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PREFACE

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PREFACE

This special issue presents full versions of selected talks given at the minisymposium "Theoretical, Computational and Experimental Mechanics for Coupled Field Problems and Multiphase Materials", held during the joint scientific meeting that took place in Gdansk, Poland on September 8–11, 2015, uniting the Third Polish Congress on Mechanics (PCM) and the Twenty-First International Conference on Computer Methods in Mechanics (CMM).

The investigation of coupled field problems is of pressing interest in many areas of science. Coupling effects influence experimental measurements, which in turn creates the need for sophisticated physical models and presents challenges for their numerical treatment, bringing to bear a vast array of scientific techniques. Modeling tools designed to incorporate size effects in time and space, such as fractional derivatives, enrich the underlying concepts. This drives new research in many subfields of mechanics.

The papers contained in this special issue address topics related to the constitutive modeling and numerical treatment of coupled field problems and multiphase materials. Emphasis is placed on relating theory to experimental observations, on nonconventional mathematical methods, and on new concepts and developments in the computational algorithms for the solution of the governing equations. The general topics addressed include model adaptation to experimental data, model identification and validation, fractional calculus and its applications in mechanics, nonlocal (scale) effects, and new concepts in the computational treatment for mechanical and thermomechanical problems.

The Guest Editors express their thanks to the *Journal of Mechanics of Materials and Structures* for the opportunity to edit this special issue.

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