Title: North QLD: nothing beats the infectious disease transmission

Speaker: Roslyn Hickson (Australian National University)

Time and Date: 1:30pm, Thursday, August 25, 2011

Location: Room 15.206

Abstract: Mathematical modelling is a useful tool for informing the control of infectious diseases. I illustrate the use of modelling by two examples of infectious diseases currently problematic in northern QLD: tuberculosis (TB) and dengue.

Papua New Guinea (PNG) has a high burden of TB, and is suspected to have the highest proportion of multidrug-resistant TB in the world. The border between PNG and the Australian Torres Strait Islands is highly porous, with over 59,000 crossings a year protected by an international treaty. The common approach is to use a population level compartment model, where the population is divided into groups corresponding to different aspects of TB. This is used in conjunction with a metapopulation model to capture the border crossing behaviour in the region, to evaluate the effect of the World Health Organisation’s (WHO) control strategy.

Dengue is a growing problem in North QLD, with outbreak sizes increasing, and dengue overwintering in 2010. Dengue is transmitted via the mosquito vector Aedes Aegypti, which is becoming increasingly resistant to insecticides. An alternative strategy has been proposed, which introduces the Wolbachia bacterium into the mosquito population, and halves the adult lifespan. However, with the decreased fitness of the Wolbachia infected mosquitoes, it is not clear if they will be outcompeted in the wild. Mathematical modelling is used to evaluate the conditions under which they are likely to survive.