

## International Research in Computational Social Sciences

*Feb 23-26 – Networking Workshop*

*Funded by Volkswagen Foundation*

*Cologne, Germany*

### Tuesday, February 23

Location: GESIS, Unter Sachsenhausen 6-8, Cologne

09:15 – 10:30 Registration + coffee

**10:30 – 10:45** *Markus Strohmaier*  
(*GESIS – Leibniz Institute for the Social Sciences, Cologne*)  
Event opening

**10:45 – 11:00** *Anika Haverig, Hanna Wielandt (Volkswagen Foundation)*  
Event opening

**11:00 – 12:15** Keynote  
*Alan Mislove (Northwestern University, Boston)*  
Increasing the Transparency of Online Algorithms

12:15 – 13:30 lunch

**13:30 – 14:00** Introductory Phase

**14:00 – 15:30** Pecha Kucha Session 1  
Plenary slot for presentations (presentations à 2 mins)

15:30 – 16:00 coffee break

**From 16:00** Evening at Chocolate Museum, Cologne ([www.chocolatemuseum-cologne.com](http://www.chocolatemuseum-cologne.com))

16:00 Small train to Chocolate Museum

17:00 – 18:00 Guided Tour

18:30 Conference Dinner

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### Wednesday, February 24

Location: GESIS, Unter Sachsenhausen 6-8, Cologne

- 09:00 – 10:15** Keynote  
*Michael Macy (Cornell University, Ithaca)*  
The Polarization of Science
- 10:15 – 11:00** Pecha Kucha Session 2  
Plenary slot for presentations (presentations à 2 mins)
- 11:00 – 11:30 coffee break
- 11:30 – 12:15** Pecha Kucha Session 3  
Plenary slot for presentations (presentations à 2 mins)
- 12:15 – 13:15 lunch
- 13:15 – 13:45** *Anika Haverig, Hanna Wielandt (Volkswagen Foundation)*  
General Funding Requirements
- 13:45 – 17:15** Group work
- 14:45 – 17:15 individual breaks
- 18:30** Dinner *Brauhaus* (Brewery style restaurant)

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### Thursday, February 25

Location: GESIS, Unter Sachsenhausen 6-8, Cologne

- 09:00 – 10:15** Keynote  
*Sandra González-Bailón (Annenberg School for Communication, University of Pennsylvania)*  
Online Networks and Large-Scale Coordination
- 10:15 – 12:15** Group work  
Individual consulting slots  
*(Sandra González-Bailón, Michael Macy, Alan Mislove, Jürgen Pfeffer, Claudia Wagner)*  
Individual consulting slots (Volkswagen Foundation)
- 12:15 – 13:15 lunch
- 13:15 – 14:45** Group work  
Individual consulting slots  
*(Sandra González-Bailón, Michael Macy, Alan Mislove, Jürgen Pfeffer, Claudia Wagner)*  
Individual consulting slots (Volkswagen Foundation)
- 14:45 – 15:15 coffee break
- 15:15 – 17:30** Group work  
and/or  
Leisure activities [optional, but organised and booked by GESIS]  
Town tour  
Cathedral (Kölner Dom)  
3D-Minigolf ([www.glowingrooms.com](http://www.glowingrooms.com))
- 18:30** Dinner Restaurant da Bepi (Italian)

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### Friday, February 26

Location: GESIS, Unter Sachsenhausen 6-8, Cologne

- 09:00 – 10:45** Plenary presentations; Feedback session 1  
[brief presentation of group work results]
- 10:45 – 11:15 coffee break
- 11:15 – 12:15** Plenary presentations; Feedback session 2  
[brief presentation of group work results]
- 12:15 – 13:15 lunch
- 13:15 – 14:15** Plenary discussions:  
(1) Key challenges of CSS: validity, representativity, and bias of data  
(2) How to achieve interdisciplinary collaboration for computational social sciences research
- 14:15 – 14:30** *Markus Strohmaier*  
Official closing of the event
- 14:30 – 16:00** Group work (voluntary, rooms provided)

*Sandra González-Bailón*

## Online Networks and Large-Scale Coordination

Social media and web technologies have become a prominent source of data for researchers interested in the analysis of social interactions and communication dynamics. Online data help us revisit old theoretical accounts of interpersonal influence, diffusion processes, and social mobilization; they offer, in other words, an empirical domain in which to test and develop social theory. The analysis of online networks, however, also creates methodological challenges that are new to researchers used to employing more traditional measurement instruments (like surveys or name generators, tailored to yield smaller and more static network data). The analysis of online networks requires methods that can offer a simplified map of the structure, and that allow us to understand the dynamics that unfold through constantly pulsating ties. This talk will consider recent applications of computational tools that help us develop a theoretical understanding of social interactions and coordination in the digital age.

