

The alteration and control of near-wall turbulence by complex surfaces

Dr. Ricardo Garcia-Mayoral
University of Cambridge
Department of Engineering
Trumpington Street
Cambridge CB2 1PZ
United Kingdom

The structure of turbulence near walls can be altered by the presence of surface features such as roughness or texturing, providing opportunities to control the flow passively. While smooth walls force all three velocity components to become zero at the same plane, flows over complex walls can exhibit different 'virtual origins' for the streamwise, spanwise and wall-normal velocities. This can give rise to significant changes in drag, as well as in the structure of the flow. Through DNS and modelling, we will illustrate the mechanisms involved using three examples: superhydrophobic textures, permeable substrates and densely packed canopies.