



UNIVERSITÀ DEGLI STUDI
DI TRENTO

Dipartimento di Ingegneria Civile,
Ambientale e Meccanica



Instabilities and nonlocal
multiscale modelling of
materials

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AVVISO DI SEMINARIO

Si comunica che **mercoledì 12 ottobre 2016 a partire dalle ore 16.00**
si terrà presso l'aula **B1** (via Mesiano 77) il seguente seminario

Soft Microstructured Materials: From Artificial Muscles to Bio-inspired Flexible Armor

Prof. Stephan Rudykh

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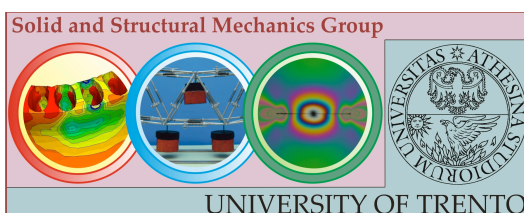
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Nature actively uses sophisticated designs of microstructures to achieve astonishing material properties and functionalities. Thus, the microstructures give rise to the incredible toughness of mother of pearl. Another example is an octopus, an amazingly effective soft machine created by nature. The beast can squeeze its whole body through an extremely narrow space while preserving a large variety of functionalities. The nature created soft machine comprises highly deformable composites that are characterized by different microstructures and phase properties, depending on the required functionalities. Moreover, combinations of the sophisticated microstructures with the ability to sustain extremely large deformations give rise to the opportunity of controllable microstructure transformations. These cascade transformations on the microscopic length-scales change dramatically the macroscopic properties of the materials. In this talk, I will specifically focus on the role of microstructures in the overall performance of deformable multifunctional composites. We will explore the behavior of *soft electroactive composites* that gained the name “*artificial muscles*”. These materials can undergo large deformations when excited by an external electric field. Next, we will turn to *bio-inspired flexible armor* which draws its design principles from fish’s scale-tissue protective systems. As personal armor, these composites grant protection while preserving the flexibility so that the movement is not restricted. We will consider how large deformations and elastic instabilities can be used to trigger dramatic pattern transformations and control the large variety of functionalities. Analytical, numerical, and experimental results on 3D printed materials will illustrate the ideas.

Tutti gli interessati sono invitati a partecipare.

Il seminario è organizzato dal gruppo di Scienza delle Costruzioni
(D. Bigoni, L. Deseri, N.Pugno, A. Piccolroaz, F. Dal Corso, M.F. Pantano, R. Springhetti, D. Misseroni)



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