UNIVERSITY OF PAVIA

DEPARTMENT OF CIVIL ENGINEERING (DICAr)

COMPUTATIONAL MECHANICS & ADVANCED MATERIALS GROUP

SCIENTIFIC SEMINAR

ON THE DESIGN AND MODELLING OF SCAFFOLDS FOR TISSUE ENGINEERING

SPEAKER: PROF. ANDRÉ CASTRO

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September 8th, 2025
11:00 AM

MS1, Dept. Civil Engineering and Architecture, Ground floor
Via Ferrata 2, Pavia

SEMINAR OVERVIEW:

Triply periodic minimal surfaces (TPMS) are widely studied for tissue engineering (TE) in multiple fields, including bone, cardiac tissue and intervertebral disc. This is due to their versatility in terms of geometry, suitability for additive manufacturing and favourable mechanical behaviour. Despite this high interest, there are still many unknowns in what concerns to the behaviour of these structures when manufactured with different materials/techniques, or how the interplay between different geometrical parameters influence their suitability for a given application.

This talk aims to demonstrate how the selection of a given TPMS configuration (network or sheet), together with different geometries and porosity levels, affects the mechanical properties of TPMS-based scaffolds. On the one hand, mechanical compression and permeability experiments are executed, in order to understand the potential variabilities coming from the production process and to provide insight for further numerical developments. On the other hand, numerical simulations of fluid flow and tissue differentiation are performed to accelerate the development of these innovative TE solutions, as a function of the final application.

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