



*Call for Papers*

## **How to Analyze Large-Scale Network Structures? The “Boundary Specification Problem” Revisited**

Social network analysis presupposes the specification of a network boundary. Typically, boundaries follow theoretical definitions of medium-sized groups, think of local elites, or clear institutional settings such as school classes, villages, or workplaces. Researchers from various scientific disciplines have developed sophisticated statistical methods to analyze the genesis and evolution of such networks. These methods include Autoregressive Models, Exponential Random Graph Models, Latent Space Models, or Stochastic Actor-Oriented Models.

Over the last decade, however, the size of networks that scholars may use to answer their research questions has increased tremendously, and therefore specifying their boundaries is not as straightforward anymore. Large relational structures such as Twitter or Facebook, as well as patent, citation, covert, transaction, or academic collaboration networks confront researchers with novel challenges: their size exceeds typical social networks and stretches the boundary assumption of sophisticated methods of social network analysis. At the same time, these networks have drawn attention from computational sciences. One promising solution to novel challenges may be to integrate computational and sociological approaches and partition large networks into smaller segments (providing meaningful sub-network boundaries), analyze them separately, and then combine the results back to the larger network to learn about its genesis and evolution.

This workshop aims to explore how we may use modern computational tools to partition large-scale networks into meaningful components and the implications for applying statistical models to them. These analytical steps come with empirical and conceptual caveats and require rigorous descriptions and substantive interpretations of the sub-components with respect to their members and the tie-generating processes. This endeavor is inherently interdisciplinary and will profit enormously from joining forces across scientific disciplines, which is why **we explicitly invite interested scholars from a broad range of fields such as mathematics, physics, biology, environmental science, computer science, data science, medicine, criminology, political science, and sociology.**

Open questions that scholars interested in these problems may address contain, but are not limited to

- Mathematical approaches to partitioning graphs into clusters and community detection
- Probabilistic assignment of members of a sub-network into multiple clusters according to different partitioning techniques
- Ontological problems of using algorithms to define network boundaries
- Techniques for comparing different clusters to each other to arrive at a substantive understanding about the dimensions along which the clusters differ

- Aggregation of the cluster-based analyses
- Computational demands of handling large graphs in general and partitioning graphs in particular
- Theoretical and conceptual issues of combining partitioning algorithms for large-scale networks with actor-oriented statistical models

We hope this workshop will help participants with their challenges and produce a more general guide for scholars interested in analyzing large-scale networks. As part of the workshop, we will discuss ways for publishing the results to share them with the wider network science community.

### **Organizational information**

**Date:** 13.-14.06.2019

**Location:** Mannheim Centre for European Social Research  
University of Mannheim,  
A5, 6, 68159 Mannheim, Germany

**Mode:** Oral presentation of 20 minutes and 10 minutes discussion per presenter

**Application:** Please send a one-page abstract of your topic **until the 23.04.2019** to [philipp.brandt@uni-mannheim.de](mailto:philipp.brandt@uni-mannheim.de) and/or [sebastian.pink@uni-mannheim.de](mailto:sebastian.pink@uni-mannheim.de).

**Support:** The workshop is supported by the Academy for Sociology and the Mannheim Centre for European Social Research. In addition to providing refreshments and a conference dinner, we are able to cover the accommodation for a limited number of participants who have no own funding. Please indicate in your application if you would like to be considered.

If you have any questions, please do not hesitate to ask us! Moreover, please do not hesitate to circulate this call!

We look forward to your contribution and to seeing you at the University of Mannheim,

Philipp Brandt and Sebastian Pink