



KU LEUVEN

Statistics Seminar

Joint organization by
ORSTAT, Faculty of Business and Economics and the Statistics Research Group,
Faculty of Science
Leuven Statistics Research Center

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“Making a network from fMRI data: Always a small-world with correlations ”

Thursday, January 19, 2012
12.00–13.00h

Location: Room HOG 03.101, Naamsestraat 69, Leuven.
Supporting research project: GOA-project 2007/04

Abstract. Connectivity measures of large-scale networks of the brain can reveal many interesting features like which brains are efficient and therefore lead to high IQ. These results often rely on a network constructed from time series of functional magnetic resonance imaging (fMRI). A network is obtained from pairwise correlations between regions (or voxels) and a connection between two regions is set if the absolute correlation is higher than a chosen threshold. From this network average pathlength, degree distribution, small-worldness, and other measures can be computed. In this presentation we will show that using pairwise correlations to determine the network nearly always results in a small-world, even if the underlying network is not a small-world. The obvious reason is that using correlations to determine connections yields many spurious connections. Spurious connections can be avoided by using partial correlations. In large-scale networks, however, the partial correlations are difficult to obtain. We compare three different methods to determine the partial correlation network. Partial correlations partially solve the issue: when hubs are present in the network any method fails to be highly accurate. *Joint work with:* Verena Schmittmann, Sarah Jahfari, and Denny Borsboom.