

# Synthesis of metamaterials: new experimental and theoretical challenges

**Speaker:** Francesco dell'Isola

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**Abstract:** The problem of synthesis of metamaterials is becoming of great importance for its emerging potential and important technological applications. It can be resumed as follows: once prescribed some desired and physically admissible properties for a novel metamaterial to find a micro-structure that at certain macro length-scale produces a homogenised material whose mechanical behaviour is exactly the prescribed one. This problem produces very interesting and difficult challenges both theoretical and experimental. A list of the available results when the desired properties are those of second gradient materials will be presented and some interesting technological applications of the developed concepts are envisioned.

**Bio:** Francesco dell'Isola has a Laurea in Theoretical Physics and a PhD in Mathematical Physics obtained at the Università di Napoli Federico II. He was professor at the Universities of Aix-Marseille III, Roma La Sapienza, Toulon, VirginiaTech, California at Berkeley, Lobatchevski de Nijni Novgorod. His works were dedicated to the synthesis and numerical and experimental study of novel metamaterials, either based on micro-architected structures or exploiting the piezoelectric coupling. He also studied the applications of discrete Lagrangian models, their homogenisation and the formulation of the corresponding higher gradient continuum models. In doing so he was obliged to attentively examine the original sources where mechanics of continuous media were formulated at first.