Date: **December 2nd, 2005**

Time: **11:00 AM**

Location: **Maryland Hall 110**

Speaker: **Dr. Alexander Yakhot**
Department of Mechanical Engineering
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Title: **"Turbulent Flow and Heat Transfer Around a Wall-Mounted Cube: a Direct Numerical Simulation"**

Abstract

An immersed boundary method was employed to perform a direct numerical simulation (DNS) of flow and heat transfer around a wall-mounted cube in a fully-developed turbulent channel flow for a Reynolds number Re =5,610, based on the bulk velocity and the channel height. In order to specify the fully-developed inflow condition, an entrance (upstream) channel was introduced where DNS simulations were run simultaneously with the main computation procedure. The objectives of this work were to test the recent trend to employ immersed-boundary methods for simulating turbulent flows and heat transfer, and to examine the feasibility of using DNS for complex geometry flows. We present the time-averaged data on the following turbulence statistics: mean-square intensities, Reynolds shear stress, kinetic energy, dissipation rate, Kolmogorov's length scale and turbulent heat flux. We draw attention to the occurrence of negative turbulence kinetic energy production in front of the cube that is relevant for turbulence LES/RANS modeling.