

BRAIN COMPUTATIONAL MECHANICS

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ANTOINE JERUSALEM^{*}, ALAIN GORIELY[†]
AND ELLEN KUHL[‡]

^{*} Department of Engineering Science, University of Oxford
Parks Road, Oxford, OX1 3PJ, UK
antoine.jerusalem@eng.ox.ac.uk and <http://jerugroup.eng.ox.ac.uk/>

[†] Mathematical Institute, University of Oxford
Woodstock Road, Oxford, OX2 6GG, UK
alain.goriely@maths.ox.ac.uk and <http://goriely.com/>

[‡] Department of Mechanical Engineering, Stanford University
Building 530, 440 Escondido Mall, Stanford, CA 94305, USA
ekuhl@stanford.edu and <http://biomechanics.stanford.edu/>

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ABSTRACT

The multiphysics of the brain has been the subject of a growing body of research in the recent years. In particular, the view that the brain is a physical entity subject to mechanical laws has allowed for the consideration of brain functions, traumas and diseases as phenomena directly related to morphology, brain and cell mechanics. The answer to many of these problems require invariably close collaborations between scientists in different disciplines including clinicians, biologists, engineers and mathematicians. Due to the complexity of experimental validations, it is also naturally dependent on numerical modelling. In silico testing is however not exempt of its own complexities: patient specific geometries, subsequent meshing, multiphysics constitutive modelling, multiscale approaches, among others, are all potential pitfalls experienced by the current research programmes. This symposium will focus on various aspects of brain computational mechanics. It will address new fundamental challenges of brain computational mechanics including both the classical point of view of biomechanics (e.g., constitutive modelling and mathematical implementations), as well as the numerical aspects of the different implementations (e.g., scheme convergence, multiphysics aspects) and aims at gathering experts of all fields.

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