KTH SOLID MECHANICS SEMINAR; Thursday, January 30th, 13.15; KTH Solid Mechanics Seminar room

# Demetra Hadjiloizi

# "Multiscale modeling of composite and reinforced structures"

Dr. Demetra Hadjiloizi is currently a Postdoctoral Researcher within the VARICOMP research project funded by Science Foundation Ireland at the University of Limerick. She received her bachelor's degree in Mathematics from the University of Patras, Greece where she also received her Masters and PhD Degrees in Applied Mathematics. Her work focuses on the development of micromechanical models for the analysis and design of advanced composite structures (spatially and temporally) for different applications.

The properties of the various types of composite materials that are of interest with respect to practical applications include strength, stiffness, energy harvesting and storage, electrical and thermal conductivity, sensing and actuation. Exploitation of these properties is essentially tantamount to incorporation of the aforementioned materials in novel and emerging technologies and fields; in this respect, the implementation of appropriate hierarchical (micromechanical and/or nanomechanical) models is critical. This presentation focuses on multiscale modeling of complex structures for different applications using the asymptotic homogenization approach. The pertinent micromechanical models lead to closed-form expressions for the effective properties of a composite structure; these expressions are particularly conducive to engineering design and can be used to tailor the effective properties of a structure with a given architecture by changing some material or geometric parameter in accordance to the requirements of a particular application. The pertinent design considerations may be classified into two categories; mechanical/thermal characteristics that make composites attractive candidates for structural, thermal, biomedical, optimization and other applications and mechanical/electrical/magnetic characteristics that render composites ideal for nanotechnology, sensing, actuating and environmental applications.