1. Title:

\textit{Sum-of-Sinusoid channel models for wireless ad-hoc networks}

\textbf{Supervisor: Dr. Salman Durrani}

\textbf{Abstract:}

Channel Modelling is one of the most important and fundamental research areas in wireless communications. Recently, several new sum-of-sinusoid models have been proposed for simulation of Rayleigh-faded cellular channels. Sum-of-Sinusoid channel models are formed by sum of multiple sinusoidal waveforms having frequencies, amplitudes and phases that are appropriately selected to reproduce the desired channel properties. This project has two main parts. The first objective is to mathematically analyse and verify the statistical (autocorrelation and cross-correlation) properties of the sum-of-sinusoid models for cellular channels and compare with desired properties (as number of sinusoids approaches infinity). The second objective is to study application of sum-of-sinusoid models for simulating mobile-to-mobile channels, which are required for design and testing of wireless ad-hoc networks. This project will appeal to a student with an interest in mathematical modelling.
2. Title:

*Dynamic Source Routing in Wireless Mobile Adhoc Networks*

**Supervisor:** Dr. Salman Durrani

**Abstract:**

Ad hoc networking is currently a very active area of research. A mobile ad hoc network consists of multiple wireless nodes that can move around and communicate without the need for any existing network infrastructure or a central controller. Ad hoc routing protocols are at the core of ad hoc networks and must be designed to cope with the dynamic nature of the ad hoc network environment. The ad hoc routing protocols can be divided into two main categories: proactive (network topological information is maintained at every node) and reactive (a route is only calculated, when it is needed). This project will focus on *Dynamic Source Routing* (DSR) which is a candidate for next generation mobile ad hoc network routing protocol. DSR is based on reactive routing approach and is designed for mobile ad hoc networks of up to about two hundred nodes and high rates of mobility. The aim of this project is to build a Matlab/Simulink simulation model for DSR. This project will appeal to a student with an interest in computer simulations.