

Multi-scale Multi-Physics Poromechanics

Mini Symposium at Interpore 2016

This mini-symposium focuses on the mechanical behavior of porous biomaterials including tissue adhesives, bone scaffolds, soft and hard tissues and their implants. Biomaterials present several features such as load-dependent microstructure, chemical interaction between solid and fluid phases, chemical potential-driven fluid flow, presence of multiple fluid phases, large deformations and multiple scale-porosity that affect their overall mechanical behavior. Biphasic poromechanics models exist but do not capture all these features. Experimentation, constitutive modeling as well as numerical simulation that shed light on the multi-scale, multi-physics mechanical behavior of porous biomaterials are encouraged to be submitted. In particular, the following topics are of interest:

- a) Development of multiscale and multi-physics constitutive models which bridge the gap between material synthesis and continuum-scale modeling. Methods such as micromechanics, continuum mixture theory, statistical mechanics, quantum chemistry etc. may all be used to embed micro/molecular scale phenomena into constitutive models. Numerical simulation can involve several techniques including FEM, molecular dynamics, ab-initio calculation or combinations of them. Interesting details include:
 - a. Chemical equilibria between fluid phases
 - b. Viscoelasticity and hyperelasticity of the solid phase
 - c. Microstructure-dependent non-linearity in the solid phase
 - d. Pore-pressure driven biological changes
 - e. Multi-phase fluid flow such as blood, plasma and synovial fluid
 - f. Viscous and Non-Newtonian fluids, capillary pressure
 - g. Swelling and Leaching
- b) Experiments on underlying micro or molecular-scale phenomena affecting continuum scale behavior.
 - a. Imaging of microstructural or molecular change with deformation
 - b. Evidence of poroelastic behavior based on size-dependence
 - c. Effect of leaching, swelling and tissue deposition/apposition

Instructions for Submission of Abstracts

Please submit your abstract electronically by **December 18, 2015** following the instructions given below. You can submit your abstract at: <https://www.interpore.org/65-event-booking/8th-international-conference-on-porous-media-annual-meeting/390-abstract-uploading-17>

For the submission of the abstract, the following information is needed as unformatted text:

- Abstract title
- Names and affiliations of authors
- Presenting author
- Three to six keywords
- Abstract body, up to a maximum of 500 words
- Reference list, up to 6 lines
- Up to 3 graphics (accepted formats: GIF, JPEG, PNG).
- Mini-symposium to which the abstract is submitted: Please choose “**Poromechanics of Biomaterials**”
- Preference for oral or poster