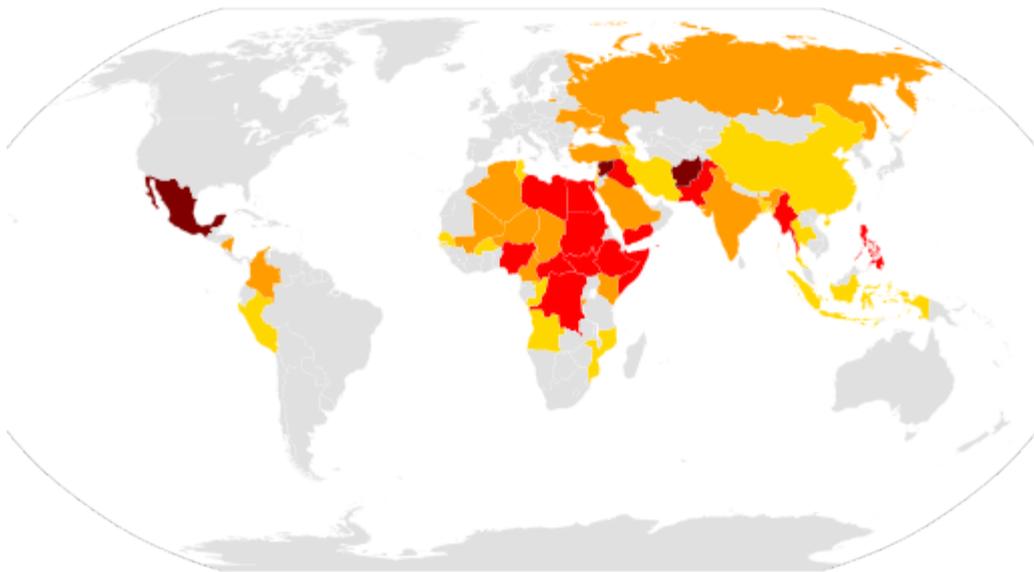# BIGSSS Summer School in Computational Social Science

Research Incubators on Data-driven Modeling of Conflicts

July 23 – August 3, 2018
Jacobs University Bremen

Version: July 26, 2018

Ongoing armed conflicts in 2018 (Source: Wikimedia)

**Prep-Workshop R | Program | Lectures | Workshops | Projects
Experts & Participants**

<u>Prep-Workshop R</u>

Sunday, 22 July 2018		Room
09:00	R-Workshop: **R Basics**	East Hall 1
12:00	Lunch (only until 13:00!)	
14:00	R-Workshop: **Data management and the tidyverse**	East Hall 1
18:00	Dinner	

Monday, 23 July 2018		Room
09:00	R-Workshop: **Quantitative analysis**	East Hall 1
12:30	Lunch	

R Basics

This short course is designed to introduce you to the R language, its use, and its handling in the integrated development environment RStudio. You will learn the basics of R syntax, get an overview on some of the most widely-used R packages: You also get an overview how to apply standard statistical techniques in R. We will showcase a couple of R's graphical capabilities and teach you the fundamentals of the package ggplot2. No prior experience with R is expected. This course is meant to provide you with a basic understanding of how R works and how to get started.

Data management and the tidyverse

This workshop aims at familiarizing you with a set of powerful tools comprised in a number of R packages known as the "tidyverse". In the course you'll learn the intertwined processes of data manipulation, data wrangling and data visualization. We teach how to manipulate data by filtering, sorting and summarizing a dataset in order to answer exploratory questions. You'll then learn to turn this processed data into informative visualisations for exploratory analysis and interpretation by domain experts. This course expects only a minimum level of experience in R and mainly requires a strong interest in learning to perform data analysis and how to keep your data manipulation process under control and tidy

Quantitative analysis

The workshop aims at providing an overview and understanding of the current state-of-the-art applied statistical techniques in the field of conflict studies and their implementations in R. The standard setting will be the supervised learning situation in which there is one target variable, the behavior of which is to be predicted by some other predictor variables. We will cover methods for both continuous responses as well as categorical responses. Primarily, the module deals with multiple regression techniques, its extensions to binary and count data, the handling of panel data structures and some machine-learning techniques. On request, we will give a very hands-on experience to NetLogo for those who have never touched it. We also will explain the possibility to connect it with R.

Summer School WEEK 1

Monday, 23 July 2018 (Chair: Jan Lorenz)	Room
13:30 Registration	IRC Conference Hall
13:45 Welcome & Opening	IRC Conference Hall
Jan Lorenz, Adalbert Wilhelm, Klaus Boehnke, Emanuel Deutschmann, Arline Rave
14:00 Jan Lorenz: **Introduction to Research in Computational Social Science**	IRC Conference Hall
14:30 Adalbert Wilhelm: **Introduction to Research on Conflicts**	IRC Conference Hall
15:00 Project fair	IRC Conference Hall
16:30 Project work: *Pin down Research Questions*	IRC Conference Hall
18:00 Campus tour	Main entrance gate
18:30 Welcome-BBQ	Terrace Krupp College

Tuesday, 24 July 2018 (Chair: Adalbert Wilhelm)	Room
09:00 Lectures 1 (plenary)	IRC Conference Hall
− Fariba Karimi: *Application of Network Theory in Social Sciences to Tackle Societal Problems*
− Cornelius Puschmann: *Introduction to topic modeling research*
10:30 Coffee break
11:00 Lectures 2 (plenary)	IRC Conference Hall
− Adam Pah: *Modeling contagion in behavioral time series*
− James Kitts**:** *Engaging Network Theory with Event Data*
12:30 Lunch
14:00 Project work: *Define Theoretical background & Data*	East & South Hall
15:30 Coffee break
16:00 Keynote lecture	IRC Conference Hall
Kristian Skrede Gleditsch: *Advances in data on conflict and dissent*
18:00 Dinner

