14. Universitätsseminar Junge Wissenschaft und Praxis
sponsored by the Martin Nixdorf - Hanns Martin Schleyer - Foundation:

'SCIENTIFIC METHODS IN THE DIGITAL AGE - SCIENCE MEETS HUMANITIES IN THE CONTEXT OF MODERN DIGITAL TECHNIQUES'

Held at Schloss Machern, Schlosspl. 1, 04827 Machern, Phone: 034292 72079
19 and 20 December 2016

Current developments in research give rise to an intensive methodical discourse which is often in a simplifying manner connected with the term "big data". In fact, the scientific interaction which is evolving around new techniques of information and data analysis and processing runs much deeper and touches much more of scientific methodical grounds than the fashionable term referring merely to large quantities suggests. A key question in the interdisciplinary scientific discourse addresses the opposition of hypothesis driven versus data driven research. This concerns for example the issue whether guiding questions for a scientific project arise out of the given material or whether they are a priori chosen and determine the process of approaching material. How does the researcher arrive at guiding hypotheses out of given material? How are they tested? How does one arrive at interpretations and explanations?

Especially modern developments of scientific techniques applied to research topics in humanities such as cultural evolution offer a very fruitful context for such a discourse. How can inference methods interact with hermeneutics? Which methods lead to meaningful explanations or merely to phenomenological mappings? Modern information analysis leads to new possibilities of interactions between science and humanities. The workshop intends to offer a forum for an interdisciplinary discourse for young researchers to reflect and discuss those questions.
Schloss Machern is a beautiful small baroque summer palace with a lovely park with a temple, a pyramid and a castle ruin, which invites to walks during brakes and/or to early morning or evening joggings.

Scientific concept and realization: M. Schwarz
Local organizer: Research Academy Leipzig

For further queries regarding the meeting please contact R. Rübsamen (rueb@uni-leipzig.de) and regarding organizational issues contact Juliane Rein (juliane.rein@uni-leipzig.de).

Programme			
Monday 19. December		**Speaker**	**Topic**
10:00 – 10:30	Registration		
10:30 – 11:00	Coffee & Warm up		
11:00 - 11:15	Opening	M. Schwarz	
11:15 - 12:15	Lecture	M. Laubichler	Detecting and Explaining Innovations in Science with Big-Data Computational Methods and Modeling
12:15 - 13:00	Discussion		
13:00 - 14:00	Lunch		
14:00 - 15:00	Lecture	P. Stadler	Bioinformatics as a Hermeneutic Endeavor
15:00 - 15:30	Discussion		
15:30 - 16:30	Panel Discussion	S. Schüler, Ch. Kleine	Hermeneutics in Humanities and Cultures Studies
16:30 - 17:00	Coffee		
17:00 - 18:00	Lecture	R. McElreath	The evolution of statistical methods for studying evolution
18:00 - 18:30	Discussion		
18:30 - 19:30	Dinner		
19:30 - 20:30	Panel Discussion	All	
20:30 -	Fire Side Chat	ALL	

Tuesday 20. December		**Speaker**	**Topic**
8:00 - 9:00	Breakfast and Check Out from the Hotel		
9:00 - 10:00	Lecture	O. Morin	Thin descriptions: How to be simplistic in the cultural sciences—and why

Tuesday 20. December		Speaker	Topic
10:00 - 10:30	Discussion		
10:30 - 10:45	Coffee Break		
10:45 - 11:45	Lecture	S. Schüler	The Evolution of Religion and the Quest for Big Data Analysis
11:45 - 12:45	Discussion		
12:45 - 14:00	Lunch		
14:00 - 15:00	Joint Panel Discussion	All	
15:00	Fare Well	M. Schwarz	

Schloss- und Landschaftsgarten zu Machern

Abstracts

Christoph Kleine, University of Leipzig, Institute for Scientific Studies of Religions:

Title: Big Data and Close Reading. Will Digital Humanities Revolutionise Research in the History of Religions?

Scholars of Religion who deal with the religious history of East Asia have always been both blessed and cursed by the sheer mass of available source materials. Even under the most favourable circumstances no single researcher would be capable of reading all relevant texts. He or she has to make a choice which texts to read - and how to read them. The selection of texts as well as the ways in which the chosen texts are read have often been informed by traditional ("theological") preselections and predilections. As a result, much of the research conducted in the field focusses on details only relevant for very few likeminded scholars and with a rather limited explanatory power and theoretical scope. As a scholar of religion, however, I am interested in historical patterns and pathways of historical developments which may contribute to general theories with regard to the functions of religion in human history. The recent digitalisation of a huge amount of relevant texts written in Chinese and Japanese seems to offer an array of new possibilities. Hitherto, however, these possibilities have not been exhausted. In my brief presentation I will tentatively discuss the opportunities and risks of applying methods of the digital humanities to my field of research.

