Date: March 14

Time: 11:00 AM

Location: Maryland Hall 110

Speaker: Dr. Michael Schultz

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Title:*"The effect of surface roughness on wall-bounded turbulent flows"*

Abstract

In turbulence research, a great deal of attention has been given to wall-bounded flows over smooth surfaces. While smooth-wall studies have provided a basis for understanding wall-bounded turbulence, surface roughness is present in most engineering applications and geophysical flows (e.g. ship hulls, piping systems, turbomachinery & atmospheric boundary layers). The goal of the present research is to gain a better physical understanding of surface roughness effects on turbulent flows. To this end, several fundamental questions remain unresolved. For example, Townsend's Reynolds number similarity hypothesis states that the turbulence outside the roughness sublayer, a region extending a few roughness heights from the wall, is independent of surface condition at sufficiently high Reynolds number. This implies that the roughness simply plays a role in setting the velocity and length scales for the outer flow without altering the turbulence structure. The existing literature, however, contains conflicting views on this hypothesis. And, from a practical perspective, perhaps the most important unresolved question regarding surface roughness is to identify suitable roughness length scales that can be used to predict the frictional drag of a body covered with any generic roughness. Recent experimental results will be discussed which hopefully shed some light on these questions.