



# PhD exit seminar: Connecting social system dynamics, population genetics and symbiotic interactions: insights from the mountain brushtail possum (*Trichosurus cunninghami*)

Thursday 8 August 2013 1pm

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Gould Seminar Room (Rm 235) Gould Building (Bldg. 116), Linnaeus Way, ANU



The mating system and dispersal patterns of a species can have profound effects on population genetic structure. Conversely, fine-scale spatial genetic patterns may have important ramifications for the development of kin cooperation and mate choice. In my PhD I explored the connections between social system dynamics and population genetic variation using a combination of modelling techniques and empirical analyses. My empirical research centred on a field based study of the mountain brushtail possum in the central highlands of Victoria. Using proximity logger collars I revealed that the night time foraging interactions of this elusive species reflect the genetic similarity (kinship) between pairs. I also demonstrated that limited natal dispersal has led to the spatial clustering of kin and fine-scale genetic structure between males and females; creating an inbreeding risk. To reduce this risk of inbreeding the mountain brushtail possum appears to actively avoid kin during mate choice. Additionally, I detected social pair-bonding and genetic monogamy amongst some individuals; which may reduce the risk of father-daughter mating. However, the rate of pair bonding varied between populations, suggesting behavioural plasticity in mating patterns.

One potential constraint on social interactions is pathogen transmission. To understand the transmission dynamics associated with mountain brushtail possum behaviour I used commensal *E. coli* strains as a model system. First, I characterised the spatial and

temporal variation of commensal *E. coli* strains in the mountain brushtail possum, as well as the role of functional genes in determining *E. coli* community structure. I am now investigating how social interactions impact *E. coli* strain sharing and transmission. Together my results highlight how the study of semi-social species can provide valuable insights into the factors that shape social system evolution.

Presented by

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