



FORUM ACUSTICUM EURONOISE 2025

Hot topic 5. Vibroacoustics: a practical approach

Organizer: Eduardo Latorre-Iglesias

Content:

This course aims to provide a practical approach to Vibroacoustics, that is, the sound generated by vibrating structures such as a musical instrument or a washing machine. To warm up, a short introduction about the fundamentals of vibration of simple systems will be given. Several key topics will be covered such as how to categorize and characterize noise sources, which parameters should be used (sound intensity, sound power...), what is radiation efficiency of a vibrating surface and how to control it. An overview of advance experimental techniques such as modal analysis and Transfer Path Analysis (TPA) will be given as well as of simulations methods used in the industry (FEM, BEM). Stress will be put on practical applications. The course includes two lab sessions: one to perform a modal analysis of a beam and another to estimate the radiation efficiency of a guitar excited by a shaker by means of vibration and sound intensity measurements using a Microflown Scan and Paint system.

Organizers and Key Trainers:



Eduardo Latorre-Iglesias obtained his PhD. at the Institute of Sound and Vibration (ISVR) of the University of Southampton under the supervision of Prof. David Thompson, completing a thesis with the following title: "Semi-empirical component-based model to predict aerodynamic noise from high-speed trains". He worked as Vibroacoustic Expert in Alstom, which is one of the main train manufacturers worldwide, and as Test and R&D Engineer in the Centro Tecnológico de Automoción de Galicia (CTAG). Currently, he is Associate Professor in Universidad Politécnica de Madrid (UPM)



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and his main research interests are noise and vibration control, high-speed train aerodynamic noise prediction and reduction, design and optimization of acoustic metamaterials for low-frequency sound absorption. He collaborates with the Railway Technical Research Institute (RTRI) of Japan in the topics mentioned above.



Robert Arcos Villamarin graduated as an Industrial Engineer from the Universitat Politècnica de Catalunya (UPC) in 2008, and he gets his PhD degree in Mechanical Engineering, from the same university, in 2011. He was an Academic Visitor at the Institute of Sound and Vibration Research (ISVR) of the University of Southampton, and postdoctoral fellow of the Faculdade de Engenharia da Universidade do Porto (FEUP) for periods of 12 and 15 months, respectively. He is currently an Associate Professor of the Mechanical Department of the UPC, working in the Research Group Acoustical and Mechanical Engineering Laboratory (LEAM). His main research interests include railway-induced noise and vibration, computational acoustics and elastodynamics, vibration energy harvesting and pantograph-catenary dynamic interaction.



Arnau Clot Razquin received a degree in Physics from University of Barcelona in 2008. He joined the Acoustical and Mechanical Engineering Laboratory (LEAM) from Universitat Politècnica de Catalunya (UPC) in 2009, completing his PhD on underground railway-induced vibrations in 2014. From 2017 to 2019, Arnau was a research associate at University of Cambridge, where he worked on combining experimental testing and numerical modelling in vibroacoustic design. Arnau returned to LEAM in 2020 as a Lecturer in the Department of Mechanical Engineering of UPC. He has been an Associate Professor of this department since 2023. His current research is mainly focused on ground-borne noise and vibrations, especially those induced by railway traffic.