Wednesday, 25 July 2018 (Chair: Jan Lorenz)	Room
09:00 **Lectures 3 (plenary)**	IRC Conference Hall
− Henrik Dobewall: *Values - Concepts, Measurement and Data Sources*	
− Bruce Edmonds: *Agent-based Modeling*	
10:30 Coffee break	
11:00 **Lectures 4 (parallel)**	East Hall 1 & 4
− Gerd Wagner: *Simulation Modeling with UML and BPMN*	
− Karsten Donnay**:** *Foundations of Spatial Data Analysis*	
12:30 Lunch	
14:00 **Project work:** *Familiarize with Methods & data*	East & South Hall
15:30 Coffee break	
16:00 **Keynote lecture** **Nils Weidmann:** *The Limits of Predictability: Conflict Forecasting in a More Peaceful World*	IRC Conference Hall
18:00 Dinner	
21:15 **Guided City Tour**	St. Petri Dom, Main Entrance

Thursday, 26 July 2018 (Chair: Adalbert Wilhelm)	Room
09:00 **Lectures 5 (plenary)**	IRC Conference Hall
− Juan Masullo**:** *Civil Wars Research - An overview of the field*	
− Davide Natalini**:** *Destabilising nations - Research on food and fuel riots*	
10:30 Coffee break	
11:00 **Project work**	East & South Hall
12:30 Lunch	
14:00 **Project work**	East & South Hall
15:30 Coffee break	
16:00 **Keynote lecture** **Michael Ward**: *What is the place of theory in conflict analysis*	IRC Conference Hall
18:00 Dinner	

Friday, 27 July 2018 (Chair: Jan Lorenz)	Room
09:00 **Lectures 6 (plenary)**	IRC Conference Hall
− Peter Holtz: *How to Extract Latent Psychological Constructs from Textual Data*	
− Fabian Flöck: *The Wikimedia projects as a data source for Social Science research*	
10:30 Coffee break	
11:00 **Project work**	East & South Hall
12:30 Lunch	
14:00 **Project work:** *Summarize progress*	East & South Hall
Additional Lecture 1:	East Hall
Arnim Bleier: *Bayesian Analysis for the Social Sciences with Stan*	
15:30 Coffee break	
16:00 **Project work:** *Plan research for second week*	East & South Hall
Additional Lecture 2:	East Hall
Bruce Edmonds: *Exploring Possible Outcomes of Ingroup Bias Using Agent-Based Modelling*	
18:00 Dinner	
20:00 Pub Crawl Downtown Bremen & Breminale (optional)	Meeting: Square in front central station (exit: city "Stadt" or "Reisezentrum")

Summer School WEEK 2

Monday, 30 July 2018 (Chair: Adalbert Wilhelm)	Room

09:00 **Lectures 7 (parallel)**
  − Nicolas Payette: *NetLogo*
  − Arnim Bleier: *Hands-on Topic Modeling*
	East Hall 1 & 4

10:30 Coffee break	

11:00 **Lectures 8 (parallel)**
  − Sebastian Schutte**:** *Spatial event data analysis*
  − Luis Gustavo Nardin: *Implementing Simulation Models with OESjs*
	East Hall 1 & 4

12:30 Lunch	
14:00 **Project work**	East & South Hall
Additional Lecture 3: James Kitts: *Design and Evaluation of Computational Experiments*	East Hall
15:30 Coffee break	
16:00 **Project work**	East & South Hall
18:00 Dinner	
19:30 **Roundtable discussion** *Gender Balance in Computational Social Science* Panelists: James Kitts, Fariba Karimi, Lara Minkus, Lusine Grigoryan, TBA Chair: Klaus Boehnke	IRC Conference Room

Tuesday, 31 July 2018 (Chair: Jan Lorenz)

09:00	**Project work:** *Preparation of presentation*	East Hall 1 & 4
10:30	Coffee break	
11:00	**Plenary presentations & discussions I:** *State of work* (30 minutes each including discussions)	IRC Conference Hall
	1. *Values in everyday language and inter-group conflict*	
	2. *Socio-ecological tipping points*	
	3. *Simulating economic impacts of mafia*	
12:30	Lunch	
14:00	**Plenary presentations & discussions II:** *State of work* (30 minutes each including discussions)	IRC Conference Hall
	4. *The role of homophily in the emergence of social norms within social networks*	
	5. *Analyzing conflict dynamic at the event level*	
	6. *The timing and execution of terrorist attacks*	
15:30	Coffee break	
16:00	**Plenary presentations & discussions III:** *State of work* (30 minutes each including discussions)	IRC Conference Hall
	7. *Between cooperation and conflict*	
	8. *Emergence of the image of social conflicts in social media*	
18:00	Dinner	

Wednesday, 1 August 2018 (Chair: Adalbert Wilhelm)

09:00	**Workshops (parallel)**	East Hall 1 & 4
	– Jan Lorenz, Emanuel Deutschmann: *Publication Strategies and Reproducible Research*	
	– Klaus Boehnke**:** *Academic writing*	
10:30	Coffee break	
11:00	**Project work:** *Write first draft*	East & South Hall
12:30	Lunch	
14:00	**Project work**	East & South Hall
15:30	Coffee break	
16:00	**Project work**	East & South Hall
18:00	BBQ	Terrace Krupp College

Thursday, 2 August 2018 (Chair: Jan Lorenz)

09:00	**Project work**	East & South Hall
10:30	Coffee break	
11:00	**Project work**	East & South Hall
12:30	Lunch	
14:00	**Project work:** *Prepare the final presentation*	East & South Hall
15:30	Coffee break	
16:00	**Project work:** *Post school work plan*	East & South Hall
18:00	Dinner	

Friday, 3 August 2018 (Chair: Adalbert Wilhelm)

09:00	**Final project presentations** (10 min for each project, presentations will be open for the university public announced as work in progress)	IRC Conference Hall
11:00	Coffee break	
11:30	**Feedback & Goodbye**	IRC Conference Hall
12:30	Lunch	

Projects & seminar rooms:

1	Values in everyday language and inter-group conflict	East Hall 1
2	Social-ecological tipping points	East Hall 3
3	Simulating economic impacts of mafia	East Hall 4
4	The role of homophily in the emergence of social norms within social networks	East Hall 5
5	Analyzing conflict dynamic at the event level	East Hall 6
6	The timing and execution of terrorist attacks	South Hall East
7	Between cooperation and conflict	South Hall West
8	Emergence of the image of social conflicts in social media	South Hall West

Notes:
- East Hall 1 and East Hall 3 are also used for Parallel Lectures
- South Hall West is shared between two projects
- In case of problems we can also offer the seminar rooms South Hall 003 and South Hall 004

Social Program

Jacobs University Campus tour
When: Monday, 23 July 2018, 18:00
Where: Main gate (Campus)
Price: for free
Find your way on campus and learn something about Jacobs University history during our guided Campus tour!

