Bioengineering CRS4

28 marzo 2011 - 11:00 A.M.
CRS4 - Sala D 130

SEMINAR: *Multiscale Modelling of Biological Materials and Bioartificial Systems*

SPEAKER: *Marco Deriu, Politecnico di Torino*

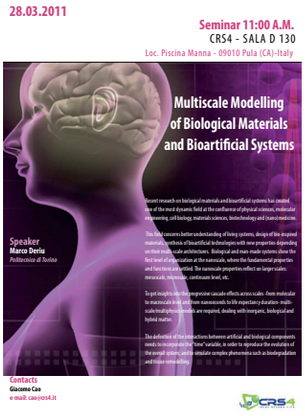
ABSTRACT:

Recent research on biological materials and bioartificial systems has created one of the most dynamic field at the confluence of physical sciences, molecular engineering, cell biology, materials sciences, biotechnology and (nano)medicine.

This field concerns better understanding of living systems, design of bio-inspired materials, synthesis of bioartificial technologies with new properties depending on their multi-scale architectures. Biological and man-made systems show the first level of organization at the nanoscale, where the fundamental properties and functions are settled. The nanoscale properties reflect on larger scales: mesoscale, microscale, continuum level, etc.

To get insights into the progressive cascade effects across scales -from molecular to macroscale level and from nanoseconds to life expectancy duration- multiscale/multiphysics models are required, dealing with inorganic, biological and hybrid matter.

The definition of the interactions between artificial and biological components needs to incorporate the "time" variable, in order to reproduce the evolution of the overall system, and to simulate complex phenomena such as biodegradation and tissue remodelling.



BIOGRAPHY :

Marco A. Deriu was born in Cagliari in 8 May 1981. He received cum laude his Master Degree in Biomedical Engineering at Politecnico di Milano in 2005 with a master thesis concerning mechanical characterization of the proteins using molecular mechanics and molecular dynamics approaches.

He has received the European Doctorate in Biomedical Engineering in 2009 at Politecnico di Torino. His main fields of interest consists in computational modelling of biological, active biomimetic and bioartificial systems at molecular scale using several different multiscale approaches.

Today he holds a postDoc position at Politecnico di Torino in the Industrial Bioengineering Group headed by Prof. Franco Montevecchi. He is lecturer of "Multiscale Modelling in Biomechanics", Master Degree course at Politecnico di Torino.

KEYWORDS:

multiscale modelling, molecular modelling, coarse grain, tissue remodelling, tissue engineering

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