



The
University
Of
Sheffield.

Faculty
Of
Engineering.

Sheffield Engineering Scholarships

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

Project: *Towards accurate indolent prostate cancer prediction via gene expression profiling*

Prostate cancer is a common cancer with more than 35,000 new cases reported in the UK in 2006 (Cancer Research UK). In the early stage of the screening process it is of paramount importance to distinguish between significant and indolent (slow growing) cancer. This early categorisation of cancer aggressiveness not only helps the patient avoid unnecessary treatment (often with serious side-effects) but will also provide substantial savings to national health care programmes. Existing data-driven predictive methodologies (regression, prognostic nomograms) and statistical data analysis methods struggle to cope with the inherited noise and uncertainty associated with this type of clinical and gene expression data therefore yielding average prediction results. Furthermore, the generalisation ability of existing models is very poor, i.e. failing to accurately predict new patient cases, which limits their scope of usage.

The aim of this proposed PhD Degree research will be to investigate a hybrid modelling framework able to tackle the issues of generalisation, identification of important parameters, and accurate predictions. A multidimensional approach will be examined where the modelling structure uses numerical data (clinical data, gene expression data) as well as linguistic information (clinical knowledge, biomedical knowledge, heuristic models) towards the building of 'patient maps' and associated 'rules'. Such rules will merge the available information and by taking into consideration data-induced uncertainty criteria will be able to lead to reliable predictions for this potent type of cancer.

Supervisors: Dr G Panoutsos (Automatic Control and Systems Engineering), Professor M. Mahfouf (Automatic Control and Systems Engineering) and Dr J Catto (The Medical School).

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.