



## Meteorology Seminar

**Title:** The Spectra and Vortices of Two-dimensional Turbulence

**Speaker:** Dr Colm Connaughton (Center for Nonlinear Studies, Los Alamos National Laboratory)

**Date:** Mon 24th July 2006 at 2:15PM

**Location:** Mathematical Sciences Seminar Room

**Abstract:** I will describe the physics of so-called "blocked inverse cascades" in two dimensional turbulence. A blocked cascade occurs when the large scale dissipation is too weak to dissipate all of the energy pumped into the inverse cascade before it reaches the size of the system. This blocking facilitates the generation of very intense coherent vortices on the scale of the system which are qualitatively different to the vortices observed in the regular inverse cascade. They are stabilised by finite size effects and as a result can become much more intense than regular vortices. They can have a strong impact on the energy spectrum and other "standard" turbulence diagnostics. In particular the presence of these large scale vortices tends to replace the usual  $k^{-5/3}$  energy spectrum with a  $k^{-3}$  spectrum at the largest scales. I will make some speculations about where