



University of Pavia  
Ph.D. School in Electrical and Electronics Engineering and Computer Science



## SEMINAR

### Topics in modeling large sparse graphical models

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**Abstract:** Covariance selection involving, e.g., edge exclusion deviances are part of a long tradition in graphical modelling to find parsimony. However, in the past decade work on parsimonious or sparse graphical models has received an important impulse through interesting multivariate data and regularization techniques that were applied in to graphical models. In this talk, I will give a brief introduction to regularized inference of graphical models and then discuss a number of extensions that I have worked on.

(i) Model selection is an important topic in regularized inference and the graphical modelling literature has been somewhat confused. I will show how the KLCV is an efficient method for minimizing the prediction error, with excellent small sample properties.

(ii) Non-normality is a crucial topic in high-dimensional graphical models in many practical situations. Simple non-parametric techniques are important tools to address some of these issues, but especially when the number of samples is small (as is almost always the case), more powerful methods, such as copula graphical models are crucial.

(iii) Temporal multivariate data are common in finance and sparse temporal graphical models can be employed to identify underlying structure.

(iv) Most of the methods we have described so far have been frequentist. However, Bayesian approaches have an important role to play. We describe a birth-death approach to modelling sparse graphical models.

**Bio:** Professor Ernst Wit has been **Chair of Statistics and Probability** at the University of Groningen and he has a wide interest in the field and applications of Statistics, ranging from high-dimensional inference, network analyses, statistical bioinformatics, systems biology, optimal design and algebraic approaches to statistics. .

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Seminar in English

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