BBQ
When: Monday, 23 July 2018 & Wednesdays, 2 August 2018 starting from 18:30
Where: Terrace of Krupp College
Price: for free
Enjoy a delicious BBQ on the terrace of the Krupp College. Get to know your project team members, have a relaxed conversation with our faculty and chat with other summer school participants or say goodbye to your new colleagues!

Guided City tour
When: Wednesday, 25 July 2918, 21:15-23:00
Where: St. Petri Dom (Meeting point 19:00 and 20:30 main gate @Jacobs Uni)
Price: for free
Join our guided city walk and explore Bremen´s special attractions. Find out about Bremen, its buildings, history and people.

We offer you two option:

1. **City + tour**: You can join us and go to the city centre after dinner to enjoy some free time on your own or have a cold drink at the "Schlachte". We will meet at 19:00 at the main gate of Jacobs University.
2. **Tour only**: You could relax on campus and join later for the guided city tours. We will meet at 20:00 at the main gate of Jacobs University.

Pub Crawl & Breminale
When: Friday, 27 July 2018, 20:00 until open end
Where: Square in front of central station (take the exit towards the city saying "Innenstadt")
Price: Depends on you…(for your orientation: public transportation tickets (2.80 Euro /one way), drinks (3-5 Euro/Beer) and food)

Together we will catch the train to Bremen and explore the nightlife in Bremen's lively and hip neighborhood "Viertel", hop from bar to bar and end up at the *Breminale* - Bremen's yearly culture and music festival next to the river Weser.

Once arrived at the Breminale, you will be responsible yourself for finding your way around and getting back to Bremen Schönebeck. Make sure to catch the last train!

Bunker Valentin

When: Sunday, 29 July 2018, 12:00

Where: Meeting at the main gate (Campus)

Price: Public transportation tickets (2.80 Euro/one way), free admissions, rental of multimedia guide on payment of a deposit.

The former submarine bunker "Valentin" is the second largest above ground bunker in Europe and the most visible legacy of three major Nazi armament projects that have transformed a predominantly agricultural region since the mid-1930s.

In January 2011, when the "Bunker Valentin" became the "Denkort Bunker Valentin" memorial, the bunker began serving a civilian function for the first time in its almost seventy-year history. The memorial offers a broad range of programs that encouraging visitors to actively and critically examine the bunker's past, present and future and to explore its surroundings.

__Lectures__

Fariba Karimi

Application of Network Theory in Social Sciences to Tackle Societal Problems

Modeling social behavior, homophily and group perception using network theory.
Homophily can put minority groups at a disadvantage by restricting their ability to establish links with people from a majority group. This can limit the overall visibility of minorities in the network. In this talk, I will discuss how to model social networks with groups and homophily and the application of the network analysis on the ranking of minority and the formation of perception in groups.

Cornelius Puschmann

Introduction to Topic Modeling Research

This lecture provides a concise and hands-on introduction to topic modeling, an increasingly popular method in computational social science (Blei, 2012; DiMaggio, 2015; Puschmann & Scheffler, 2016). While a growing number of packages in widely used programming languages are at the disposal of researchers, there are a number of caveats to consider when deploying topic models in the research process, both on the technical level and in terms of research design, such as which algorithm to rely on, how to set parameters, and in which ways to preprocess data. Interpreting the output generated by popular algorithms such as Latent Dirichlet Allocation (LDA; Blei, Ng & Jordan, 2003), and evaluating the validity of topic model statistics are key challenges for social scientists interested in using topic modeling, as is the question of successfully embedding topic models in a research design in a fashion that allows the testing of concrete hypotheses.

Adam Pah

Modeling Contagion in Behavioral Time Series

This lecture focuses on what contagion is and how it draws from the biology and applies to human behaviors and interactions. After detailing the idea and history of how contagion works at the individual level, we will then discuss how this understanding is conceptualized when we only have the observed outputs of behavior (a time series) and unknown interactions between individuals and groups. We will finish with describing the basic concept for identifying contagion in a time series and its limitations in comparison to networks of individuals.

James Kitts

Engaging Network Theory with Event Data

I will discuss some empirical lenses emerging from computational social science – time-stamped events from wearable sensors, location-aware devices, electronic calendar meetings, logs of phone calls, messages, online transactions, etc. I will ask how these event series correspond to conventional network concepts and theories. This lecture draws on a [theoretical working paper](#) building on [an article](#) that I published in *Advances in Group Processes* and an [empirical study of reciprocal exchange](#) that I just published in the *American Journal of Sociology*.

Henrik Dobewall

Values - Concepts, Measurement and Data Sources

Values are shared beliefs about what is right or wrong, good or bad, and desirable or undesirable in a society. They are also used to judge others. I provide an overview of how values have been conceptualized and measured over time and available data sources for values. Finally, I will discuss recent attempts to identify values in words and likes.

Bruce Edmonds

Agent-based Modeling

This talk introduces the approach of agent-based modelling, some of its methodology as well as its prospects and difficulties. In particular it encourages users to think about the purpose they have for their model. This is illustrated with some example models.

