



JOHNS HOPKINS  
Center for Environmental  
& Applied Fluid Mechanics

## Weekly CEA FM Seminar: Spring 2013

Date: **Friday, February 1, 2013**  
Time: 11:00 AM  
Location: Gilman 50 (Marjorie M. Fisher Hall)  
Speaker: **Dr. Xiaohua Wu** (Royal Military College of Canada)  
Title: ***"Osborne Reynolds Pipe Flow and Ludwig Prandtl Boundary Layer: Direct Computation from Laminar to Fully-Developed Turbulence"***

### Abstract

Modern fluid mechanical science rests upon two corner-stone building blocks: the incompressible flow through a smooth pipe (the Osborne Reynolds pipe flow), and the incompressible boundary layer over a smooth flat-plate at zero pressure-gradient (the Ludwig Prandtl boundary layer). These two idealizations, in the meantime, are also the limiting cases and calibration benchmarks of many complicated practical engineering flows. Recently, we computed the pipe flow and the boundary layer from first-principle in the laboratory framework. The pipe flow exhibits a turbulence onset scenario that bears certain similarities and differences to the bypass transition process found in the boundary layer with continuous free-stream turbulence.