium is to bring together researchers in biomechanics and mechanobiology and share recent advances in theoretical and computational methods with particular emphasis to medical and biological applications. This session will allow the exchange of ideas on generalized theoretical formulations and efficient numerical methods and computational implementations addressing the study of multiphysics and multiscale processes from subcellular mechanisms to whole-organ function. Contributions addressing the identification of biomedical technological challenges and novel experimental techniques that benefit from a close interaction with computational techniques are also welcome. The mini-symposium will promote a multidisciplinary discussion to identify open problems that merit increased attention from those in applied mechanics, biomechanics, mathematics and mechanobiology. Major breakthrough contributions are expected from emerging areas of biomedical research, e.g. respiratory and gastro-intestine systems, exchanging ideas along with more established fields, e.g. cardiovascular and musculoskeletal systems.