Gerd Wagner

Simulation Modeling with UML and BPMN

This tutorial presents a general approach how to use UML class diagrams and BPMN process diagrams at all three levels of model-based simulation engineering: for making conceptual domain models, for making platform-independent simulation design models, and for making platform-specific, executable simulation models. In our Object-Event Modeling (OEM) approach, object and event types are modeled as stereotyped classes, random variables are modeled as stereotyped operations constrained to comply with a specific probability distribution, while event rules/routines are modeled both as BPMN process diagrams and in pseudo-code. We will discuss how to extend the basic OEM approach by adding modeling concepts of activities and agents with perceptions, actions and beliefs.

Karsten Donnay

Foundations of Spatial Data Analysis

This lecture introduces the conceptual foundations of spatial data and their analysis. Topics covered range from foundational concepts and standard techniques to common pitfalls and current best practices. Where applicable, relevant methodological solutions and tools are introduced throughout including techniques specifically tailored to event data.

Juan Masullo

Civil Wars Research - An Overview of the Field

This lecture will provide participants with a broad introduction to the field of civil wars research from the early 1990s to date. It will cover some of the main topics, approaches, data and findings of different schools of research on the topic, taking stock of what we know and what we do not know. The emphasis will be on studies that explore the micro-dynamics of war, in particular the role of civilians (non-combatants) in shaping war trajectories and outcomes. The ultimate aim of this lecture is to stimulate reflection on civil war social processes that can lead to research questions that could be explored with the use of computational methods.

Davide Natalini

Social-Ecological Systems and Environmental Conflict

Humans and the environment are part of a highly complex system characterised by multitude of actors, the presence of thresholds, high connectivity and where dynamics give life to emergent properties such as conflict. In this talk I am going to introduce the concept of social-ecological systems and I will identify some of the environmental dynamics that trigger conflict around the world. I will provide examples, especially for the 2008 global multi-systemic crisis.

Peter Holtz

How to Extract Latent Psychological Constructs from Textual Data

New methods for text- and data-mining and the reams of freely available behavior data on the internet, for example, in the form of comments and likes in Social Media, have opened up the possibility to extract latent psychological constructs such as personality traits or political and sexual orientations from such behavior data with reasonable reliability. Of course, this also leads to ethical dilemmas and societal concerns. In this introductory talk, I will provide an overview over some relevant methodological approaches and ongoing developments.

Fabian Flöck

The Wikimedia Projects as a Data Source for Social Science Research

Wikipedia and her sister projects can almost be thought of as the "drosophila" of computation-aided research, due to the comprehensiveness of their human-curated content. Yet, not all possible use cases of the available data are obvious to social science researchers.

This talk will therefore firstly reflect on how Wikipedia can be used in research in various ways: As a (distorted?) mirror of the factual world, as a natural experiment in large scale collaboration, or to study language evolution over time - to name some of the perspectives.

Secondly, an overview is given of the services and data sets the Wikimedia Foundation and third-party providers make available beyond the different language versions of Wikipedia, such as DBpedia and Wikidata, enriched editor interaction data sets and other sources - and how those can be used in connection.

Nicolas Payette

NetLogo - From the Fundamentals to Advanced Concepts

In this lecture, we will take a deep dive into the NetLogo programming language. We will describe the fundamental data structures of the language, with an eye on their internal implementation, their performance characteristics and the appropriate ways to use them. Throughout the lecture, we will keep NetLogo's roots in the functional programming tradition in mind, paying special attention to anonymous procedures and the higher-order procedures that use them. We will try to show how thinking about side effects and functional purity can be helpful in keeping the complexity of large agent-based models under control.

Arnim Bleier

Hands-on Topic Modeling

This session provides an introduction to Natural Language Processing (NLP) in R with an emphasis on Topic Modeling. The session touches on issues ranging from data pre-processing and import to model inference and visualization. Participants will get a first insight into the practical aspects of text mining and relevant R packages for Quantitative Analysis of Textual Data and Structural Topic Modeling. The session is intended as an extension of the talk "Introduction to topic modeling research".

Luis Gustavo Nardin

Implementing Simulation Models with OESjs

As opposed to traditional simulation technologies, web-based simulations, typically implemented with JavaScript, can be executed in any web browser, not just on desktop computers, but also on mobile devices like tablets and smartphones. This allows sharing simulations by means of simple web links and makes them easily accessible to anyone anywhere. OESjs is a JavaScript simulation framework that implements the Object-Event Simulation (OES) paradigm. It supports both next-event time progression, as used in discrete event simulation, and fixed-increment time progression, as used in NetLogo-based social science simulations as well as in continuous state change simulations. As opposed to NetLogo, OESjs supports the development of web-based simulations. We show how to implement different versions of the Schelling Segregation Model with OESjs.

Sebastian Schutte

Spatial Event Data Analysis

This lecture focuses on the analysis of event data with spatial and temporal coordinates. It covers challenges to econometric analysis of event data, spatial point processes, and other dedicated methodology for the analysis of events. Several illustrative examples and underlying concepts are discussed in depth. Examples are presented in R.

Optional Additional Lectures

The following lectures do not appear in the program now, but the sessions on Friday 27, 16:00 and Monday 30, 16:00 are reserved for additional lectures if sufficient interest exists.

James Kitts

Design and Evaluation of Computational Experiments

After developing an agent-based model, you may aim to set up experiments to investigate how that model's behavior changes as you manipulate parameters, network topology, or other features. We will examine some judgment calls in experimenting on a model and drawing conclusions based on those experiments: Are you interested in the model's dynamic behavior or stable outcomes? If the latter, what constitutes stability and how long should you allow a model to run when those criteria are not met? Which parameters will you manipulate and how fine-grained will those manipulations be? How will you set initial conditions for simulations? How will you analyze resulting data, present your conclusions, and justify these various judgment calls to reviewers and audiences? Participants will work with hands-on NetLogo exercises using their laptops, but no programming background or NetLogo experience is required.

