



EPSRC-DSTL Ph.D. Research Studentship:

Cooperative Localisation: Distributed Optimisation with Hypothesis Testing

Communications and Information Systems Group

Providing a useful localisation will require, in some cases, metre-perfect resolution to be achieved over air. Yet, the fundamental physical challenges such as channel fading, low signal-to-noise ratios, multiuser interference, and multipath conditions have put obstacles on meeting the objective. Our vision of next-generation (xG) localisation systems will be the provision of dynamic, distributed, robust and high-resolution location-based services (LBSs). The realisation of these xG LBSs will require advanced signal processing and intelligence at the nodes to resolve the problem of interference and to detect the presence of a direct line-of-sight (LoS).

This innovative 3-year programme, supported by EPSRC-DSTL, aims to investigate the use of mobile user cooperation for localisation. The novelty of user or node cooperation lies in that nodes can work collaboratively by proper relaying to mitigate the multipath interference that can help identify the LoS for ranging in the presence of delay paths. The cooperation can, more importantly, exchange positioning information from one node to another so that location ambiguity due to the lack of LoS signal paths could be removed and higher resolution can also be achieved. Another novelty of this proposal is the use of hypothesis testing based machine learning for the detection of LoS, which will be integrated with the cooperative signal processing for wireless localisation. This exceptionally challenging objective also has the potential to redefine the architecture of wireless networks, provide a novel system solution for organising the access of users to the system resources in this cooperative and self-regulating architecture, and revolutionise key areas of the 21st century ICT.

The successful candidate will be working with Dr Kit Wong and will ideally meet the following criteria:

1. First (minimum upper second) or Masters degree in Electronic Engineering, with excellent analytic skills.
2. Strong background in wireless communications and signal processing.
3. Experience and familiarity with optimisation techniques.
4. Excellent mathematical skills.
5. Programming experience (e.g. Matlab).

The studentship is for three years and provides payment of tuition fees at the UK/EU rate plus a stipend at the level of approximately £15,363 per annum (normally tax free), increasing with inflation. Applicants must fulfil EPSRC eligibility criteria and the normal academic requirements for acceptance for postgraduate study in the Department. Further information regarding the Department is available at www.ee.ucl.ac.uk

Applications should be made using the standard UCL Research Student application form, obtainable at <http://www.ucl.ac.uk/prospective-students/graduate-study/application-admission>, or from PhD Enquiries, +44(0) 20 7679 7307. Candidates should indicate on the application form under 'Programme of Study' that they are applying for "Localisation - Wong". Candidates should send **two** complete sets of the application form (including references) by **15th February 2010**. One application set should be directed to the Registry (as per application form), and a copy sent directly to: Dr Kit Wong, Department of Electronic & Electrical Engineering, UCL, Torrington Place, London, WC1E 7JE, England; k.wong@ee.ucl.ac.uk, to whom informal enquiries may also be directed. The project is to commence between February and August 2010.