

// MECS // Annual Conference 2016 //

# AGENT CULTURES AND ZOMBIELANDS. FIELDS, FICTIONS AND FUTURES OF AGENT-BASED MODELING AND SIMULATION

## SHORT ABSTRACT

The MECS 2016 Annual Conference Agent Cultures and Zombielands explores the epistemological impact and the mediatechnological conditions of Agent-based Modeling and Simulation (ABM). Today, ABM ranges from infrastructure models for production sequences, administrative processes, warehousing, transport and traffic, and communication networks, to the simulation of social systems like animal collectives, pedestrian motion, urban studies, crowd management, evacuation studies, epidemiology, and financial markets, up to integrative Global Scale Agent Models. Agent-based Modeling and Simulation share a paradigm of distributed control among multiple autonomous and lifelike agents. The rise of ABM implies a conception and specification of (artificial) sociality.

The MECS 2016 Annual Conference Agent Cultures and Zombielands will examine this particular dimension of sociality in ABM from a transdisciplinary perspective, conveying scholars from computer science, social science, and media studies. General questions touch on the verisimilitude of 'lifelike' behavior. They ask about the conceptual ingredients of the 'sociality' in social simulations. And they inquire how social simulations, vice versa, might have been impregnated sociological and political notions of 'the social'.

## CONFERENCE DATES

Thursday, June 23rd – Saturday, June 25th, 2016

## MECS

Media Cultures of Computer Simulation

Wallstr. 3

21335 Lüneburg

Tel.: +49 (0) 4131 2197 819

E-Mail: [mecs@leuphana.de](mailto:mecs@leuphana.de)

Homepage: [www.mecs.leuphana.de](http://www.mecs.leuphana.de)

## CONFERENCE VENUE

Freiraum Lüneburg

Salzstraße 1

21335 Lüneburg

Tel.: +49 (0) 4131 8201 750

E-Mail: [info@freiraum-lueneburg.de](mailto:info@freiraum-lueneburg.de)

## ACCOMODATION

Hotel Altes Kaufhaus, Kaufhausstraße 5,  
21335 Lüneburg

Tel.: +49 (0) 4131 3088-0

Fax: +49 (0) 4131 3088-259

E-Mail: [info@alteskaufhaus.de](mailto:info@alteskaufhaus.de)

Homepage: [www.alteskaufhaus.de](http://www.alteskaufhaus.de)

**mecs**  
MEDIA CULTURES OF  
COMPUTER SIMULATION

 LEUPHANA  
UNIVERSITY LÜNEBURG

 DFG Deutsche  
Forschungsgemeinschaft

# PROGRAM

Thursday	Friday	Saturday
	9.30 <b>Thomas Schelling and James M. Sakoda:</b> How to Become an Unknown Pioneer? Rainer Hegselmann (Bayreuth University)	10.00 <b>Simulating the World:</b> The Digital Enactment of Pandemics as a Mode of Global Self-Observation Sven Opitz (University of Marburg)
	10.30 <b>Coffee Break</b>	11.00 <b>Coffee Break</b>
	11.00 <b>On Methodological Discreticism</b> Franck Varenne (University of Rouen)	12.00 <b>Agent-based Modeling and Algorithmic Finance:</b> What ABM might teach Economic Sociology about Inter-Algorithmic Sociality Christian Borch (Copenhagen Business School)
	12.00 <b>Delegate it to the Fridge!</b> Reverse Engineering of Desired Global Behaviour into Individual Behaviour within Mixed Societies Judith Simon (IT University Copenhagen)	13.00 <b>Agent-based Modeling in Macroeconomics:</b> Opportunities of Obstacles. Some Evidence from the Field. Hanno Pahl (Ludwig-Maximilian-University München)
	13.00 <b>Lunch Break / Catered</b>	14.00 <b>Closing Remarks</b> Sebastian Vehlken, Ricky Wichum
14.30 <b>Welcome Reception</b>	14.30 <b>Drawn from Life: Power of a Paradigm</b> Petra Gehring (TU Darmstadt)	
15.00 <b>Opening Remarks</b> Claus Pias, Martin Warnke <b>Introduction</b> Sebastian Vehlken, Ricky Wichum	15.30 <b>The Computational Decision</b> Alexander Galloway (New York University)	
15.30 <b>A Tale of Two Methods</b> Eric Winsberg (University of Southern Florida)	17.00 <b>Coffee Break</b>	
16.30 <b>Get Together / Castered</b>	17.15 <b>Can Agent-based Simulation Models Replicate Organized Crime?</b> Klaus G. Troitzsch (University of Koblenz-Landau)	
18.00 <b>KEYNOTE:</b> t.b.a. Robert Axtell (George Mason University, Fairfax, VA)	18.15 <b>Get Together / Castered</b>	
20.00 <b>Dinner</b> Restaurant zum Roten Tore	19.00 <b>KEYNOTE: Agent-based Modeling Approaches for Simulating Infectious Diseases</b> Sara Y. Del Valle (Los Alamos Laboratory)	
	20.30 <b>Drinks &amp; Dinner</b> Schröders Biergarten	

