Alma Mater Studiorum Università di Bologna
Department of Industrial Engineering – Via Montaspro 87, Forlì

Giovedì, 27 Febbraio, 2025, ore 14

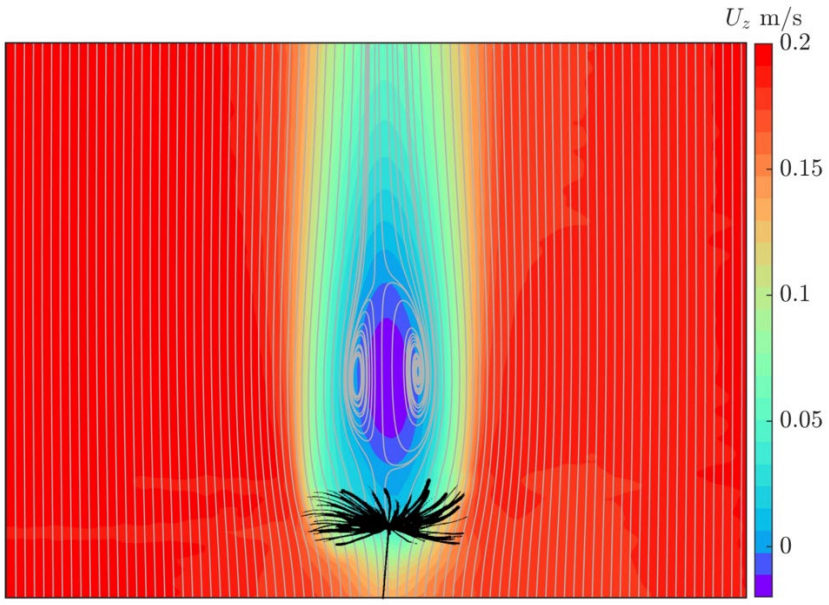
Aula 1.4 e online al seguente indirizzo

Join the meeting now

Meeting ID: 344 355 412 820

Prof. Ignazio Viola
Professor of Fluid Mechanics and Bioinspired Engineering
School of Engineering, University of Edinburgh

From Dandelions to Dandidrones



We are developing swarms of dandelion-inspired drones, dandidrones, that are passively transported and distributed by the wind and scavenge energy from the wind to remain afloat. They will undertake complex autonomous tasks such as following concentrations of chemical agents, and will provide a persistent volumetric measurement of environmental indicators such as temperature, pressure, etc. In this talk, the underpinning aerodynamics of the dandelion diaspore, and how its study is informing the design of this technology will be presented. First, the aerodynamics of the free-falling dandelion diaspore in quiescent flow will be discussed. Dandelions can be described by permeable disks and plates. Their aerodynamics is governed by the Reynolds, Galilei and Darcy numbers, whose effect on the aerodynamics of disks will be discussed. Novel experimental and numerical methods for studying transverse gusts will be presented, revealing how each horizontal wind gust uplifts the dandelion further increasing its endurance. Finally, we will provide an overview of our progress on the development of this technology.

Prof. Ignazio Viola

Ignazio Maria Viola is Professor of Fluid Mechanics and Bioinspired Engineering at the School of Engineering of the University of Edinburgh, Distinguished Visiting Professor at Tsinghua University, and Adjunct Professor at the Alma Mater Studiorum University of Bologna. His research is in unsteady aerodynamics and fluid structure interaction and includes applications to passively morphing sails, wings and blades, and free-falling small flyers. He publishes in Nature, Nature Communication, eLife, Renewable Energy, Journal of Fluid Mechanics, etc. He is the Functional Vice President Alt. of Knowledge Management of the Society of Naval Architects and Marine Engineers (SNAME), and a member of several Executive Committees, including the Group on Energy Research and Applications of the American Physical Society, the UK Fluids Network, the UK Robotics and Autonomous Systems Network, etc. He is Editor-in-Chief of the Journal of Sailing Technology (SNAME), and Associate Editor of the Journal of Offshore Mechanics and Arctic Engineering (ASME), and the Journal of Ocean Engineering and Marine Energy (Springer).

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