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Flow over Superhydrophobic Hydrofoils ROBERT DANIELLO, JONATHAN SULLIVAN, JONATHAN ROTHSTEIN, University of Massachusetts, Amherst — For several years, superhydrophobic surfaces which are chemically hydrophobic with micron or nanometer scale surface features have been considered for their ability to reduce drag in microfluidic devices. More recently it has been demonstrated that superhydrophobic surfaces reduce friction coefficient in turbulent flows as well. In this talk, we will consider the effect of superhydrophobic surfaces on drag, lift and fluid-structure interactions of hydrofoils and the effect of superhydrophobicity on separation point and vortex structure at high angles of attack. Drag reductions and significant changes to the fluid structure interactions are observed with the presence of superhydrophobic coatings. Hydrofoils are coated with patterned microridge geometries from 5μm to 30μm. Selectively coated symmetrical hydrofoils are also examined to characterize the effect of superhydrophobicity on lift behavior. Particle image velocimetry, streak images and direct force measurements will be presented. Experiments were conducted over the range of Reynolds numbers $100<Re<10{,}000$ demonstrating the effect of the coating on laminar, transitioning and turbulent flow regimes.

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