



Department of Automatic Control & Systems Engineering
would like to announce the following seminar:

Minimizing Maximum Transient Energy - a Problem in Fluid Flow Control

Speaker: Dr James F Whidborne

**Dynamics, Simulation and Control Group
Department of Aerospace Sciences
Cranfield University**

**Wednesday 22nd February 2006
at 14:10**

Location: St Georges Mappin Building LT3

Coffee and Biscuits will be served afterwards.

ABSTRACT

Problems in fluid flow control as well as recent theoretical developments in the area of pseudospectra have renewed interest in the problem of controlling transient energy. Many fluid flow control problems are highly non-normal. This means the flow is very sensitive to small initial perturbations, with the consequence that despite the system being asymptotically stable, very small flow perturbations result in large deviations from the base flow with the result that the flow becomes unstable and turbulence results. For example, it is known that a laminar flow can become turbulent at much lower Reynolds numbers than those predicted by linear stability analysis. In the fluid dynamics community, the distance from the equilibrium is often measured by the energy of the transient deviations - and so minimizing the maximum transient energy by feedback is of interest in fluid flow control problems. In the presentation, the phenomena of transient energy will be investigated, and methods to minimize the maximum transient energy proposed. The methods will be applied to the problem of maintaining laminar flow in a channel.