



The  
University  
Of  
Sheffield.

The Department of Automatic Control & Systems Engineering  
is pleased to announce the following seminar:

## **Modelling and feedback control of flow resonances**

***Speaker: Dr Simon Illingworth***

*Department of Engineering, University of Cambridge*

**Wednesday, 6 February 2013 at 14:00**

**Location: Sir Henry Stephenson Building, Lecture Theatre LT02**

### **ABSTRACT**

Feedback flow control has been investigated for a number of unstable fluid flows, but many of the early studies used simple phase-shift controllers that were found by trial-and-error. More recently, the application of linear control theory to fluid flows has been promoted. My presentation will focus on model-based feedback control of flow resonances, with application to three systems: combustion instability on a laboratory-scale rig (a Rijke tube); compressible cavity oscillations; and vortex shedding from a circular cylinder at low Reynolds numbers. The presentation will focus in particular on finding low-order models of flow resonances that are useful for feedback control purposes. I will also demonstrate the improvements in performance (i.e. better resonance suppression) and robustness (i.e. control effectiveness over a larger range of operating conditions) that are possible when model-based control techniques are used. For all systems, in addition to demonstrating the efficacy of the feedback controllers, I will also discuss some of the challenges of control.

*Refreshments are available following the talk*