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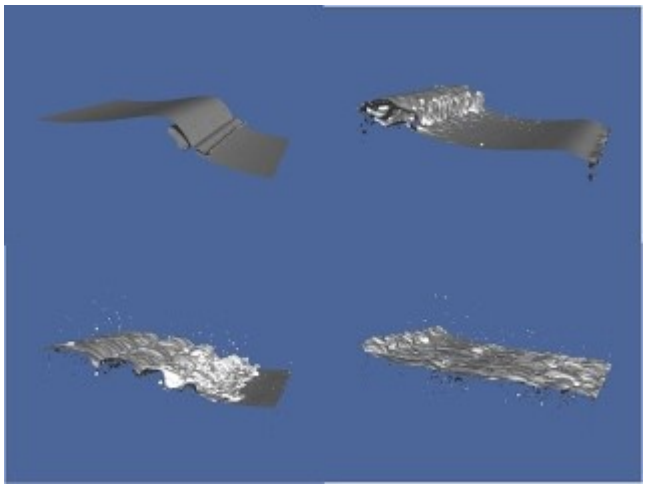
Will present

Two-Phase Turbulence in Breaking Waves

On
Monday, September 26th
at
12:30 PM EQUAD Rm J223

Complex turbulent mixture of fluids are encountered in various environmental situations: air water fluxes in the ocean, lakes or in coastal areas, spray dynamics in the atmosphere or water droplets in clouds. They are also prevalent in industrial contexts, such as atomization in chemical reactors, or oil and gas transportation challenges. However a fundamental understanding of the general multi-scale properties of such multiphase turbulent flows is still lacking.

Breaking waves at the water surface is a striking example of turbulent mixing across a fluid interface. The impact of the jet generates turbulence, entrains air into the water and ejects droplets into the air. In this talk, I will present laboratory experiments and novel direct numerical simulations of breaking waves that bring new insights into the associated two-phase turbulent flow. I specifically address the dissipation of energy and the entrainment of air bubbles for a single breaking wave. I will then discuss the up-scaling to the ocean and implications for air-sea exchanges of gases and marine aerosols, key to the climate system.



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