People, Places, Things
NetSci 2018 Satellite Session

12th June

Time	Presenter	Title
13:45–14:30	Mark Stewart	People Places Things... Feels? The Affective Layer of Complex Social Networks
14:30–14:50	Leto Peel	A Closer Look at Assortative Mixing
14:50–15:10	Demival Vasques Filho	Investigating the Interdependency between Collaboration Networks
15:10–15:30	Ruiqi Li	Simple Spatial Scaling Rules behind Complex Cities
15:30–16:00	**Coffee Break**	Served with the NetSci School.
16:00–16:20	Kate Hannah	Contextualising Historic Correspondence Networks
16:20–16:40	Yerali Gandica	Does Aggregation Preserve Communities?
16:40–17:00	Steven Turnbull	Using Bourdieu and Networks to Place Student Data in a Societal Context
17:00	Panel Discussion	
17:45	Session ends	

Mark Stewart
University of Amsterdam

People Places Things... Feels? The Affective Layer of Complex Social Networks

Digital analysis and mapping of networks of social connectivity is providing insight into interpersonal communication and interaction that was unattainable before now. However, many of the approaches adopted contain limitations which may prevent a full and complete understanding of the behaviours, emotions, and actions present in a data set.

Fan Studies, the study of fandoms, fan cultures and fan behaviours, has predominantly eschewed digital humanities and big data approaches for this reason, focusing instead on the behaviours and affective connections of the individual in trying to understand their position and relationship to a larger whole.

I argue that Fan Studies, although a young and developing discipline, has developed practices and identified research limitations which may assist complex human network researchers in thinking in more nuanced manners about the large data sets they collect and collate, as well as the role of critical distance in ethnographic research.

Biography

Mark Stewart is currently an Assistant Professor of Television and Cross-Media Culture at the University of Amsterdam. His research is interdisciplinary in nature, and is usually positioned at the intersection of Television Studies, Fan and Audience Studies, and Media Industries. His forthcoming monograph, under contract with Amsterdam University Press, examines the changing television landscape in the twenty-first century, identifying the shifts in how it was made, the types of television being made, the ways it was watched and engaged, and how it was funded. His work can also be found in *Television and New Media* and *Flow* journals.

Leto Peel
Universite catholique de Louvain
Joint work with Matteo Cinelli, Jean-Charles Delvenne, and Renaud Lambiotte

A Closer Look at Assortative Mixing

Assortative mixing in networks is the tendency for nodes with the same attributes to link to each other. It is a property often found in social networks, manifesting as a higher tendency of links occurring between people of the same age, race, or political belief. Quantifying the level of assortativity or disassortativity (the preference of linking to nodes with different attributes) can shed light on the organisation of complex networks. It is common practice to measure the level of assortativity according to the assortativity coefficient, a network analogue of Pearson's correlation. In this talk I will describe a number of issues with measuring and interpreting assortativity, particularly for categorical attributes. First is that often the extremal values (-1,1) are often unattainable due to the degree heterogeneity of the network and I will present combinatorial bounds that may be used to renormalise for a given degree sequence. Second is that assortativity is an average over the network and may not be a representative statistic when mixing patterns are heterogeneous. To capture the heterogeneity in assortativity I will present an approach to localise this global measure so that we can describe the assortativity, across multiple scales, at the node level.

Demival Vasques Filho
University of Auckland

Investigating the Interdependency between Collaboration Networks

There has been a recent development in research about the growth and evolution of scientific collaboration networks. Empirical studies and mathematical growth models have tried to understand the dynamics of citation and co-authorship networks both studied separately and together. This is one of the best examples that relates network analysis to the real-life behavior of interactions (collaborations) between nodes (authors). Literature suggests a strong correlation between the growth of citation and co-authorship networks. In this project, we perform the core-periphery analysis on the dynamic co-authorship network and try to relate the observed changes with the changing citations of authors. Our main aim is to propose a more sophisticated mechanism to understand the strong correlation between collaboration networks (citation and co-authorship) and model the simultaneous dynamic evolution of both the networks. We believe that systematic network analysis can be a major tool to build arguments and mathematical framework for questions driven by intuition.

