

Editorial

# Preface to the Special Issue on the New Frontiers of Acoustic Modeling and Optimization

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The field of acoustics involves the study of sound propagation, both in free and closed environments, through the development of both forecasting simulations and experimental techniques [1–8]. Currently, such science finds its applications covering several engineering sectors, especially when it is necessary to evaluate the sound response in mid- and high-frequency ranges. The purpose of acoustic modeling is to design “systems” (aeronautical, buildings, engines, electronic, etc.) that are more comfortable and functionally more efficient. From this perspective, the development of effective tools for acoustic prediction and optimization is a challenge for the research community, as the qualification processes need to be streamlined to reduce high computational/testing efforts. The main issues of theoretical modeling include the discretization of disturbance sources, stochastic signal processing, active/passive noise control studies, the optimization of genetic algorithms, and neural network implementation, which are among the most interesting topics yet to be covered in-depth. For this Special Issue (belonging to the section “Acoustics and Vibrations”), the Editors encourage the submission of novel contributions (papers, technical reports, and broad reviews) from members of the technical-scientific community involved in the advancement of predictive methods and in the study of solutions aimed at noise identification/optimization. This initiative will help readers understand various acoustic modeling issues with comprehensive details. Research methods can include numerical validations, experimental studies, and the development of new certification standards, presenting the state-of-the-art results that will have a significant impact on academic interest and industrial growth. Potential future directions could be presented, relying on advanced trends, but also on existing research limitations.



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