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Impact of Curved Profiles on the Drag-Reducing Ability of Riblet-Textured Surfaces SHABNAM RAAYAI, Harvard University — Inspired by the rib-like textures on the denticles of fast swimming shark species, riblet-textured surfaces have been shown to be an effective passive method for reducing the frictional drag force on walls. In addition to flow dynamics (i.e. the Reynolds number), the level of reduction, achieved by application of these parallel grooves aligned in the flow direction, is directly dependent on the geometry and the shape of the cross-sectional profiles of these textures. Previous research has been focused on the study of the changes in the total frictional drag as a function of riblet wavelength and amplitude (as the key geometric parameters) and mainly centered around riblets with V-groove profiles. Here, I will discuss the impact of the variations in the cross-sectional profiles of the riblets on the changes in the total frictional drag. Using a custom-designed Taylor-Couette cell with 3D-printed texture-covered rotors, I will explore the case of different curved profiles and discuss the effect of concave vs. convex cross-sectional shapes on the ability of the riblet surfaces to reduce the total frictional torque exerted on the textured rotors. Lastly, I will compare the effectiveness of riblets with curved-profiles against the conventional V-grooves (linear profiles).

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