Arnim Bleier

Bayesian Analysis for the Social Sciences with Stan

In the field of CSS programming with probabilities has become a indispensable skill. Stan (http://mc-stan.org) allows us to program with probabilities in a high-level language and is attractive because of its simplicity and efficiency. Building Bayesian models with Stan enables us to be more precise about our assumptions than we may otherwise have been. In this session we will give an overview of the Bayesian methodology, introduce you to writing models with Stan, apply inference procedures.

Bruce Edmonds

Exploring Possible Outcomes of Ingroup Bias Using Agent-Based Modelling

Essential to understanding the impact of in-group bias on society is the micro-macro link and the complex dynamics involved. Agent-based modelling (ABM) is the only technique that can formally represent this and thus allow for the more rigorous exploration of possible processes and their comparison with observed social phenomena. This talk discusses these issues, providing some examples of some relevant ABMs.

__Workshops__

Jan Lorenz, Emanuel Deutschmann

Publication Strategies and Reproducible Research

In this workshop, we will bring together publication strategies in computational social science from different disciplinary perspectives, e.g. Sociology, Political Science, Psychology, Economics, Statistics, Computer Science, Complex Systems, or Network Science. We will collect potential disciplinary and multidisciplinary target journals and how to address their audience. We will also discuss how to best realize open science in its various dimensions. We will briefly look at some tools and exchange experiences.

Klaus Boehnke

Academic Writing

The short workshop will address core elements of writing an academic journal article. In very short exercises it will address choosing a title and keywords, writing an academic bio and an abstract, planning an intro, a method and a results section, and discussing findings and limitations of the undertaken study. Instruction will be based on the instructor's seven-year experience as associate editor of the *International Journal of Psychology*.

Roundtable Discussion

"Gender Balance in Computational Social Science"

Panelists: *James Kitts* (University of Massachusetts), *Fariba Karimi* (GESIS Leibniz Institute for the Social Sciences), *Lara Minkus* (University of Bremen, socium), Lusine Grigoryan (Jacobs University, BIGSSS), TBA
Chair: *Klaus Boehnke* (Jacobs University, BIGSSS)

Social science textbooks often divide the discipline into approaches that aim for explaining (German: "erklären') social processes and approaches that aim for understanding (German: "verstehen") them. Sometimes women are seen as connected with the *Verstehen* approach, men with the *Erklären* approach. Is this the reason why so few women engage in Computational Social Science, a subdiscipline of the social sciences linked more closely with explanatory research questions? Or why is this summer school clearly dominated by men? All keynoters are men, and almost all expert input comes from men. Is there a power issue at stake, does it have societal reasons, or is it just a matter of individual differences in interests?

The roundtable will address these issues and will eventually open the discussion to the auditorium.

Projects

Peter Holtz & Henrik Dobewall

1. Values in Everyday Language and Intergroup Conflict

Inter-group conflicts often revolve around cultural differences between groups (Dobewall, & Strack, 2011). We argue that people's perceptions of their own cultural values as well as of other groups' cultural values are accessible by means of an analysis of short informal statements on social media (for example, internet postings; Holtz, Kronberger, & Wagner, 2012). Within our project, we will relate value attributions to social conflicts such as debates on migration in Germany and other European countries.

We want to construct a value dictionary based on the work of Christen and colleagues (2016) and use it to analyze discourse on social conflicts such as migration related debates. We will collect data from popular channels such as political party web pages and programs, open comment sections in online newspapers, Facebook, Twitter, and LinkedIn and use several software tools for linguistic analysis, such as word counting (e.g., LIWC), topic models (using the statistical programming environment R), and comparative keyword analysis (using software tools such as AntConc) to relate patterns of linguistic expressions to value expressions and value expressions consequently to conflict related discourse patterns.

References

Christen, M., Narvaez, D., Tanner, C., & Ott, T. (2016). Using thesauruses as a heuristics for mapping values. *Cognitive Systems Research, 40*, 59-74.

Dobewall, H., & Strack, M. (2011). Cultural value differences, value stereotypes, and diverging identities in intergroup conflicts: The Estonian example. *International Journal of Conflict and Violence, 5*(1), 211-223.

Holtz, P., Kronberger, N., & Wagner, W. (2012). Analyzing internet forums: A practical guide. *Journal of Media Psychology, 24*(2), 55-66.

Davide Natalini & Bruce Edmonds

2. Socio-ecological Tipping Points. Quantifying the Link Between Environmental and Climate Change and Conflict

Research focussing on the link between climate and environmental change, and human conflict, found a significant, positive relationship between the two (Homer-Dixon 2001, Hsiang et al. 2013). However, how the effects of climate and environmental change are transmitted through the system and translate in increased conflict remains unknown. Unsustainable environmental change is chaotic and difficult to predict, often characterised by nonlinear behaviours and tipping points. When these are surpassed the system generates a shock that reverberates through the system and impacts society in complex ways, mainly through conflict and general loss of wellbeing. An example of this is the 2008 multisystem crisis which was environmentally driven and resulted in national food and fuel riots.

This project will further develop the Food and Fuel ABM in different possible directions. The final option will be selected with the students that will join the project:

- − Option 1: Identify additional environmental variables to find a connection between environmental scarcity and food and fuel riots.

- Option 2: Test the effect of other socio-economic variables at different scales on food and fuel riots, to find additional multi-scalar, socio-economic drivers of riots (e.g. volatility in international prices of natural resources).
- Option 3: Extend the original quantitative analysis on drivers of food and fuel riots from Natalini (2016) to different types of environmentally-driven conflict, e.g. civil wars.

References

Homer-Dixon, T.B. 2001. *Environment, scarcity, and violence.* Princeton University Press.

Natalini, D. 2016. *Estimating dynamics that lead to food and fuel riots: a quantitative and agent-based modelling approach.* PhD thesis.

Luis Gustavo Nardin & Gerd Wagner

3. Simulating the Economic Impacts of Mafia

The aim is to understand if and how organized crimes, in specific Mafia-type organizations, impact the economy. We usually assume that Mafia only influences negatively the economy, but there are some works, such as van Dijk (2007), showing that sometimes these organizations boost some aspects of the economy giving the impression that they are beneficial to the society. Hence, this model aims to serve as a tool (1) to evaluate different social scenarios and individual reactions to extortion to check these conclusion about the different impacts Mafia has on economy, and (2) to identify measurements/metrics that helps us to check the possible benefits and damages caused by Mafia.

