Abstract Submitted
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**Skin friction measurements of systematically-varied roughness: Probing the role of roughness amplitude and skewness**[1] JULIO BARROS, KAREN FLACK, MICHAEL SCHULTZ, U.S. Naval Academy — Real-world engineering systems which feature either external or internal wall-bounded turbulent flow are routinely affected by surface roughness. This gives rise to performance degradation in the form of increased drag or head loss. However, at present there is no reliable means to predict these performance losses based upon the roughness topography alone. This work takes a systematic approach by generating random surface roughness in which the surface statistics are closely controlled. Skin friction and roughness function results will be presented for two groups of these rough surfaces. The first group is Gaussian (i.e. zero skewness) in which the root-mean-square roughness height ($k_{rms}$) is varied. The second group has a fixed $k_{rms}$, and the skewness is varied from approximately -1 to +1. The effect of the roughness amplitude and skewness on the skin friction will be discussed. Particular attention will be paid to the effect of these parameters on the roughness function in the transitionally-rough flow regime. For example, the role these parameters play in the monotonic or inflectional nature of the roughness function will be addressed. Future research into the details of the turbulence structure over these rough surfaces will also be outlined.

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