

A focus issue in **International Journal of Structural Stability and Dynamics**
published by World Scientific (current impact factor: 0.675 by JCR 2012)

Call for Papers

“Dynamics of Smart Materials and Structures”

Scope and Aims:

Structures made of advanced composites are widely used in many modern branches of industry due to advantageous balance among their weight, stiffness and strength. Such structures very often are subjected to an operation and variable environmental conditions which lead to high nonlinear behaviour of the structures as large deflections and rotations, plasticity, contact phenomena, nonlinear damping, coupled fields (thermo –mechanical; electro-mechanical), etc. On the other hand, the nonlinear behaviour of such structures is often desired and designed by the engineers because it could allow “smart” and very effective behaviour of the designed structure. Typical examples in these directions are the shape memory alloys, magnetostrictive, thermoelectric, piezoelectric devices used in system control and health monitoring, energy harvesting, smart sensors and actuators, self-sensing actuators used in medicine or industry and MEMS. Nonlinear effects are usually introduced into the above devices as they are necessary to increase their efficiency and/or improve their controllability. Smart materials and/or more complex devices based on them show some additional nonlinear phenomena as a hysteresis loop, non-classical and fractional damping, and synchronization as the result of higher correlations.

This focus issue of the journal aims to report on latest research and development findings related to the multi-disciplinary area of nonlinear dynamic phenomena in smart materials and related structures made from composite materials, functionally graded materials, laminated structures, active mechanical systems sensitive to thermal-, electric-, and magnetic- fields. Manuscripts considering nonlinear responses of the periodically or stochastically loaded composite structures, bifurcation and synchronization phenomena, fractional and nonlinear damping in vibrating structures will be appreciated. This would also include modelling of energy harvesting devices with a broadband effect. Traditional energy harvesters are based on a linear mechanical resonator coupled to active elements as piezo-ceramics patches placed on vibrating beam, electromagnetic coils in the magnetic field or charge capacitors with variable capacity. As ambient sources of mechanical present random vibrations in amplitude and frequency, harvesters should be designed in such a way to work efficiently in wide range of frequencies. This could be achieved by nonlinear effects. Finally, the composite structure implies some specific dynamical system responses to the damages which could be modelled and measured experimentally. The problem of damages identification in composite materials systems and structures are also in scope of this issue.

The main topics of the special issue include but are not limited to following:

Nonlinear phenomena in dynamics of structures made of composite materials.
Nonlinear dynamics of structures from functionally graded materials.
Dynamic stability of composite structures.
Dynamics of electromechanical systems.
Nonlinear dynamics based energy harvesting systems.
Dynamics of shape memory devices.
Dynamics of system with hysteresis.
Modelling and dynamics of the systems with fractional damping.

Submission of contributions:

Interested authors should submit to the guest editors an extended abstract, and the corresponding manuscript using the authors guidelines:

<http://www.worldscientific.com/page/ijssd/submission-guidelines> .

Key Dates:

Abstracts submitted to guest editors: 20 October 2013

Manuscript due: 31 December 2013

First round of reviews: 1 March 2014

Expected publication date: July-September 2014

Guest Editors:

Prof. Grzegorz Litak (g.litak@pollub.pl)

Prof. Emil Manoach (e.manoach@imbm.bas.bg)

Prof. Gabriel Abadal (gabriel.abadal@uab.cat)