8th. World Congress on Computational Mechanics (WCCM8)
5th. European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2008)
June 30 – July 5, 2008
Venice, Italy

Computational Methods in Composite Materials and Structures

ANASTASIA MULIANA[*], RAMI HAJ-ALI[†], MARCIN KAMINSKI[#]

[*] Department of Mechanical Engineering, Texas A&M University,
3123 TAMU, College Station, TX 77843-3123
amuliana@neo.tamu.edu
http://www.mengr.tamu.edu/People/facultyinfo.asp?LastName=muliana

[†] School of Civil and Environmental Engineering, Georgia Institute of Technology
790 Atlantic Drive, Atlanta, GA 30332-0355
rami.haj-ali@ce.gatech.edu
http://www.ce.gatech.edu/fac_staff/research_bio.php?active_id=rh156

[#] Chair of Mechanics of Materials, Technical University of Lodz Al. Politechniki 6,
93-590 Lodz, POLAND tel/fax 48-42-6313551
Marcin.Kaminski@p.lodz.pl
http://kmm.p.lodz.pl/pracownicy/Marcin_Kaminski/index.html

Key words: micromechanics, homogenization, multi-scale modeling, probabilistic and stochastic approaches, time-dependent, damage, fracture mechanics, high fidelity, couple mechanical and non-mechanical properties, multiphase flow.

ABSTRACT

The aim of this mini-symposium is to provide a form for contributions in the areas of computational methods in composite (heterogeneous) materials and structures. A progress in computational method is now driven by the theoretical research in smaller range, multifunctional materials, or multiphase flows. Homogenization method remains very important because determination of the effective physical properties for the system may significantly simplify discretization of its computational domain, may reduce the total time of computations and can also decrease the number of correlated or uncorrelated random variables in the model of a composite.

Special consideration will be given to sub areas such as multiple-scale computations, nonlinear micromechanical models, homogenization schemes, with or without damage, multiphase flow problems solved in computational physics. Examples include, but are not limited to:

1) Nonlinear micromechanical models of various forms of composite materials, including biocomposites/biomaterials
2) Deterministic, probabilistic, and stochastic homogenization approaches

3) Integrated global/local structural-material modeling
4) Sensitivity analysis of the effective material characteristics with respect to in-situ material properties and the other design parameters of most popular engineering composites.
5) Time effects, non-mechanical behaviors (hygrothermal, electrical, magnetic), and physical properties at the microscale
6) Multi-scale framework for analyzing coupled mechanical and nonmechanical behaviors of heterogeneous media, e.g. multi-layered composites, atomistic-continuum scales.
7) Computational damage and fracture mechanics with multi-scale features
8) High fidelity micromechanical models
9) Computational micromechanical model for particles reinforced polymers

For any further request, please contact

Anastasia Muliana amuliana@neo.tamu.edu

Rami Haj-Ali rami.haj-ali@ce.gatech.edu

Marcin Kaminski Marcin.Kaminski@p.lodz.pl

IACM-ECCOMAS08@cimne.upc.edu