XI International Conference on Coupled Problems in Science and Engineering, COUPLED 2025
May 26-29, 2025, Villasimius, Sardinia, Italy

PROCESS-STRUCTURE-PROPERTY RELATIONSHIPS IN METAL ADDITIVE MANUFACTURING

M. CARRATURO*, S. MORGANTI†
AND F. AURICCHIO*

*Department of Civil Engineering and Architecture
University of Pavia
Via Ferrata 3, 27100, Pavia, Italy
†Department of Electrical, Computer, and Biomedical Engineering
University of Pavia
via Ferrata 5, Pavia, 27100, Italy
massimo.carraturo@unipv.it, simone.morganti@unipv.it, ferdinando.auricchio@unipv.it

ABSTRACT

Additive Manufacturing (AM) technologies are undergoing exponential growth in many engineering fields, from aerospace to biomedical applications, from fashion to the food industry. In particular, metal AM technologies are nowadays knowing a dramatic growth in many engineering applications due to their capability to produce close-to-freeform components with structural and mechanical properties close or even superior to the ones obtained using traditional manufacturing processes.

As a direct consequence of metal AM widespread diffusion, there is an increasing necessity of a deeper understanding of the complex process-structure-property relationships to optimize the manufacturing parameters as well as to generate the optimal design of the 3D printed part. Yet, developing numerical tools suitable to address the above challenges is not trivial due to the multiphysics and multiscale nature of the physical problem.

The present Symposium aims at presenting and discussing the most recent results in the exciting and challenging field of metal AM technology development.

The Symposium addresses, but is not limited to the following topics:
- Process modelling and validation
- Product properties and performances
- Material modelling
- Data-driven analysis
- Multiphysics simulations