

Colloquium Thermo- and Fluid Dynamics

Cavitation in High-Speed Sailing

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Even though sailing ships existed more than 5000 years ago, their true golden age was between the 15th and 19th centuries. The advent of diesel engines and later aviation relegated sailing ships to sports and recreational activities. Yet, the ongoing climate change is giving sailing ships a second wind, as they are increasingly seen as a viable solution for decarbonizing maritime transport. Throughout their long history, speed has always been a major challenge. The recent advent of foil boats represents a true revolution, which enabled breaking the 75-year-old record for crossing the North Atlantic, reducing it from 13 days in 1905 to less than 4 days in 2009. Nowadays, with sailboat speeds approaching the mythical 50-knot limit, major obstacles have emerged, related to cavitation and flow-induced vibrations. In this presentation, I will review the work conducted at EPFL in close collaboration with various sailing teams, aiming to break the world sailing record. This includes tests in high-speed cavitation tunnel to investigate the cavitation occurrence and its influence on the hydrodynamic and structural performances. In particular, we developed ventilated foils to mitigate cavitation effects and passive control of the flow to reduce the vortex induced vibration.



Mohamed Farhat holds a Master degree from Institut Nationale Polytechnique de Grenoble in France and a PhD from Ecole Polytechnique Fédérale de Lausanne. He worked in R&D center of Hydro Quebec (Montreal, Canada) from 1995 to 2002. He then joined EPFL to lead the Cavitation Research Group. Dr Farhat is active in various topics involving experimental fluid dynamics, including hydraulic machines, marine propulsion, cavitation, fluid-solid interaction, sloshing, high-speed sailing and hemodynamics.

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Time: 16:15 - 17:15h

Place: ETH Zurich, ML H 44

Host: Prof. Outi Supponen