# Student Internship

## Infectious Disease Modelling

Never Stand Still | Medicine | The Kirby Institute

- Do you have strong mathematical/computational skills?
- Would you like to apply these skills to real-world problems in infectious disease epidemiology and earn some money at the same time?

A summer internship is offered in infectious disease modelling at the Kirby Institute (kirby.unsw.edu.au) under the guidance of Associate Professor David Regan (kirby.unsw.edu.au/people/dr-david-regan). David's research focuses on the development of mathematical models for studying the transmission dynamics of sexually transmissible infections and for evaluating strategies for their control and prevention. An enthusiastic undergraduate student with background in a quantitative discipline (mathematics, statistics, physics, engineering, computing, ecology) is sought to undertake a research project over the summer vacation period. A range of projects is available for the successful applicant to choose from, including:

- ***Mass drug administration for scabies control in a high prevalence setting***: Scabies is a contagious skin infestation by the mite *Sarcoptes scabiei*. High prevalence of scabies is reported in many developing countries and has recently been added to the WHO's list of neglected tropical diseases. A number of trials of mass drug administration for the treatment of scabies have produced promising results. This project will involve the development of a mathematical transmission model of scabies transmission that will be used to determine the optimal frequency of mass drug administration for the control of scabies.
- ***The impact of new cervical cancer screening guidelines on the epidemiology of trichomoniasis***: Trichomoniasis is a sexually transmitted infection caused by the protozoan parasite *Trichomonas vaginalis*. The shift from Pap smear to HPV testing as the primary triage for clinical management of cervical abnormalities means some cases of will go undiagnosed. This project will involve the development of a mathematical model of trichomoniasis transmission that will be used to quantify the impact of this shift on trichomoniasis incidence and prevalence in Australia.
- ***Emergence of drug resistance in Neisseria gonorrhoeae***: *Neisseria gonorrhoeae* (NG), the organism that causes the sexually transmissible infection gonorrhoea, has developed resistance to successive classes of antimicrobial drugs. There are now few proven effective therapeutic options available for the treatment of gonorrhoea. This project will involve the development of models of genetic mutation in NG that lead to antimicrobial resistance through selective pressure. The aim is to determine the rate of emergence of mono- and multi-drug resistance to specific antimicrobial drugs, taking into account the mechanisms by which resistance is conferred.

Interested students should contact David on 9385 0860 or by email at dregan@kirby.unsw.edu.au.