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Drag Reduction On Multiscale Superhydrophobic Surfaces[1] ELLIOT JENNER, University of Pittsburgh, CHARLOTTE BARBIER, Oakridge National Laboratory, BRIAN D'URSO, University of Pittsburgh — Fluid drag reduction is of great interest in a variety of fields, including hull engineering, microfluidics, and drug delivery. We fabricated samples with multi-scale superhydrophobic surfaces, which consist of hexagonally self-ordered microscopic spikes grown via anodization on macroscopic grooves cut in aluminum. The hydrodynamic drag properties were studied with a cone-and-plate rheometer, showing significant drag reduction near 15% in turbulent flow and near 30% in laminar flow. In addition to these experiments, numerical simulations were performed in order to estimate the slip length at high speeds. Furthermore, we will report on the progress of experiments with a new type of surface combining superhydrophobic surfaces like those discussed above with Slippery Liquid Infused Porous Surfaces (SLIPS), which utilize an oil layer to create a hydrophobic self-repairing surface. These "Super-SLIPS" may combine the best properties of both superhydrophobic surfaces and SLIPS, by combining a drag reducing air-layer and an oil layer which may improve durability and biofouling resistance.

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