



The
University
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Sheffield.

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

Nonlinear Dynamics for Engineering Design

Speaker: Professor Marian Wiercigroch

*Centre for Applied Dynamics Research, School of Engineering,
University of Aberdeen*

Wednesday, 17 April 2013 at 14:00

Location: Sir Henry Stephenson Building, Lecture Theatre LT02

ABSTRACT

In this lecture I will paint a broad picture of the nonlinear world and examine implications of this view on science and engineering. Through carefully chosen examples from everyday life, science and engineering I will show just how nonlinear and dynamic our world really is.

In the first part, I will define nonlinearity and nonlinear dynamics. Specifically I will focus on a class called non-smooth dynamical systems. Then I will show how such problems can be effectively modelled and analysed by low dimensional dynamical systems. The generic complexity of non-smooth dynamics will be demonstrated by a soft impact oscillator – an archetypal model for the high frequency vibro-impact drilling.

The second part will be devoted to what we might call Nonlinear Dynamics for Engineering Design where I will present results from my recent projects, where nonlinear dynamic interactions have been used to enhance the performance of real systems and structures. I will put a special emphasis on one large project from oil and gas industry, where we have developed a revolutionary downhole drilling technology. I will argue that this would not be possible in a linear and static world!