Contribution ID: **1000** Type: **not specified**

Bayesian Methods for Network Modeling in Psychological Research

Saturday, September 13, 2025 2:30 PM (1 hour)

Network modelling is quickly gaining ground as a promising approach to understanding psychological phenomena. A 2018 review identified approximately 400 papers on network modelling in psychology, and a 2023 review found nearly 1,400 papers on cross-sectional designs alone, illustrating the field's rapid growth. While network models have become particularly influential in psychopathology, they are now increasingly used across diverse areas of psychology and in a range of study designs, including the growing use of intensive time-series data. A central goal in network analysis is to evaluate hypotheses about the network's structure, defined as the configuration of relations between variables. However, current methods face two major limitations. The first is that they typically estimate a single network and provide no way to express the uncertainty involved in selecting that structure from limited data. The second is that, although they often produce sparse networks to balance model complexity and fit, they cannot distinguish between a lack of evidence for a relation and evidence for the absence of that relation. These limitations complicate the interpretation of network results and raise concerns about the reliability of the conclusions drawn from them. The core problem with current methods is their inability to represent the uncertainty involved in network inference. In a reanalysis of 126 published network datasets, we found that this uncertainty is often substantial. However, standard tools provide no way for researchers to quantify or communicate it. As a result, researchers are typically unaware of how uncertain their results may be. This can lead to overconfidence in the reported networks and, ultimately, to potentially misleading conclusions. In this talk, I argue that addressing the limitations of current network methods requires a shift toward Bayesian modelling. Bayesian approaches offer a principled framework for expressing and reasoning about model uncertainty, which is essential for drawing reliable inferences from finite data. I will demonstrate how these methods can be used to analyze both cross-sectional and longitudinal data, and I will outline a research agenda focused on developing software tools that make the Bayesian approach to network modelling accessible to applied researchers across psychological subfields.

If you're submitting a symposium talk, what's the symposium title?

If you're submitting a symposium, or a talk that is part of a symposium, is this a junior symposium?

Presenter: MARSMAN, Maarten (University of Amsterdam)

Session Classification: Keynote 3: Maarten Marsman

Track Classification: Methodology