*Sandra González-Bailón is an Assistant Professor at the Annenberg School for Communication, affiliated faculty at the Warren Center for Network and Data Sciences, and research associate at the Oxford Internet Institute. She completed her doctoral degree in Nuffield College (University of Oxford) and her undergraduate studies at the University of Barcelona. Her research lies at the intersection of network science, data mining, and computational tools, with a special interest in dynamics of political communication and social change. She is currently working on a book titled *Decoding the Social World: When Data Science Meets Communication* (under contract with MIT Press) and in the edited volume *Communication in the Networked Age* (under contract with Oxford University Press, co-edited with Brooke Foucault-Weltes).*

*Michael Macy*

## The Polarization of Science

Passionate disagreements about climate change, stem cell research, and evolution raise concerns that science has become a new battlefield in the culture wars. We used millions of online co-purchase recommendations as a behavioral indicator for whether science bridges or deepens political divides. Findings reveal political polarization both within and across scientific disciplines. Across fields, customers for "blue" political books prefer theoretical sciences (e.g., physics, astronomy, and zoology), while "red" customers prefer commercially applied science (e.g., medicine, criminology, and geophysics). Within disciplines, red books tend to be co-purchased with a narrower subset of science books on the periphery of the discipline. We conclude that the political left and right share an interest in science in general, but not science in particular.

*Michael Macy earned his B.A. and Ph.D from Harvard and M.A. from Stanford. He is currently Goldwin Smith Professor of Arts and Sciences and Director of the Social Dynamics Laboratory at Cornell, with a dual appointment in the Departments of Sociology and Information Science. With support from the U.S. National Science Foundation, Google, Minerva Initiative, and the National Research Foundation of Korea, his research team has used computational models, online laboratory experiments, and digital traces of device-mediated interaction to explore familiar but enigmatic social patterns, such as circadian rhythms, lifestyle politics, the mesh of civilizations, the emergence and collapse of fads, the spread of self-destructive behaviors, cooperation in social dilemmas, the critical mass in collective action, the spread of complex contagions, the polarization of opinion, segregation of neighborhoods, and assimilation of minority cultures. His research has been published in leading journals, including Science, PNAS, American Journal of Sociology, American Sociological Review, and Annual Review of Sociology.*

*Alan Mislove*

## **Increasing the transparency of online algorithms**

We have recently entered the era of "big data", where the online activities of billions of people are now routinely collected and analyzed. This explosion of data has led to the development of numerous algorithms for tasks as diverse as online content recommendations, dynamic pricing of goods, and prediction of criminal activity. However, external observers---including researchers, lawmakers, and regulators---typically have only limited visibility into such systems, as both the algorithm itself and the input data are typically considered proprietary. As a result, the increasingly popularity of these systems has brought up significant concerns about their fairness, transparency, and potential discrimination.

In this talk, I discuss my group's recent work that aims to increase the transparency of these systems via online algorithmic auditing. We have developed techniques that allow an external observer to determine properties of the algorithms, such as the extent to which outputs vary between users and the most important input features used to generate outputs. I describe our results from applying our techniques to three different real-world systems: content personalization in Google search, price discrimination in popular e-commerce retailers, and the surge pricing algorithm in Uber. Overall, our results offer a first step towards increasing the transparency of big data algorithms.

*Alan Mislove is an Associate Professor at the College of Computer and Information Science at Northeastern University. He received his Ph.D. from Rice University in 2009. Prof. Mislove's research concerns distributed systems and networks, with a focus on using social networks to enhance the security, privacy, and efficiency of newly emerging systems. He is a recipient of an NSF CAREER Award (2011), and his work has been covered by the Wall Street Journal, the New York Times, and the CBS Evening News.*

Further to our esteemed keynote speakers we are excited to welcome at the event:

*Jürgen Pfeffer, Carnegie Mellon University, Pittsburgh*

*Claudia Wagner, GESIS - Leibniz Institute for the Social Sciences, Cologne*

Both Jürgen and Claudia will act as mentors during the workshop.