We may use different survey data to define the input parameter values of the simulation model about level of crime, strength of the State, and entrepreneurial behaviors. For instance, use surveys from World Economic Forum ("The global competitiveness report") and other European Social Survey to inform the level of activity of organized crime (or at least a perception of this type of groups) and the level of Police enforcement against them.

Reference

van Dijk, J. (2007) Mafia markers: Assessing organized crime and its impacts upon societies. *Trends in Organized Crime* 10:39-56. DOI: 10.1007/s12117-007-9013-x

Fariba Karimi & Julian Kohne

4. The Role of Homophily in the Emergence of Social Norms Within Social Networks

In our research project, we aim to study the impact of homophily in the emergence of social norms within networks among actual humans, instead of simulated agents. Participants will be members of societal groups with clearly distinguishable group identities and demographics (e.g. religious Muslims and Christians of varying sex and age). The participants will be placed in a virtual network with each participant representing a node. Importantly, participants will only be able to see the demographic information of nodes connected to them in their intermediate vicinity. With the instruction for participants to maximize connected networks of the same norms (Axelrod, 1986), the network will iterate two steps. First, participants will be asked to choose a behavioral option related to an arbitrary social norm without pre-existing convictions ("What color of shirt should people wear on Fridays? Green Blue or Red?"). Second, people will receive feedback about the choices of their neighboring nodes. Afterwards, people can adapt their choices to react to the feedback from the neighboring nodes. Iteration will stop after connected networks of norms have converged. To test the impact of

homophily on the emergence of norms, we manipulate the connectivity among nodes based on their demographics (Lee et al, 2017).

Reference

Lee, E., Karimi, F., Jo, H., Strohmaier, M., & Wagner, C. (2017). Homophily explains perception biases in social networks, arXiv preprint arXiv:1710.08601

Sebastian Schutte, Karsten Donnay & James Kitts

5. Analyzing Conflict Dynamics at the Event-Level

Contemporary conflict research relies on a wealth of previously inaccessible data. Actors, locations, and events can be described in great numbers at unprecedented levels of detail. The earlier burden of data acquisition has largely been replaced by the increased challenges of data analysis. In the proposed research project, we introduce students to the basics of geographic event data analysis. In a second step, we give an outlook on inferential and predictive methods for working with event data. Finally, we introduce new methodology directly from the research frontier. Karsten Donnay has pioneered and implemented novel approaches for integrating event data sets. Moreover, he has developed software for automatically joining events with geographic variables from other data sets. Sebastian Schutte and Karsten Donnay have co-developed methodology for the analysis of reactive patterns in conflict event data. Students enrolled in the class will be acquainted with these approaches in a stepwise fashion and are encouraged to pursue their own substantive or methodological research throughout the class. Weaknesses of existing methodology and areas of future extension are introduced toward the end of the class.

Adam Robert Pah, Nicolas Payette & Juan Masullo Jiménez

6. The Timing and Execution of Terrorist Attacks

The escalation of attacks from terrorist groups, in frequency and/or casualties, in any city or region poses a distinct threat. While it has been hypothesized that there is a dynamical process at play within a single city or region (Johnson et al. 2011) that pits terrorist groups against the state actor that would produce an 'arms race', it is unclear how much inter-group learning occurs. Further, it is unknown how much the dynamics of a city and its populace (such as holidays, festivals, protests, etc.) impact the planning and execution of attacks, as opposed to the process between state and terror actors. This work will focus on decoupling and quantifying the extent that natural city dynamics, inter-group learning, and state opposition impact the timing and execution of terrorist attacks.

Fabian Flöck & Arnim Bleier

7. Between Cooperation and Conflict. Modeling Fine-Grained Textual Revision Changes as Social Interactions

While every minute action in the collaborative creation of digital artifacts on the World Wide Web is recorded, we still know too little about how conflicting stances between collaborators get resolved and what value or harmful effect they have on the produced content or the social dynamics of the system.

In this project we will explore a large, novel corpus of data on several language versions of Wikipedia, containing all changes ever made by editors to content of other editors, complemented by additional interaction data like talk page discussion threads.

The participants will learn how to handle this data and will explore different ways to classify interactions between editors on the spectrum between cooperation and outright antagonism, ending either in a consensus or a "winner-takes-all" result. To this end, participants will expand on existing human assessments of interaction between editors via crowdsourcing and use text mining and machine learning approaches to build models that can explain or predict these interactions.

A certain pre-existing text mining and machine learning expertise is preferable.

Jan Lorenz, Cornelius Puschmann, Ahmadreza Asgharpourmasouleh & Masoud Fattahzadeh

8. Emergence of the Image of Social Conflict in Social Media

This research aims to study the social construction of the image of a particular social conflict in Iran through agent-based modeling. Although many researchers have examined the processes of formation and decline of social conflicts, a few have studied their social image among the larger population of a society. This is important since in most cases a relatively few numbers of citizens engage in a social conflict in the initial phases. However, the social image can determine the future of social conflicts. We believe that in our case in Iran there was a second order conflict in the social media among different political camps to give meaning to the social conflict and it was this meaning that diffused through a social image and damped the unrests. The social images are emergent phenomena and change through time. This is the reason that makes agent-based modeling a proper approach to address them.

<u>Keynote Speakers</u>

Kristian Skrede Gleditsch | University of Essex (UK)

Kristian Skrede Gleditsch is Professor in the Department of Government at the University of Essex (UK), director of the Michael Nicholson Centre for Conflict and Cooperation, and a research associate at the International Peace Research Institute Oslo (Norway). He obtained his PhD in 1999 in Political Science from University of Colorado (USA).

