



UNIVERSITÀ DEGLI STUDI DI GENOVA
SCUOLA POLITECNICA

DICCA, Dipartimento di Ingegneria Civile, Chimica e Ambientale

ANNUNCIO DI SEMINARIO

“THE KERNEL WAVE PERSPECTIVE: FROM GEOPHYSICS TO ENGINEERING”

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Mercoledì 5 Giugno, 2019 – ore 11:00
Scuola Politecnica, Villa Cambiaso
Aula A11 (presso il DICCA)

Il seminario sarà tenuto in italiano o inglese, a seconda del pubblico presente.
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Abstract

Within the geophysical sciences, shear instability is known to be an important cause of turbulence and mixing in the atmosphere and oceans. A linear stability analysis is often used to determine whether small perturbations applied to the flow will grow in time. However, the results of stability analyses can often be nonintuitive, and one would hope that a consistent physical interpretation of instability can help to explain these results. One such physical interpretation, i.e. the kernel wave perspective, is based on the idea that two otherwise stable waves that exist in the flow may interact to produce instability. In this seminar this physical interpretation is taken away from its natural habitat, i.e. from geophysical sciences, and exploited for industrial purposes. In particular it is used to improve the design of the injectors of rockets engines where the combustion efficiency is strictly connected with the quality of the mixing between gaseous H₂ and liquid O₂. The kernel wave perspective helps us in explaining (i) why adding a recess to these injectors the mixing significantly improves and (ii) the counterintuitive destabilising effect of the surface tension at the interface between these two fluids.

Short Bio

Dr. Luca Biancofiore received his Ph.D degree in Fluid Mechanics/Applied Mathematics at University of Nice-Sophia Antipolis (France) under the supervision of Dr. François Gallaire (EPFL, Switzerland) and Dr. Richard Pasquetti (University of Nice). During his thesis he spent three months as an invited researcher at EPFL. In light of his research contributions, he was selected as recipient of (i) the 2012 Göran Gustafsson Fellowship in Science (a competitive prize, awarded to three fellows after an international competition, in order to attract promising young scientists to Sweden), (ii) the 2012 Marie Curie Intra-European Fellowship (IEF), (iii) the 2015 Imperial College Research Fellowship.

In 2016 he started to work as Assistant Professor in the Mechanical Engineering Department at Bilkent University where he established the FluidFrame Lab (<http://web4.bilkent.edu.tr/fluidframe/people/>). He is currently PI of several ongoing projects funded by National and European research agencies.