Weekly CEAFM Seminar: Fall 2015

JOHNS HOPKINS
Center for Environmental
& Applied Fluid Mechanics

Date: **Friday, October 30, 2015**

Time: 11:00 AM

Location: Gilman Hall # 132

Speaker: **Prof. Ivan Marusic** (University of Melbourne)

Title: ***"High Reynolds Number Wall Turbulence: Universality, Structure and Interactions"***

Abstract

A key consideration in the characterization of the mechanics of turbulent flows is to understand the generation, evolution and interactions of the large-scale structures and the range of eddying motions that make up the turbulent flow. The non-linearity of these processes makes the problem very challenging, both computationally and experimentally. This is particularly true in wall-bounded flows where an increasing hierarchy of energy-containing eddy scales exists with increasing Reynolds number.

In this talk we will review recent studies in high Reynolds number flow facilities and from the atmospheric surface layer documenting unique high Reynolds number phenomena in wall turbulence. The focus will be the logarithmic region, looking at issues regarding its universality, coherent structures and how they interact across the boundary layer. These findings lead to a new consideration of so-called "inner-outer" interactions and form the basis of a predictive model for the near-wall inner region and the wall-shear stress. The implications of this model will be discussed.

Bio

Ivan Marusic is an Australian Research Council Laureate Fellow and Professor in the Department of Mechanical Engineering at the University of Melbourne. He received his PhD in 1992 and BE (Hons) Mech in 1987 from the University of Melbourne. His research is primarily in experimental and theoretical studies of turbulence at high Reynolds numbers. This includes studies in atmospheric surface layer flows and aquatic ecosystems. Prior to arriving in Melbourne in 2007 as an ARC Federation Fellow he was a faculty member at the University of Minnesota, where he was a recipient of an NSF Career Award and a Packard Fellowship in Science and Engineering. He is an Associate Editor of the Journal of Fluid Mechanics, and a Fellow of the American Physical Society and the Australasian Fluid Mechanics Society. In 2014 he was elected as a Fellow of the Australian Academy of Science.