

## **Professor Ray Chambers**

Title:

Using Social Network Information for Survey Estimation

Abstract:

Standard model-based and model-assisted methods of survey estimation aim to improve the precision of estimators of the population total or mean. These methods are often based on a linear regression model defined in terms of auxiliary variables whose values are assumed known for all population units. Social relationships represent another form of auxiliary information that might increase the precision of these estimators. Such relationships are typically expressed in terms of a social network. Common linear models that use social networks as an additional source of information include autocorrelation, disturbance and contextual models. In this paper we investigate how much of the population network needs to be known for estimation methods based on these models to be useful. In particular, we use simulation to compare the performance of the best linear unbiased predictor under a model that ignores the network with model-based estimators that incorporate network information. Our results show that incorporating network information via a contextual model is the best performer overall. We also show that the full population network is not required, but that the partial network linking the sampled population units to the non-sampled population units needs to be known. Finally, we illustrate the contextual model by applying it to friendship network information collected in the British Household Panel Study.