

COMPOSITE MATERIALS AND MULTISCALE MODELING AND DESIGN IN MEDICINE AND ENGINEERING

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ABSTRACT

Composite materials critically enter in the modern design of industrial products in medicine and engineering. For instance, the design of implantable medical devices or complex mechanical structures for tire manufacturing and composite materials for the aerospace industry require careful mathematical and reliable numerical modeling from basic biological or physical principles that preserve their essential features. In particular, those products must be adaptable and reliable. Interaction with environment must be carefully handled in order to avoid early failure and unreliable evolution. The complexity of their mechanical behavior requires special multiscale modeling and homogenization techniques. Contact problems with a dry or wetted, rigid or deformable body often occur in both medicine and engineering (heart valves, aquaplaning, medical simulators). Nevertheless, for optimization/design purposes, the size of the model must be kept sufficiently small. Applications will be given from the interventional medicine, the design of tires, and the manufacturing of composite materials in the aerospace industry.

The following speakers have accepted to present a paper

- *1) Yves Bourgault, Université de Ottawa, Canada
- *2) Marie-Isabelle Farinas, Faculté des Sciences Appliquées, UQAC, Canada
- *3) Luca Formaggia, Politecnico di Milano, Italy
- *4) André Fortin, GIREF, Université Laval, Canada
- *5) Michel Fortin, GIREF, Université Laval, Canada
- *6) André Garon, Génie mécanique, École Polytechnique, Canada
- *7) Joaquim Peiró, Imperial College of London, UK
- *8) Tony Sheu, National Taiwan University, Taipei, Taiwan,
- *9) Marc Thiriet, INRIA and CNRS, France
- *10) Klaus Wolf, Universität Siegen, Germany