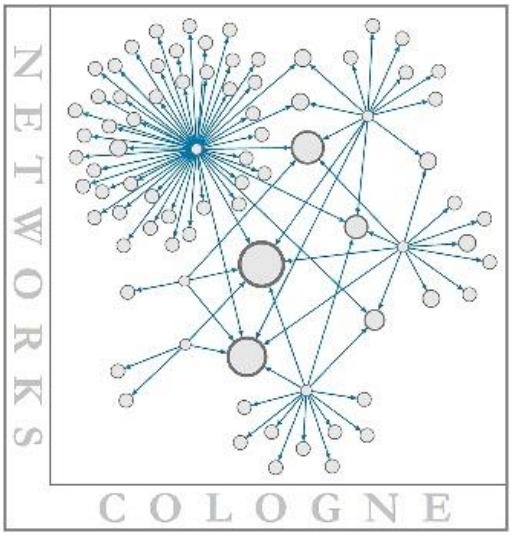
Representing Networks:

Past and Present

Workshop at the University of Cologne,

5-6 June 2019



VENUES

106)	Public key note lecture:	Universitätsstraße 37 (seminar room S21)
114)	Reception:	Meister-Ekkehart-Straße 7
210)	Workshop:	Aachener Straße 217

PROGRAM

Wednesday, 5 June

17:30 Welcome and registration

18:15 Public key note lecture:

From Microhistory to the Global Network – The World of the Treasurer Senebi *(Danijela Stefanović, University of Cologne, University of Belgrade)*

Reception in the rooms of Egyptology, sponsored by Uschebti e.V.

Thursday, 6 June

09:30 Welcome and registration

09:45-10:00 Introduction

10:00-11:30 **How Many Networks? Representing Dynamic Social Change Using Archaeological Network Methods** *(Fiona Coward, Bournemouth University)*

An Ivory Diaspora: Digitizing Exchange & Production Networks in the Medieval World *(Sara Ann Knutson, University of California, Berkeley)*

11:30-11:45 Coffee break

11:45-12:30 **Casting a Wide Net: The Distant Reading of Archival Documents from Babylon** *(Maarja Seire, University of Leiden)*

12:30-14:00 Lunch break

14:00-15:30 **From Networks to High-dimensional Geometry and Back** *(Allon Wagner, Tel-Aviv University, University of California, Berkeley)*

Representing Credit and Kinship in the 19th Century: Between Exploration and Simulation *(Martin Stark, ILS- Research Institute for Regional and Urban Development)*

15:30-15:45 Coffee break

15:45-16:30 **Representing the Community of Ptolemaic Pathyris as Network Models: Possibilities and Limitations** *(Lena Tambs, University of Cologne)*

16:30-17:00 Closing discussion

ABSTRACTS

How Many Networks? Representing Dynamic Social Change Using Archaeological Network Methods

Fiona Coward (Bournemouth University)

Representing archaeological and historical data as networks poses a range of issues both practical and theoretical; in this talk I will address two related problems that have arisen in my own work on social change during the transition from mobile hunting and gathering to settled farming in the Near East ~20-6,000 years ago. Firstly, representing network changes over such long timescales raises some significant practical issues: most applications of social network analysis in the social sciences involve the analysis of one or comparison of just a few configurations of networks comprising the same actors, representing 'snapshots' of social relationships at a particular time. In contrast, archaeologists often need to understand dynamic change over time among changing sets of actors, requiring the comparison of multiple networks or temporal 'states' of a single network with overlapping but highly variable sets of actors and relations. A further concern is the nature of the edges between these nodes; archaeological network research typically uses material culture similarities over space and time as a proxy for social interaction, and in many cases a range of different types of material culture are subsumed into the edges represented as connecting nodes. However, not all forms of material culture are equal: different types of objects may be part of different kinds of relationships, and representing the interactions attested to by the multiplex patterning of many types of material and object as static networks may thus conflate multiple different forms of social relationship as well as collapsing dynamic processes into static 'timeslices'. In this talk I will thus explore some of the challenges encountered when representing and analysing temporal change in multiply-material social interactions.

An Ivory Diaspora: Digitizing Exchange & Production Networks in the Medieval World

Sara Ann Knutson (University of California, Berkeley)

Diaspora has recently gained enormous attention in human migration and mobility studies over the past decade. The discipline of Archaeology has great potential to contribute to current debates and issues on human mobilities and how such activity transforms the way we think about social identity markers, not least "diaspora," "refugee," "indigenous," and "immigrant." For their part, archaeologists based in network analysis have the toolkit to shed light on the cultural movements of diasporic individuals in the past and the resulting interconnected network of humans and material objects. This paper will offer some possibilities for the representation of networks based on the archaeological record by exploring the movements and activity of the Scandinavian diaspora throughout the medieval world (ca. 800- 1500 AD). My work interrogates the geographic networks

of walrus ivory objects of Scandinavian origin and reveals large-scale movement patterns, otherwise imperceptible on an individual level. Across their itinerant histories, walrus-ivory materials provide 'cultural data' with which we can reconstruct a diasporic network. I argue that the development of human-material networks across medieval Europe and beyond—triggered by market demand and economic opportunity—operated at such a high scale and intensity as to facilitate and anchor Scandinavian activity in the North Atlantic.

