**Title**: *Fractality, hierarchy and architecture in mechanical metamaterials and metasurfaces: impact on mechanics and multifunctional properties*

**Abstract:** Mechanical metamaterials are characterised by different classes of architectures, from lattice to multiphase composites. In this seminar we will describe how fractal and hierarchical patterns using periodic or quasi-periodic tessellations provide unusual deformation characteristics under in-plane loading, but also out-of-plane bending, fracture and wave propagation properties. We will also show how gradient/hierarchical Kirigami and metasurface topologies could be used within piezoelectric and biobased electroadhesive substrates to develop metasurfaces for sensing and actuations, from soft robotics to biomedical devices.

**Short CV**: ***Prof Fabrizio Scarpa*** is a Professor of Smart Materials and Structures at Bristol University. He is the Materials Theme Leader of Bristol Composites Institute. Prof Scarpa was the former chair of UK EPSRC Metamaterials Network. He holds numerous research grants. Notable, in 2020, he was awarded with a prestigious European Research Council (ERC) Advanced Grant (€2.5M) in the area of metamaterials. The grant titled NEUROMETA focuses on the natural neuroactive mechanical metamaterials.

**Date:** 27 October 2022

**Time:** 14:00-15:30

**Room:** School of Management 011*,*  Bay Campus