POLITECNICO DI MILANO

PhD in INGEGNERIA AEROSPAZIALE / AEROSPACE ENGINEERING - 41st cycle

THEMATIC Research Field: APPLICATIONS IN AEROSPACE ENGINEERING

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	Research in the various areas of Aerospace Engineering aims to address emerging scientific and technological challenges in aerodynamics, advanced materials, propulsion, fluid dynamics, space sustainability, renewable energy, and structural safety. The main objectives are To improve the performance, safety, and sustainability of aerospace vehicles and energy systems. To develop multifunctional, lightweight, and intelligent structures capable of adapting to varying operational conditions. To tackle issues related to space traffic management, debris removal, and the long-term sustainability of space activities To foster innovation in the use of composite materials, advanced manufacturing technologies, and autonomous control systems To support the transition towards more efficient and sustainable propulsion systems, including those for deep space missions and wind energy.
Methods and techniques that will be developed and used to carry out the research	The methodologies adopted are multidisciplinary and include: Development and application of advanced numerical models (CFD, FEM, MDO, high-fidelity simulations). Design and execution of experimental tests in wind tunnels, on materials and structures, crash tests, and

	validation of models. Use of optimisation techniques, machine learning, robust/adaptive/nonlinear control, and development of algorithms for autonomous guidance. Integration of virtual simulation tools, augmented reality, and test platforms for human–machine interaction. Implementation of new manufacturing technologies (additive manufacturing, out-of-autoclave processes), sensing/monitoring strategies, and the development of smart materials. Analysis and design of space missions, orbital traffic management, debris modelling, and the development of strategies for space sustainability.
Educational objectives	The common educational objectives are: To provide advanced skills in the modelling, simulation, design, and experimentation of complex aerospace systems. To develop cross-disciplinary abilities in areas such as system dynamics, control, materials, optimisation, programming, and data analysis. To foster autonomy in research, critical thinking, problem-solving skills, and innovation. To prepare doctoral candidates to work in multidisciplinary teams, manage complex projects, and communicate scientific results effectively. To offer opportunities for international training, participation in summer schools, conferences, and supplementary teaching activities.
Job opportunities	The skills acquired open up numerous professional opportunities, including: Research and development roles in aerospace, energy, automotive, marine, and high-tech industries. Positions of responsibility such as designer, CFD specialist, structural engineer, materials expert, flight dynamics specialist, crashworthiness engineer, propulsion expert, control and simulation specialist. Roles in space agencies, national and international research centres, universities, and regulatory bodies. Activities in the field of space sustainability, orbital traffic management, development of debris removal

	technologies, and innovative services for renewable energy. Opportunities for academic or consultancy careers in multidisciplinary and innovative fields.
Composition of the research group	17 Full Professors 22 Associated Professors 29 Assistant Professors 200 PhD Students
Name of the research directors	Professors of DAER

Contacts
phd-daer@polimi.it

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents	--

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.