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PhD full-fees scholarship for China Scholarships Council scholars from Zhejiang University

***Project: Inferring and Revealing Interactive Dynamics from High Dimensional
Observations with Applications in Medicine***

The need for high dimensional data modelling and analysis arises in diverse fields and a typical example for such a need is in biomedical, biophysical and image data analysis, especially associated with the brain, where methods such as dimensionality reduction, feature (and variable) subset selection and extraction, multivariate and multiple data modelling, causal and interactive dynamic modelling and so on play a key and important role. While some analysis approaches are available, existing tools only provide very limited information about the activity of the brain and cannot provide a detailed understanding of the spatial and temporal interactive dynamics and network activity of different brain areas during important mental states and processes. The interactive dynamics between the activated brain areas, which generally involve complex coupled nonlinear dynamics, can only be discovered and quantified by introducing transparent and interpretable multivariate and high dimensional data modelling and analysis techniques.

There is now a unique opportunity to extend existing collaborations with Dr Sarrigiannis, a neurophysiologist, to develop and exploit adaptive data analysis and nonlinear dynamic modelling and interpretation methods that have been developed within ACSE for application to real neural data sets. The unique ability to model nonlinear dynamic effects in the time, frequency, and spatial domains, and to detect and monitor medical disease (e.g. seizures) shows great medical promise.

It is believed that potential outcomes of this project can be adapted and applied to other biomedical and neuro-imaging data.

Supervisors: Dr. Hua-Liang Wei (Automatic Control and Systems Engineering) and Professor S. A. Billings (Automatic Control and Systems Engineering)

Scholarship: Sheffield Engineering scholarships cover the full cost of PhD registration fees for 3 years

Eligibility: Sheffield Engineering scholarships are available to students who secure a CSC scholarship. Applicants must meet the University of Sheffield English Language requirements, full details of which are available at:

<http://www.shef.ac.uk/postgraduate/info/englang.html>

Applications: Please send a CV together with a brief covering letter to Dr Catherine Biggs, Faculty of Engineering Head of Research Studies at c.biggs@sheffield.ac.uk by **17th Feb 2010**. Include the title of the project in your covering letter and any English language test results.