

Weekly Seminar: Spring 2010

Date: Friday April 9

Time: 11:00 AM

Location: Maryland Hall 110

Speaker: Mark Tachie (University of Manitoba)

Title: *"Experimental Study of Pressure Gradient Turbulent Flows over Transverse Ribs"*

Abstract

Periodic arrays of transverse ribs are often employed to model surface roughness, and to study the effects of surface roughness on momentum transport and turbulence structure. They are also used to augment heat transfer performance in a wide range of engineering applications. In the latter applications, the ribs are often inclined at an angle to the main flow. Although most of the previous studies over ribs and other roughness elements have focused on the classical fully developed channel flows or zero pressure gradient turbulent boundary layers, both pressure gradient and surface roughness are present in many engineering applications. There is, therefore, a need to understand the combined effects of surface roughness and pressure gradient on drag and transport characteristics in turbulent flows. This presentation will focus on an experimental research program to study the effects of pressure gradients on turbulent flows over both inclined and aligned transverse ribs. These experiments were performed in both adverse and favorable pressure gradient turbulent flows over d -type and k -type ribs. The velocity measurements were performed using a planar particle image velocimetry. From these measurements, the mean velocities and turbulent statistics were obtained to document the combined effects of pressure gradient and surface roughness on the mean flow and turbulent characteristics.