His research interests include conflict and cooperation, democratization, and spatial dimensions of social and political processes. Amongst others, he authored "All International Politics is Local: The Diffusion of Conflict, Integration, and Democratization" (University of Michigan Press, 2002), "Spatial Regression Models" (Sage, 2008, with Michael D. Ward) and "Inequality, Grievances, and Civil War" (Cambridge University Press, 2013, with Lars-Erik Cederman and Halvard Buhaug).

Nils Weidmann | University of Konstanz (Germany)

Nils Weidmann is Professor of Political Science and head of the Communication, Networks and Contention Research Group. Previously, he held research fellowships at the Centre for the Study of Civil War at the Peace Research Institute Oslo (Norway), the Jackson Institute for Global Affairs at Yale University (USA) and the Woodrow Wilson School at Princeton University (USA). He received a M.Sc. in Computer Science from the University of Freiburg (Germany) in 2003, a M.A. in Comparative and International Studies from ETH Zurich (Switzerland) in 2008 and a Ph.D. in Political Science from ETH Zurich in 2009.

Michael D. Ward | Duke University (USA)

Michael Ward is Professor Emeritus of Political Science at Duke University (USA). At Duke, he established an innovative research lab of graduate and undergraduate students focusing on conflict prediction. His work began with a study of the links between global and national inequalities (1977), continued with seminal articles on the conflict processes in the Cold War, and have turned to analyses of networks of conflict and cooperation in the contemporary era. One of the first political scientists to focus on the role of prediction in scholarly and policy work, he continues these efforts in his company, Predictive Heuristics, a data analytics firm that provides risk analysis for commercial and institutional clients. Earlier in his career, he was a founding member of the Center for Statistics and the Social Sciences at University of Washington (USA), and served on its executive board for a decade. He also worked with Karl Wolfgang Deutsch on building a global political model at the Science Center Berlin (Germany). He earned his Ph.D. in political science from Northwestern University (USA) in 1977, and was a post-doctoral fellow supervised by Harold Guetzkow.

Experts

James Kitts | Department of Sociology, University of Massachusetts (USA)

James Kitts is Professor of Sociology and director of the Computational Social Science Institute at the University of Massachusetts (USA). His research includes formal theoretical models of social network dynamics and group processes as well as new methods for longitudinal data collection (e.g. wearable sensors) and analysis. He is an editor of the Computational Social Sciences series at Springer, area editor of Computational and Mathematical Organization Theory, and is on the editorial board of Sociological Science and American Sociological Review. His recent work (including an empirical study of inter-organizational exchange published in American Journal of Sociology) illustrates how the fine-grained event data produced in the computational social science community enables new breeds of theory and method in social network analysis. Since 2004 he has managed a web repository of materials for teachers and students in computational modeling of social dynamics: www.socdynamics.org

Fariba Karimi | GESIS Leibniz Institute for the Social Sciences (Germany)

Fariba Karimi is a postdoctoral researcher at the department of Computational Social Science in the GESIS Leibniz-Institute for the Social Sciences (Germany). She received her PhD in Computational Science and Physics in 2015 from the Umeå University (Sweden). In her research, she mainly uses computational approaches such as network theory, data mining and agent-based modeling to address societal challenges such as algorithmic biases, social inequalities related to minorities and perception biases. Prior to that, she has worked on various projects such as finding cultural borders using Wikipedia edits, spreading models in social and temporal networks, default contagion in financial networks and agent-based modeling of cooperation.

Bruce Edmonds | Manchester Metropolitan University (UK)

Bruce Edmonds is Professor of Social Simulation and Director of the Centre for Policy Modelling at the Manchester Metropolitan University. He is expert at the methodology and application of agent-based simulation as applied to issues of policy interest. He was the key modeller of the £2.7m "Social Complexity of Immigration and Diversity" project in the UK, and so has experience in a number of different simulations connected with conflict. In particular he has worked on "tag-based" (emergent groups based on observable characteristics) models of cooperation/conflict with David Hales.

Fabian Flöck | GESIS Leibniz Institute for the Social Sciences (Germany)

Fabian Flöck is a researcher at the GESIS Leibniz-Institute for the Social Sciences in Cologne (Germany). Before he received his PhD in Computational Social Science/Computer Science in 2016 from the Karlsruhe Institute of Technology (Germany), he worked as head product manager for a Social Network platform based in Hamburg (Germany) and as a consultant on interface and technical web design in San Francisco (California, USA). His research interests include the social dynamics behind the content creation processes in collaborative platforms, text mining and visualization, as well as Human Computation.

Arnim Bleier | GESIS Leibniz Institute for the Social Sciences (Germany)

Arnim Bleier currently works at the Department of Computational Social Science at the GESIS Leibniz-Institute for the Social Sciences in Cologne (Germany). He is interested in Quantitative Social Research, Qualitative Social Research and Communication and Media. His most recent publication is 'Truncation-free Hybrid Inference for DPMM.'

Peter Holtz | Leibniz-Institut für Wissensmedien (Germany)

Peter Holtz studied psychology, obtained a PhD from the University Erlangen-Nürnberg (Germany). Previously, he held a Postdoc position at the Department of Social and Economic Psychology at Johannes Kepler University Linz (Austria) and several other positions related to computational social sciences research and in science management. Together with Wolfgang Wagner and others, he received the Asian Association of Social Psychology's (AASP) 2011 'Misumi Award'. Currently, he is a researcher in the ERC funded international interdisciplinary research project 'Analytics for Everyday Learning' in the Knowledge Construction Lab of the Leibniz-Institut für Wissensmedien [Leibniz-Institute for knowledge media research] in Tübingen (Germany). The project aims at developing and testing socio-cognitive models of media based everyday learning.

Henrik Dobewall | Institute of Behavioral Sciences, University of Helsinki (Finland)

Henrik Dobewall is a postdoctoral researcher at the University of Helsinki (Finland). He received a Master's degree in Social Sciences from the University of Göttingen (Germany) and PhD in psychology from the University of Tartu (Estonia). As an expert in survey research methods, his research focuses on the multi-method assessment of personality, values, and subjective well-being. Henrik's research interests include, among others, the role of values in intergroup-stereotypes and ethnic conflicts.

