



### FMSL SEMINAR SERIES

Thursday, April 10th 2014

1:00pm

Teletheatre, IST Building (No 47)

**Prof. Phil Pollett,**

School of Mathematics and Physics,

University of Queensland

#### Large Population Networks with Patch Dependent Extinction Probabilities

I will consider a model for the presence/absence of a population in a network of habitat patches. Colonisation and extinction of patches are assumed to occur as distinct phases. Since the local extinction probabilities are allowed to vary between patches, the model permits an investigation of the effect of habitat degradation on the persistence of the population. The limiting behaviour of the model is examined as the number  $n$  of habitat patches becomes large. We consider a limiting regime in which the initial number of occupied patches increases at the same rate as  $n$ . A law of large numbers allows us to identify an approximating deterministic model, and a central limit theorem allows us to study the fluctuations about the deterministic trajectory.

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**Phil Pollett** is Professor of Mathematics at the University of Queensland, having previously held positions at Murdoch University, the University of Adelaide, and the University of Wales College of Cardiff.

He is an internationally recognised expert in theoretical and applied probability, having made several important and influential contributions Markov processes theory, particularly in connection with quasi-stationary distributions and Markov chain construction theory. He has also made significant contributions to stochastic network theory and mathematical biology, and has applied this theory in a variety of fields, including chemical kinetics, ecology, epidemiology, medical decision making, parasitology, population biology, soft matter physics and telecommunications. Phil is a CI on the newly established ARC Centre of Excellence for Mathematical and Statistical Frontiers of Big Data, Big Models, New Insights.