



PhD in INGEGNERIA AEROSPAZIALE / AEROSPACE ENGINEERING - 40th cycle

THEMATIC Research Field: ANALYSIS AND DESIGN TOOLS FOR UNSTEADY COMPRESSIBLE FLOWS

Monthly net income of PhDscholarship (max 36 months)
€ 1500.0
In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	Compressible flows are of interest for diverse scientific and industrial applications, ranging from high-speed aerodynamics to spacecraft launch and re-entry in the atmosphere. The objective of the present research is to develop low-fidelity and high-fidelity analysis and design tools, ranging from simplified flow models to flow-resolved numerical simulations to measurement techniques to improve the current understanding of unsteady compressible flows and to design machinery operating in compressible flow conditions.
Methods and techniques that will be developed and used to carry out the research	Novel analysis and design tools are developed. These include simplified low-fidelity and mid-fidelity approaches, such as the method of characteristics, and high-fidelity numerical simulation tools. If required, the candidate will develop simulation software for compressible flows, including aeroacoustics. Experimental activities are possibly included depending on the research needs.
Educational objectives	The specific objective of this PhD is to develop skills in aerodynamics, with particular reference to compressible flows. Through this project, the candidates will develop skills not only in mathematical modelling, numerical analysis and experiments but also an attitude open to innovation and exchange between the research and industrial worlds, with a general focus on the preservation of the ecosystem, biodiversity, reduction of the impact of



	climate change through technological innovation and promotion of sustainable development. In this sense, education will be complemented by a broad variety of soft skills, including presentation of the research, report writing, outreach, dissemination, and preparation of industrial progress meetings.
Job opportunities	The job opportunities that this project opens up are in the field of aerodynamics, primarily for aeronautical engineering, space engineering and energy engineering fields.
Composition of the research group	1 Full Professors 0 Associated Professors 3 Assistant Professors 20 PhD Students
Name of the research directors	Prof. Alberto Guardone

Contacts	
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
The PhD candidate will receive a desk, possibly through a hot-desking procedure, and a personal computer, if needed. Apart from the compulsory ones, the PhD candidate will have the opportunity to follow additional courses and receive economic support to attend summer schools and participate in conferences. There will be the possibility of paid teaching assistantship.