Manfred Laubichler, Arizona State University, School of Life Sciences

Title: Detecting and Explaining Innovations in Science with Big-Data Computational Methods and Modeling

In this talk a conceptual approach will be outlined for analyzing the history of scientific innovations. This approach combines an extended evolution theory with network analysis and signal detection and agent based modeling applied to a number of case studies in the history of modern biomedical research. Scientific innovations present a significant challenge in developing detection algorithms for topological (connectivity-based) anomalies in large networks. However, scientific collaborations and their temporal properties are well suited to network-based techniques. We can combine detected patterns of innovation with an agent-based modeling framework to test causal models about the nature of scientific collaboration and evaluate whether there are specific types of collaborations that are more likely to lead to innovation.

Richard McElreath, MPI Evolutionary Anthropology, Department of Human Behavior, Ecology, and Culture

Title: The evolution of statistical methods for studying evolution

Many, perhaps most, published research findings are false. Blame for this fact has fallen heavily on statistical practice and malpractice. I review the history of applied statistics, with a focus on the cultural evolution of contemporary (mal)practice in evolutionary biology, anthropology, and psychology. I focus on problems related to the use of null hypotheses, illustrated with examples from my own field. Finally, I present a model of how the evidential value of any statistical procedure cannot be understood in isolation, but instead depends upon the population dynamics of a scholarly community.

Olivier Morin, MPI for the Science of Human History, Minds and Traditions Research Group

Title: Thin descriptions: How to be simplistic in the cultural sciences—and why

The dominant mode of scholarship in the study of culture is what Clifford Geertz famously called "thick description." A thick description is a rich and thorough exploration of a topic, which considers its object from a great variety of angles. "Thin descriptions" are the opposite: abstract, simplified, and reductive. Researchers involved in the emerging fields of cultural evolution or digital humanities are increasingly turning to thin descriptions of cultural trends. They usually justify this by invoking the authority of the natural sciences' methods of measurement and proof. Yet a closer look at thin descriptions reveals that they are not measurement in the physical or mathematical sense of that term. This has led to charges of "physics envy" or "cargo cult science." This talk will defend thin descriptions against these charges. I will show how they differ from measurement, narrowly construed; why their simplistic character is justified; why we need them; why they can be as challenging and rewarding as any other way of looking at social life. I'll use as my main example the study of positive feelings in the 20th century, using mine and other researchers' recent work.

Sebastian Schüler, University of Leipzig, Institute for Scientific Studies of Religions

Title: The Evolution of Religion and the Quest for Big Data Analysis

In my talk I will briefly introduce some recent developments in the evolutionary study of religion commonly referred to as the Cognitive Science of Religion (CSR). Theories in the CSR mainly derive from cognitive and evolutionary psychology and can be understood as one of the first attempts in the Study of Religions of bridging methods and theories from humanities and natural sciences. In addition to applying experimental psychological methods in the CSR, in recent years a new branch of CSR has focused on Big Data Analysis in order to proof certain hypothesis concerning the evolutionary functions of religion. I will briefly take a look at these new approaches and discuss their pros and cons.

Peter Stadler, University of Leipzig, Bioinformatics

Title: Bioinformatics as a Hermeneutic Endeavor

Much of modern genomics and "big-data biology" can be seen as a hermeneutic science. The ultimate goal of annotation efforts expended on genome annotation, for instance, ultimately aim at understanding genomic features such as genes, promoters, repetitive elements, etc., in terms of their function in the organism whose ``blueprint'' is encoded in the genomic text. In other words, the aim is to be able read and understand the genomic DNA sequence. Understanding the functions of genes can be broken down to knowledge about their mutual interactions, the rules governing their expression and processing, and the eventual effects on the entire organism. Instead of a human reader who understand the meaning of the genomic text, large amounts of experimental data, collectively referred to as –omics approaches, are related to genomic locations defining operational units of function. Correlations in expression levels as well as direct measurements of physical interactions are used to infer likely functional links in the networks of proteins, RNAs, and regulatory DNA elements. Because of the sheer size of -omics data and their encoded nature, genomic text is ``read'' and interpreted by computational biologists through several layers processing that use statistical procedure to infer the functional units and substructures as well as their relationships.