1. Title:

Modelling of Link Duration in Wireless Ad hoc Networks

Supervisor: Dr. Salman Durrani

Abstract:

A wireless ad hoc network consists of self-organising nodes that can dynamically form a network, without the need for any pre-existing network infrastructure. Ad hoc networking technologies are expected to play a key role in enabling high speed, seamless and reliable communication in future fourth-generation (4G) wireless systems. In ad hoc networks, a link between two nodes is established when one node enters the transmission range of the other node and the link is broken when either node leaves the transmission range of the other. The link duration is defined as the time interval during which the link remains active. The link duration plays an important role in determining the performance of ad hoc networks.

This project has two main aims. The first objective is to analyse and implement the analytical model for link duration proposed in [1]. The second objective is to compare the performance of the proposed analytical model with existing node mobility models such as the random waypoint model. This research project will appeal to a student with an interest in Matlab based computer simulations.

Reference:

2. Title:

Interference in Wireless Ad hoc Networks  

Supervisor: Dr. Salman Durrani

Abstract:

A wireless ad hoc network consists of self-organising nodes that can dynamically form a network, without the need for any pre-existing network infrastructure. Ad hoc networking technologies are expected to play a key role in enabling high-speed, seamless and reliable communication in future fourth-generation (4G) wireless systems. In ad hoc networks, the interference among several users operating at the same time places a fundamental limit on the performance. Two approaches that have been proposed in the literature to model the interference are: (a) model the total interference in the form of Signal to Interference plus Noise Ratio (SINR) and (b) approximate the interference as just the power of the dominant (nearest) interferer.

This project has two main aims. The first objective is to develop a Matlab simulation model to compare the accuracy of the dominant (nearest) interferer approach to modelling interference in wireless ad hoc networks. The second objective is to investigate suitable strategies such as beamforming to mitigate the interference. This research project will appeal to a student with an interest in Matlab based computer simulations.