

Abstract Submitted  
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**Liquid infused surfaces in turbulent channel flow**<sup>1</sup> MATTHEW FU, HOWARD STONE, ALEXANDER SMITS, IAN JACOBI, MOHAMED SAMAHA, JASON WEXLER, JESSICA SHANG, BRIAN ROSENBERG, LEO HELLSTRÖM, YUYANG FAN, KAREN WANG, KEVIN LEE, MARCUS HULTMARK, Princeton University — A turbulent channel flow facility is used to measure the drag reduction capabilities and dynamic behavior of liquid-infused micro-patterned surfaces. Liquid infused surfaces have been proposed as a robust alternative to traditional air-cushion-based superhydrophobic surfaces. The mobile liquid lubricant creates a surface slip with the outer turbulent shear flow as well as an energetic sink to dampen turbulent fluctuations. Micro-manufactured surfaces can be mounted flush in the channel and exposed to turbulent flows. Two configurations are possible, both capable of producing laminar and turbulent flows. The first configuration allows detailed investigation of the infused liquid layer and the other allows well resolved pressure gradient measurements. Both of the configurations have high aspect ratios 15-45:1. Drag reduction for a variety of liquid-infused surface architectures is quantified by measuring pressure drop in the channel. Flow in the oil film is simultaneously visualized using fluorescent dye.

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