

Chapter 7: Dynamic scientific co-authorship network

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Brief history of SNA dynamics

SNA through to the beginning of the 1990s appeared to have had a profoundly static bias. Four event streams that can be dated as starting in the 1990s:

- Series of three special issues of The Journal of Mathematical Sociology devoted to 'network evolution' that appeared in 1996, 2001, and 2003.(edited by Frans Stokman and Patrick Doreian)
- take-off of exponential random graph models (ergms) for the study of change in social networks (Holland and Leinhardt, 1981; Frank and Strauss, 1986)
- modelling of "real world" networks - developments of small world and preferential attachment models (Watts, Barabasi)
- developments of new methods (like generalized blockmodeling) with the potential to contribute to the temporal delineation of fundamental network structures.

Content and units of analysis

Dimension of the study		Examples of studies
Main dimension	Sub-dimension	
Cross-Disciplinary	Disciplinarity	Interaction links between Australian research networks (Rigby, 2005),(see also: Wray, 2002; Glänzel and Schubert, 2004; Laband and Tollison, 2000; Hornbostel, 1997)
	Inter-disciplinarity	Inter-disciplinary research analysis in French laboratories (Sigogneau et al., 2005)(see also: Gibbons et al., 1994; Etzkowitz and Leydesdorff, 2001; Qin et al., 1997; Braun and Schubert, 2003)
Cross-Sectoral	Intra-mural	Academic research networks analysis (Lowrie and McKnight, 2004; Wray, 2002)
	Extra-mural	Cooperation models industry–university in Belgium (Veugelers and Cassiman, 2005)
Cross-National	Domestic	The interaction between immunology research institutes in Germany, due to its geographical location (Havemann et al., 2006)
	International	Comparative analysis in several countries, of their international/national collaborated publications Glänzel and Schubert (2005)

Table: Classification of levels of analysis of scientific collaboration

Basic analysis of network properties

Deterministic analysis of dynamic co-authorship networks

Modeling dynamic scientific co-authorship networks

- Modeling “real world” networks
 - Small world model
 - Preferential attachment model
 - Applications on co-authorship networks
- Models for Longitudinal Network Data
 - Models with discrete time steps
 - Markov chains - continuous time
 - Stochastic actor oriented network models

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