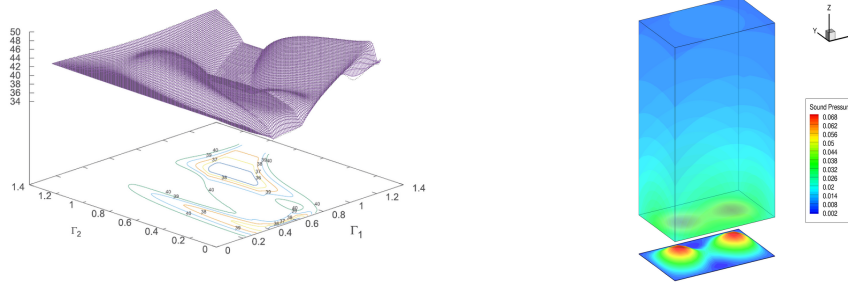


# SOUND TRANSMISSION CONTROL THROUGH OPTIMIZED COMPOSITE SANDWICH LATTICE PANELS

This course provides an overview of recent developments in sound transmission control through aeronautical panel structures. In the first part, general definitions of the sound transmission efficiency parameters are given; moreover, the classical and advanced structural models used to analyze sandwich structures are depicted. In the second part of the course, the attention is focused on recent industrial interests such as 3d-printed lattice materials used for the design of sandwich cores, the homogenization of the lattice material properties is introduced. Furthermore, the passive damping of the multilayered panels can be improved by using soft viscoelastic materials; therefore, their modelling with classical Kelvin-Voigt or fractional derivatives models is explained. In the last part of the course, the structural optimization problem is introduced; the original contributions of the authors define a new particle swarm optimization model called the Population Decline Swarm Optimization method. Finally, some case studies concerning the sound transmission control through optimized multilayered shell composite sandwich panels with lattice core embedding viscoelastic sheets are discussed.



## Learning objectives:

- Structural models for composite sandwich panels
- Properties evaluation of lattice materials
- Sound transmission optimization of aeronautical panels

**Target audience:** doctoral students, non-academic professionals, and undergraduate students.

**Dates and time:** 06 - 13 - 20 - 27 April 2022, 15:00-17:00 CEST

## SPEAKERS

**Stefano Valvano** is Assistant Professor of Aerospace Constructions at the Kore University of Enna in the MARTA Lab. He was previously a research fellow from 2017 to 2018 at the Politecnico di Torino in the MUL2 Group, where he studied variable-kinematics and node-dependent shell models for multifield applications in the framework of the Carrera Unified Formulation (CUF). His research activity concerns: computational mechanics, composite materials, finite element method, viscoelasticity, sound transmission, smart materials, thermal stresses, multiphysics analysis, analytical mechanics solutions, stiffened structures modelling, particle swarm optimization.

**Calogero Orlando** is an Associate Professor in Aerospace Systems at the Kore University of Enna. He worked as Research Fellow at the University of Palermo from 2006 to 2012 and as Aerospace System Assistant Professor from 2012 to 2017 at the Kore University of Enna. His research activity concerns the modelling and numerical analysis of aeronautical systems, the Simple Adaptive Control SAC of aerospace systems, the Stochastic Robustness Analysis RSA of control systems, the PSO based heuristic optimization procedures and the subjective and objective evaluation of pilot workload and passenger comfort. His research activity also concerns the study and modelling of smart structures and systems, structural monitoring and structural damping systems, magneto-electro-elastic and piezoelectric composites and device modelling, boundary element method and finite element method.

## REGISTRATION AND CONTACTS

**Course Code:** 20220406

This course is part of the 2022 institutional activity for AIDAA members. The registration requires the **purchase** of one of the **packages** described here <https://www.aidaa.it/package-list/>, and the completion of the online form available here <https://www.aidaa.it/2022/03/24/sound-transmission-control-through-optimized-composite-sandwich-lattice-panels-2/>.

**Course platform:** Webex, a link will be sent via email as the registration is complete.  
At the end of each course, **attendance certificates** will be sent to participants via email.

For further info, please, contact [academy@aidaa.it](mailto:academy@aidaa.it)

