1. Title:

*Characterization of Wireless Propagation Environments Using Geometric Scatterer Models*

**Supervisor: Dr. Salman Durrani**

**Abstract:**

Channel Modelling is one of the most important and fundamental research areas in wireless communications. It plays a crucial role in design, analysis and implementation of wireless communication systems. The channel models can be divided into four main categories. These are (i) empirical models (ii) deterministic models (iii) geometric scatterer models and (iv) physical models.

This project will focus on geometric scatterer models, which assume that propagation between the transmitter and receiver takes place via a single scattering (reflection) from an intervening obstacle. It will consider the fundamental one-ring and two-ring models and use MATLAB to investigate and compare their temporal (time domain) and spatial (space domain) properties for different channel environments.
2. Title:

*Modelling and Simulation of Spatial Channel Model*

**Supervisor:** Dr. Salman Durrani

**Abstract:**

Channel Modelling is one of the most important and fundamental research areas in wireless communications. It plays a crucial role in design, analysis and implementation of wireless communication systems. The channel models can be divided into four main categories. These are (i) empirical models (ii) deterministic models (iii) geometric scatterer models and (iv) physical models.

This project will focus on physical channel models, which use important physical parameters to provide a reasonable description of the wireless channel characteristics. It will consider the Spatial Channel Model (SCM), which has been proposed by the Third Generation Partnership Project Two (a standardisation body for third generation cellular systems). The aim will be to build a SCM MATLAB simulation model for use in general wireless communication system level simulations.
3. Title:

A Software Simulation Test bed for Third Generation CDMA Wireless Systems

Supervisor: Dr. Salman Durrani

Abstract:

Over the last few years, wireless cellular communication has experienced rapid growth in the demand for wireless multimedia services such as internet access, multimedia data transfer and video conferencing. Thus the third generation (3G) wireless communications systems must provide a variety of new services with different data rate requirements under different traffic conditions, while maintaining compatibility with 2G systems. Examples of 3G standards, which are currently being deployed all over the world, include cdma2000 and Wideband-CDMA (W-CDMA).

This project will focus on cdma2000 air interface for the forward (mobile to base station) and reverse (base station to mobile) links. The objective will be to implement a MATLAB simulation test bed according to the physical layer specifications of cdma2000 system. The simulator developed will be used to investigate the performance of cdma2000 systems. There is additional scope to develop suitable theoretical bounds to verify the simulation results.