

The Fourth Brooke Benjamin Lecture on Fluid Dynamics

Wednesday 19 May 2010 at 5pm

Lecture Theatre 1
Mathematical
Institute
University of Oxford

Tom Mullin

Manchester Centre for Nonlinear Dynamics
University of Manchester

‘The Enigma of the Transition to Turbulence in a Pipe’

The puzzle of why fluid motion along a pipe is observed to become turbulent as the flow rate is increased remains the outstanding challenge of hydrodynamic stability theory, despite more than a century of research. The issue is both of deep scientific and engineering interest since most pipe flows are turbulent in practice, even at modest flow rates. All theoretical work indicates that the flow is linearly stable ie infinitesimal disturbances decay as they propagate along the pipe and the flow will remain laminar. Finite amplitude perturbations are responsible for triggering turbulence and these become more important as the non-dimensional flow rate, the Reynolds number Re , increases. It is now established that there are several scalings with Re of the amplitude of the disturbance required to cause transition. Each of these provides insights into the origins of the turbulent motion and links are beginning to be made with recent discoveries of new solutions to the Navier Stokes equations.

**All are warmly invited to attend the lecture and reception
that follows.**

<http://www.maths.ox.ac.uk/events/brooke-benjamin-lecture>