Ruiqi Li
Beijing Normal University

Simple Spatial Scaling Rules behind Complex Cities

Although most of wealth and innovation have been the result of human interaction and cooperation, we are not yet able to quantitatively predict the spatial distributions of three main elements of cities: population, roads, and socioeconomic interactions. By a simple model mainly based on spatial attraction and matching growth mechanisms, we reveal that the spatial scaling rules of these three elements are in a consistent framework, which allows us to use any single observation to infer the others. All numerical and theoretical results are consistent with empirical data from ten representative cities. In addition, our model can also provide a general explanation of the origins of the universal super- and sub-linear aggregate scaling laws and accurately predict kilometre-level socioeconomic activity. Our work opens a new avenue for uncovering the evolution of cities in terms of the interplay among urban elements, and it has a broad range of applications.

Kate Hannah
Te Pūnaha Matatini, University of Auckland
Joint work with Dion O'Neale

Contextualising Historic Correspondence Networks
Beginning with a dataset of the digitised letters of 19th century printer, missionary, explorer, and naturalist, William Colenso (1811-1899), we explore and attempt to visualise aspects of 19th century New Zealand society revealed by the application of networks as research methods in historiography. The contexts of these networks are introduced, both through additional data sources such as the correspondence of key people Colenso corresponded with, and Colenso's journals and autobiography, as well as via historical interpretation utilising 'reading against the grain'. These contexts –people, places, things included or left out – provide opportunities to examine the usefulness of networks in historical research, where we must ask the question "What would we expect extant sources to record, and represent, and what are they most likely to omit or distort?" (Allen, 1986)

Allen, Judith. 1986. "Evidence and Silence: Feminism and the Limits of History." In Feminist Challenges: Social and Political Theory, edited by Carole Pateman and Elizabeth Gross, 173-189. Sydney: Allen & Unwin.

Yerali Gandica
Université Catholique de Louvain

Does Aggregation Preserve Communities?

The ecological fallacy refers to the statistical bias caused by the aggregation of individuals into categories. In geography, particular form of such fallacy is called the Modifiable Areal Unit Problem (MAUP). MAUP affects results when individual-based measures of spatial phenomena are aggregated, either to a geographical context or according to any individual or social category, for instance age, economical income or the intensity of any kind of social contacts. Some other reasons can be privacy concerns.

We are interested in analyzing the impact of this fallacy. We focus in one of the most common task in network science, community detection. We measure quantitatively the impact of node aggregation on the community structure in networks and we introduce the aggregability index, predicting quantitatively the robustness of the community structure to a graph, in order to place it into a given aggregation class. We show that some community detection methods are more suitable than others when computing communities on aggregated networks.

We illustrate our methodology on a dataset of geolocalized tweets in Belgium, and mobile phone from one provider in Belgium. We show that our proposed index is able to predict that only the phone calls data preserves the community structure of the fine-grain level.

Steven Turnbull
University of Auckland

Using Bourdieu and Networks to Place Student Data in a Societal Context

Gender and class disparities are a common trend in science participation at high school and university, with subjects such as physics and computer science tending to have an over representation of male students, and subjects like health being increasingly represented by female students. The current study utilised data from the New Zealand Integrated Data Infrastructure (IDI) to investigate these trends in fine grain detail. The IDI is an incredibly rich set of datasets from New Zealand, which includes data from the Ministry of Education, the 2013 Census, and other records that have been joined at an individual level. Sociological theory related to the work of Pierre Bourdieu was employed as a research framework, enabling results to be placed in the complex context society. Bourdieu was an advocate for Correspondence Analysis, a method of representing multidimensional data in 2-dimensional space. He argued that this method provides a "true representation" of society. The current study builds on Bourdieu's work by employing network analysis to investigate course selection patterns. As network and correspondence analysis provide two different methods of analysing the same underlying data matrix, results present a rich description of science course selection trends in New Zealand.