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Modelling boundary layer flow over barnacle-fouled surfaces JASIM SADIQUE, XIANG YANG, CHARLES MENEVEAU, RAJAT MITTAL, Johns Hopkins University — Macro-biofouling is a critical concern for the marine industry. However, there is little data on flow and drag over such surfaces. Accurate modelling of such multi-scale flows remains a big challenge. Such simulations are vital in providing insights into the fundamental flow physics, and they can be used to estimate the timing, need and effectiveness of measures used to counteract bio-fouling. This talk focuses on the use of a sharp-interface immersed boundary method coupled with a wall model and large-eddy simulations to carry out accurate simulations of a turbulent boundary layer flow over macro-fouled surfaces. For the current study, high resolution scans of barnacles were used to create simple geometrical representations. Simulations were then carried out to test how well these simpler geometric models mimic the flow over actual barnacles. Simulations of array of modeled barnacles, with different barnacle densities have also been carried out and we present results on the effect distribution density on the flow physics and drag on the surfaces. This work is funded by ONR grant N00014-12-1-0582.

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