Title: Performance Analysis of Scheduling Algorithms for Smart Grid Wireless Networks

Smart Grid (SG) refers to a class of technology people are using to bring utility electricity delivery systems into the 21st century consist of computer-based remote control and automation. Wireless communication system is the key enabler of SG networks that links together the SG terminals in the residential homes with the power substation and electricity distribution centre. In SG networks, the data transmission is originated from and transmitted to SG devices located in residential houses. There is a high attenuation path-loss to send/receive datas in a confined space. This results in a SG network with very low reliability. As it is very expensive to use outdoor macro-cell LTE (Long-Term Evolution) base stations to serve these SG terminals, for cost effective networks, we propose to use low-cost low power LTE base station, referred to as a femtocell base station, installed in a residential home or office building, to improve local coverage and increase capacity and offload macro network traffic. LTE is a new high performance air interface standard for wireless cellular networks. In this project, we will simulate a femtocell network and investigate multiple scheduling algorithms for controlling radio resources so that the femtocell and base station can manage/avoid interference between them without human intervention. The student will learn how to develop a simulation model for LTE wireless cellular network and to analyse the performance of a LTE wireless cellular network. In addition, the student will be exposed to variety of scheduling algorithms which is used not only in wireless networks but also in other engineering field for planning relevant resources.

Title: LTE-based Iterative Receiver Scheme Prototype Development

University of Sydney has developed and patented an iterative receiver scheme for highly mobile users (e.g., > 340Km/h) consist of channel estimation and inter-carrier interference (ICI) cancellation methods. It estimates the wireless channel by using pilot symbols, estimates of the data symbols and Doppler spread information at the receiver. In this project, we would proof the benefit of using the iterative receiver concept that we have invented. We will develop a LTE based-software receiver prototype for the iterative receiver scheme and its corresponding LTE based-software base station transmitter prototype. LTE is a new high performance air interface standard for wireless cellular networks. The student will obtain significant understanding about LTE Standard. He/She will also obtain a specific skill in developing and testing algorithms which can easily be applied in any other engineering field for testing new concepts.