Nicolas Payette | Laboratory for Agent-Based Social Simulation (Italy)

Nicolas Payette is a computer programmer with a background in philosophy. He joined the international research group Laboratory of Agent Based Social Simulation (LABSS) in Rome (Italy) in the beginning of 2017 to work on the simulation of criminal and terrorist networks and the processes of recruitment into these. Nicolas likes to build agent-based models and to build tools for building agent-based models. He has contributed to the development of the NetLogo platform and is the author of many extensions.

Davide Natalini | Global Sustainability Institute, Anglia Ruskin University (UK)

Davide Natalini is Research Fellow at the Global Sustainability Institute at Anglia Ruskin University in Cambridge (UK). Davide holds a PhD in Environmental Security, an MA in Environmental Economics and Policies and a BA in International Relations. Davide's research focuses on the study of complex dynamic systems through computer simulation and multi-stakeholder engagement. He applies these methods to different research fields and topics such as energy transitions (with the MEDEAS project), environmental conflict, scarcity and security, socio-ecological resilience and the evaluation of systemic risk.

Adam Robert Pah | Kellog School of Management, Northwestern University (USA)

Adam Pah is a Clinical Assistant Professor at the Kellogg School of Management and Organizations at Northwestern University (USA). He also is the Associate Director of the Northwestern Institute on Complex Systems and a Research Professor there. His research interests include adoption, behavioral contagion, and estimating individual and group performance.

Sebastian Schutte | Zukunftskolleg, University of Konstanz (Germany)

Sebastian Schutte is a political scientist currently employed as a Marie Curie Fellow at the Zukuftskolleg at the University of Konstanz (Germany). He studied Anthropology, Computer Science, and Cognitive Science at the University of Freiburg (Germany), as well as Political Science at ETH Zurich (Switzerland). His research is mostly focused on conflict processes in civil wars and sometimes methodological problems.

Karsten Donnay | Center for Data and Methods, Department of Politics and Public Administration, University of Konstanz (Germany)

Karsten Donnay is an Assistant Professor of Computational Social Science at the Center for Data and Methods in the Department of Politics and Public Administration at the University of Konstanz (Germany). Previously, he was a postdoctoral researcher at the Department of International Relations & Political Science at the Graduate Institute of International and Development Studies in Geneva (Switzerland), and the National Consortium for the Study of Terrorism and Responses to Terrorism (START) at the University of Maryland (USA). In his research, he combines a substantive interest in political science – studying social processes such as urban violence and crime, conflict and terrorism, or social influence through traditional and new media – with the development and refinement of quantitative methodologies for social science research.

Cornelius Puschmann | Hans Bredow Institute, Hamburg (Germany)

Cornelius Puschmann is a senior researcher at the Hans Bredow Institute for Media Research in Hamburg (Germany) where he coordinates the international research network Algorithmed Public Spheres, as well as an associate at the Alexander von Humboldt Institute for Internet and Society (HIIG) in Berlin (Germany). His research interests include online hate speech, the role of algorithms for the selection of media content, and methodological aspects of computational social science.

Luis Gustavo Nardin | Computer Science Department, Brandenburg University of Technology (Germany)

Luis Gustavo Nardin is a faculty member of Computer Science at the Brandenburg University of Technology (Germany). He has a PhD in Computer Engineering and experience in applying computation methods and technologies to understand different social phenomena like organized crime and epidemiology. His research interests include agent-based modeling, simulation engineering, and application of statistics for simulation output data analysis.

Gerd Wagner | Chair of Internet Technology, Brandenburg University of Technology (Germany)

Gerd Wagner is Professor of Internet Technology at Brandenburg University of Technology (Germany). He has studied Mathematics, Philosophy and Informatics in Heidelberg, San Francisco and Berlin. His research interests include modeling and simulation, foundational ontologies, and web engineering. He is the co-founder of the website web-engineering.info and the web-based simulation platform www.sim4edu.com.

Jan Lorenz | GESIS, BIGSSS & Jacobs University (Germany)

Jan Lorenz is a postdoctoral fellow in Psychology and Methods at Jacobs University and faculty member of the Bremen International Graduate School of Social Sciences (Germany). He obtained a PhD in Mathematics from University of Bremen and was a postdoc at ETH Zürich (Switzerland) and at Carl von Ossietzky University of Oldenburg (Germany). He is interested in opinion dynamics and collective decisions as well as agent-based and data driven dynamical modeling.

Adalbert Wilhelm | Jacobs University & Bremen International Graduate School of Social Sciences (Germany)

Adalbert Wilhelm is Professor of Statistics at the Commerzbank Chair of Information Management at Jacobs University (Germany) and a faculty member of the Bremen International Graduate School of Social Sciences (Germany). He was a visiting Professor at the University of Cagliari (Italy) and the George Mason University in Fairfax (USA). He received his PhD in Statistics (1993) and his Venia Legendi (2000) in Mathematics from University of Augsburg (Germany). His research interests include information and knowledge management, statistical visualization, data mining, exploratory data analysis and computational statistics.

Juan Masullo Jiménez | Jacobs University & Bremen International Graduate School of Social Sciences (Germany)

Juan Post-Doctoral Fellow at the Bremen International Graduate School of the Social Sciences, BIGSSS (Germany) and holds a Phd in Social and Political Sciences from the European University Institute in Florence (Italy). His substantive research interests include civil wars, collective action and, more broadly, contentious politics. Juan's research focuses on the individual and collective behavior of civilians (noncombatants) in the context of armed conflicts. He is particularly interested in understanding the drivers behind the choices they make and how these choices are related to their protection prospects. Moreover, he is interested in identifying the legacies that this choices leave in terms of community cohesion, social fabric, collective identities and cleavages and how these are related to obstacles and opportunities for post-conflict reconstruction and peace building. In tackling these questions, he combines multiple types of evidence and rely extensively on immersive fieldwork in conflict-affected areas.