Casting a Wide Net: The Distant Reading of Archival Documents from Babylon

Maarja Seire (University of Leiden)

In total, ca. 10,000 private archival documents in various cuneiform tablet collections date to the Neo-Babylonian and Achaemenid period (626–323 BCE). One of the best represented cities is ancient Babylon, where 13 private archives, totalling about 2,500 documents, have been found. Since the private documents relate to marriage, property, work, and loans – all of which are often proven to take place within the circle of close acquaintances –, the social networks can represent meaningful relationships. Due to large amount of documentation, these archives have often been analysed as separate entities. However, one would expect that the social world of each of these archives is connected to other archives. For cities such as Sippar and Borsippa, it has already been proven that the physical proximity of the archaeological find places can be traced back in the social relationships found within and between these archives, that often represent social units, such as families and kinship-based groups. But what about the Babylon archives? My approach is turning the traditional method of close reading the documents in one archive upside down. I will first apply social network analysis to the material, thus practicing the distant reading of the documents, and then let the results (e.g. ties between the archives) determine which documents I will use for close reading. By doing so, I aim to connect the bits and pieces that bind the archives together and make the social fabric of Babylon. Which individuals and what kind of social and economic contracts connect the inhabitants of Babylon?

Representing Credit and Kinship in the 19th Century: Between Exploration and Simulation

Martin Stark (ILS- Research Institute for Regional and Urban Development)

Most historical studies on social networks rely on just a few descriptive structural measures and explorative visualizations of network graphs and correlate the analysis with attributes of the actors of interest. This approach is closely related to the perspective of regarding given social networks as a boundary condition for actions of historical actors. The research goal is here to explain (human) agency through the analysis of social structure. Using this approach an increasing number of historically oriented studies have shown in recent decades that theories and methods of social

network analysis can be applied productively to historical questions and sources. Nevertheless, despite historical data being inherently longitudinal most of these studies have aggregated and analyzed their source material in cross-sectional research designs and as a result do not fully exploit the potential of their data. A second in historical research still underused approach considers (human) agency as an important boundary condition for the (longitudinal) emergence and change of social network structure. The goal is here to "find" the rules of creation for the network structure. This second approach is closely related to the use of simulation methods. Both approaches complement each other and form the double intuition behind social network analysis. This paper will demonstrate the different approaches and discuss their benefits and limits in the context of a historical case study on a 19th century rural credit market and the impact of kinship relations on the economic transactions. The study is based on archival records of a village in the Kingdom of Wuerttemberg in Southwestern Germany. The credit market is represented as a two-mode social network, where debtors are linked to creditors through economic ties (mortgages). The family system inside the village is represented as a one-mode network of households connected via the social tie of direct kinship relations.

From Microhistory to the Global Network – The World of the Treasurer Senebi

Danijela Stefanović (University of Cologne, University of Belgrade)

Studies on the ancient Egyptian administrative system(s) are usually based on analysis of the institutions and officials attached to them. The present paper focuses on the social settings of the four Middle Kingdom / Second Intermediate Period highest ranking officials, i.e. treasurers. Starting with the traditional methodological approach, focusing on collecting the prosopographic data, the paper further addresses the implementation of the Social Network Analysis (SNA) tools for analysing the obtained material. SNA is used to study people, or groups of people (nodes) linked together through social interaction, and relations or links between them (edges). SNA exemplifies various types of interaction through networks and analyse them. By applying SNA methodology for studying the networks of the treasurer Senebi, it is possible to reconstruct more precisely his social setting (both private and institutional) and interrelations, which complement the traditional approach, but also provide new possibilities for research into ancient Egyptian administration.

Representing the Community of Ptolemaic Pathyris as Network Models: Possibilities and Limitations

Lena Tambs (University of Cologne)

A rich body of Greek and Demotic documentary sources allows for a detailed study of the small-scale community of Pathyris (modern Gebelein), which is located some 28 km south of Thebes

(Egypt), in the 2nd and early 1st centuries BCE. For a network approach, the texts provide rich information about social ties like kinship, collegial and neighbour relations as well as economic activities such as loans and purchases, collaborative acts and services offered to and by the inhabitants. Whereas the material holds an unusual potential for the interplay between social and economic spheres in an ancient community to be studied on the basis of rich empirical data, Social Network Analysis (SNA) offers appropriate conceptual and methodological tools for doing so. By means of transforming prosopographical and relational data retrieved from 428 ancient text into network models, the dataset can be formally measured and analysed using network analytical software like *Gephi*. On the levels of whole networks as well as specific groups or individual actors, this allows for correlations between network position(s), recorded attributes (woman, soldier, non-local, etc.) and the quality of recorded ties to be identified and tested. SNA can thus help elucidate patterns of interpersonal connectivity and economic behaviour in Ptolemaic Pathyris. At the same time, there is though a real risk that some things are lost in translation. The presentation introduces the site and material under examination and critically discusses possibilities and challenges of representing past networks and socio-economic relationships as graphs and tables.

From Networks to High-dimensional Geometry and Back

Allon Wagner (Tel-Aviv University, University of California, Berkeley)

Network analysis has by now become an established discipline in the study of the past. In parallel, high-dimensional statistics has benefitted textual analysis of modern corpora, and has been applied for genre analysis of pre-modern documents as well. In this talk, we will discuss the underlying mathematical principles that bind network analysis and high-dimensional statistics together. First, we will demonstrate research questions that are intuitively formulated as network inquiries and apply geometrical tools that result in fresh insight. Then, we will assume the opposite perspective and use the network lens to study high-dimensional textual data.

The talk will be self-contained and will not assume prior mathematical knowledge — it will rather emphasize the intuition behind mathematical concepts to allow participants to appreciate where presented tools and methodology can be applied to their own research agenda.

Organised by:

Prof. Dr. Richard Bußmann

Prof. Dr. Danijela Stefanović

Lena Tambs, M.A.

Universität zu Köln

Institut für Afrikanistik und Ägyptologie

Abteilung Ägyptologie

Albertus-Magnus-Platz

50923 Köln

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