

Isabella Gollini

Latent variable models for heterogeneous multilevel networks.

Multilevel social networks have emerged as one of the main structural feature in several scientific settings. To examine such networks classical models are unable to analyse the complexity of the cross-cutting relations as they often assume that networks are self-organising systems of endogenous edges and thus exogenous factors are taken into account.

The aim of this project is to propose new latent variable models for the analysis of heterogeneous relational structure of multilevel networks by accounting for the complexity of both multiple edges between one individual-level node and multiple group-level nodes this will require to make use of fast inferential procedures in order to be able to handle real data that are often large in size.

The new modelling approaches will be applied to important scientific domains including the analysis of criminal networks and organisational networks.

The design of software is a complex yet crucial part for supporting any new statistical advance. For this reason, an important and significant outcome of this project is the development of statistical packages to implement all of the novel methodologies proposed.