Applied **Optics** group
http://optics.eee.nottingham.ac.uk

The University of Nottingham

The Electrical Systems & Optics Research Division invites you to:

Applied Optics Group Lunchtime Seminar

"On using long-range ultrasonics to track corrosion rates in pipelines via adaptive machine learning"

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Abstract: Monitoring corrosion in oil and gas pipelines has recently gained in popularity using long-range ultrasonic techniques. Recent monitoring advances uses permanently installed long-range ultrasonic transducers, requiring a continuous monitoring system. Therefore any predictive or forecasting methodology utilised in this area to monitor pipelines must be adaptive in its behaviour. Current machine learning methods used in this area to predict the corrosion level carry out supervised learning, which assumes that the corrosion level (rate) of the pipeline is known throughout the life span of the pipe. This is unrealistic, as in practice one will not know the corrosion level in advance. We propose a novel technique of predicting and forecasting the corrosion level using adaptive machine learning (online learning). We assume no prior knowledge of the depth of corrosion in the pipe, and apply an unsupervised learning technique to generate outputs for our adaptive machine learning algorithm to use. We show that in this realistic scenario our novel model can track the rate of corrosion as well as can be achieved when the complete level of corrosion is known in advance. Therefore, our model can be used in practice to track the rate of corrosion in oil and gas pipelines.

1pm **Thursday** 13 May 2010
2nd Floor Lecture Theatre
Tower Building. All welcome
http://optics.eee.nottingham.ac.uk/seminars