

ME:6260 Viscous Flow Seminar

Date: 04/30/24, 9:30am – 10:45am

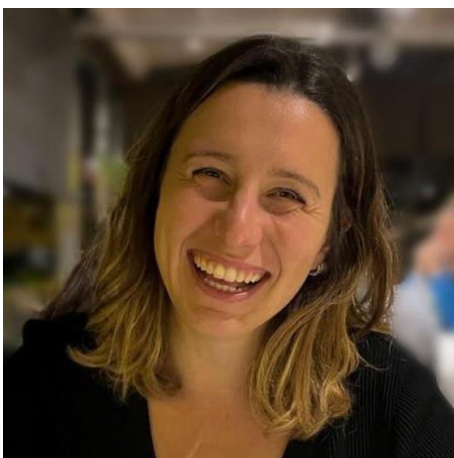
[Zoom link to join](#)

Talk "Laminar-to-Turbulence Transition Modeling for Incompressible Flows in a RANS Framework".

Today, computational fluid dynamics (CFD) simulations play a fundamental role in design decisions for marine vehicles and aircraft. When simulating a fluid flow using a Reynolds Averaged Navier-Stokes (RANS) approach, it is common practice to assume that the flow is fully turbulent. This assumption is appropriate for full-scale ships, submarines, and aircraft, and also at model scale, when the flow is tripped near the leading edge to force turbulence within the boundary layer. Nevertheless, there is a wide range of practical applications dealing with low/moderate Reynolds numbers where transition effects are important, if not dominant. This is the case for unmanned air and sea vehicles, small submarines, but also for wind energy systems such as wind turbines.

This presentation is devoted to the analysis of the performance of the RANS Local Correlation Transition Models (LCTM) developed by Menter (2009, 2015). These models are a set of transport equations built using local information, based on experimental correlations, and coupled to existing turbulence models. Their performance is evaluated for different transition mechanisms and different configurations, most of which come from the NATO AVT-313 collaboration, to highlight both their strengths and weaknesses. Finally, some perspectives on the future of RANS transition modeling are given.

Short Bio:



Dr. Ginevra Rubino is a postdoctoral researcher in the Fluid Dynamics and Ship Theory group at the Technical University of Hamburg. She received her Bachelor's degree in Mathematics from Università La Sapienza in Rome in 2015. She then obtained her Master's degree in Mathematical Engineering from the Polytechnic of Turin in 2017 and an M2 in Computational Mechanics from the Ecole Centrale Nantes in the same year. In 2021, Dr. Rubino successfully defended her Ph.D. at the Ecole Centrale Nantes with a work devoted to laminar-to-turbulence transition modeling for incompressible flows in a RANS framework. Her main research interests revolve around turbulence and transition modeling.