

Editorial

Fans: Noise, Aerodynamics, Applications and Systems—The Best of the International Conference FAN2022

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The number of air- and gas-handling fans in use today is large. Fans support our daily lives by providing air for heating and cooling, moving gases in chemical plants and food processing, helping to generate electricity, and more. At the same time, with their associated motors, fans consume a substantial share of all electricity worldwide, still mostly generated from fossil fuels; thus, they are an indirect cause of CO₂ emission. Additionally, the environmental impact of fan noise is another relevant issue.

The articles in this *International Journal of Turbomachinery, Propulsion and Power* (IJTPP) Special Issue on fans are from the FAN2022 conference. This international conference was held in Senlis, France, in July 2022. The organizing committee consisted of Geoff Sheard, AGS Consulting LLC, USA; Jürgen Schöne, ebm-papst, Germany; Alain Guedel and François Bessac, CETIAT; Xavier Carniel, CETIM, France; and Thomas Carolus, University of Siegen and Peter Pelz Technical University of Darmstadt, both in Germany. The aim of this Special Issue is to present a selection of papers of outstanding scientific quality or that address current pressing issues.

The aerodynamic design of fans is still based on analytical models but increasingly relies on numerical flow simulation. Numerical flow simulations allow multiple design variants to be predicted at a low cost and can lead to automated optimization. Optimization methods have the potential to supplement or even replace analytical design methods in the future. Computational fluid dynamics is also increasingly capable of resolving the acoustic field. Depending on the degree of approximation, it provides previously impossible levels of detail about sound sources and their location in the machine. On the other hand, experimental and semi-analytical methods remain essential to verify theoretical performance, problems of wear resistance, and most importantly, system integration and installation effects. Finally, the debate continues with legislative institutions as our community works towards defining the best metric to characterize the energy efficiency and environmental impact of an overall system.

This Special Issue reflects that fans are still the subject of multidisciplinary scientific research and development worldwide, in which universities, public research institutions and companies are involved and cooperate. Industrial manufacturers and users recognize and support these efforts. This cooperation is exemplified by ZIEHL-ABEGG SE, a fan manufacturer based in Künzelsau, Germany, who sponsored this Special Issue. This support allows open access to all articles and is expressly acknowledged.

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