

# Chiara Bisagni

## “Advanced Aerospace Composite Structures: Stability as a Design Tool”

All structural designers know that their structures must satisfy two basic criteria: the strength criterion and the stiffness criterion. In aerospace, an additional criterion has always been considered for thin-walled components subjected to compression or shear stresses: the stability criterion. Buckling phenomena are difficult to computationally analyze due to high geometric nonlinearity, especially in the case of composite panels and shells. New design methodologies will be presented for the development of innovative thin aerospace composite structures that operate in the post-buckling field.

A paradigm shift in design concepts will be introduced, considering buckling not as a phenomenon to avoid, but as a favorable behavior to actively exploit. This will be presented alongside new challenges related to the design and analysis of these structures. The developed design methodologies consist of an integrated mathematical formulation based on finite element analyses, validated by experiments using advanced test techniques. These methods also have the potential to enhance the role of modeling and simulation for aerospace composite structures from preliminary design to certification. The results of recent projects will be presented along with the design methodology that is the primary focus of the ongoing ERC Advanced Grant NABUCCO.



Chiara Bisagni is Professor at the Politecnico di Milano in Italy, Department of Aerospace Science and Technology, and she has a guest Professor position at the Delft University of Technology in the Netherlands, Faculty of Aerospace Engineering. She received her Ph.D. in Aerospace Engineering from Politecnico di Milano, where she started her academic career. Then, she was Professor at the University of California San Diego, before moving to the Delft University of Technology, where she was Professor from 2015 to 2023.

Her research regards aerospace composite structures. Her projects span from buckling, post-buckling, and crashworthiness, to fatigue, damage tolerance and optimization, for aeronautical and space applications.

Professor Bisagni received several awards, including an Amelia Earhart Fellowship, a Marie Curie Grant, a Young Researcher Fellowship from MIT, a Fulbright Grant, and recently was awarded an ERC Advanced Grant. She is Fellow of the American Institute of Aeronautics and Astronautics, and Knight of the Order of Star of Italy.