Statistics and Actuarial Science Seminar

Title: Modelling relational event data with multiple receivers Bayes factor testing in Gaussian Graphical Models

Speaker: Joris Mulder (Tilburg University)

Date: Thu 5th March 2020 at 3:00PM

Location: Seminar Room SCN 1.25

Abstract: This talk consists of two research topics that I am currently working on.

- First part. Social behaviour between individuals in a network can often be characterised by short communication actions of one actor towards another actor or several other actors (multicast events). In an information network of employees in an organisation, a relational event can be an email message send by an employee to one or several other employees, in a school class a relational event can be a teacher hushing one of multiple students, or in a military squad a relational event can be a soldier giv-

ing a command to one or multiple soldiers. Currently available methods for modelling such data are not specifically suited when the events have multiple receivers or when the relational events are triggered by unobserved nodal or dyadic characteristics. To address these shortcomings, we present a generalised multivariate probit model for capturing multicast events with a multiplicative latent factor structure for modelling unobserved heterogeneity in the relational event data.

- Second part. Gaussian graphical models assume a network structure between the outcome variables where an edge between two variables implies a nonzero partial correlation between the respective variables given the other variables. These models are becoming increasingly popular in psychopathology to better understand relationships between symptoms of patients with post-traumatic stress disorder. To test hypotheses with equality and order constraints on the partial correlations, Bayes factor tests are presented based on matrix F priors on the precision matrix. This class of conditionally conjugate priors allows one to (i) properly tune the priors for the partial correlations based on external prior knowledge and (ii) compute Bayes factors between constrained hypotheses in relatively efficient manner.