## PLACES

### RESTAURANT ZUM ROTEN TORE

Vor dem Roten Tore 3  
21335 Lüneburg

### SCHRÖDERS BIERGARTEN

Vor dem Roten Tore 72  
21335 Lüneburg

**meCS**  
MEDIA CULTURES OF  
COMPUTER SIMULATION

# PARTICIPANTS

**ROBERT AXTELL**

## **KEYNOTE: T.B.A.**

### **BIO**

Robert Axtell earned an interdisciplinary Ph.D. degree at Carnegie Mellon University, where he studied computing, social science, and public policy. His teaching and research involves computational and mathematical modeling of social and economic processes. Specifically, he works at the intersection of multi-agent systems computer science and the social sciences, building so-called agent-based models for a variety of market and non-market phenomena. For nearly 15 years he was Senior Fellow in Economic Studies, Foreign Policy Studies, and Governance Studies at the Brookings Institution (Washington, D.C.) where he helped found the Center on Social and Economic Dynamics (CSED). During this time he taught courses on his research as Mellon Distinguished Visiting Professor at Middlebury College (2004), Visiting Professor of Economics of the Graduate Faculty of Political and Social Science at the New School for Social Research (2004), Adjunct Professor of Computer Science at Georgetown University (2002) and Visiting Associate Professor of Economics at Johns Hopkins (1998-2000). He is co-author of "Growing Artificial Societies: Social Science from the Bottom Up" (MIT Press) with J.M. Epstein, widely cited as an example of how to apply modern computing to the analysis of social and economic phenomena.

**CHRISTIAN BORCH**

## **AGENT-BASED MODELING AND ALGORITHMIC FINANCE: WHAT AGENT-BASED MODELING MIGHT TEACH ECONOMIC SOCIOLOGY ABOUT INTER-ALGORITHMIC SOCIALITY**

### **ABSTRACT**

During the past 10 years, financial markets have undergone significant transformations: today, the vast majority of orders in financial markets are executed by fully automated computer algorithms that are programmed to carry out trades without any human intervention. Economic sociologists have offered important insights into this algorithmic revolution of financial markets. However, sociologists drawing on qualitative data (such as interviews and ethnographic fieldwork) struggle to understand the interactions that take place between algorithms, i.e. the interactions that now unfold in a fully digital space. More specifically, they are ill-equipped to understand how algorithmic finance might trigger novel forms of non-human sociality. In this presentation, I suggest that agent-based modeling may offer an important step forward in terms of analyzing and understanding such inter-algorithmic sociality. However, in addition to arguing that agent-based modeling might therefore contribute significantly to economic sociology, I claim that for such modeling to be convincing,

it requires specification based on sociological observations (indeed, extant agent-based models in computational finance often suffer from inadequate empirical specification). The presentation will discuss these issues with particular reference to so-called high-frequency trading, where orders are executed in fractions of a second, and in conversation with recent debates within economic sociology.

## BIO

Christian Borch is Professor at the Department of Management, Politics and Philosophy, Copenhagen Business School. His work focuses on crowd theory, economic sociology, urban studies, and social theory. He is currently the Principal Investigator of a large research project on Crowd Dynamics in Financial Markets, in the context of which he particularly examines high-frequency trading. His books include “Urban Commons: Rethinking the City” (ed. with Martin Kornberger, Routledge, 2015); “Foucault, Crime and Power: Problematisations of Crime in the Twentieth Century” (Routledge, 2015); “Architectural Atmospheres: On the Experience and Politics of Architecture” (ed. volume, Birkhäuser, 2014); “The Politics of Crowds: An Alternative History of Sociology” (Cambridge University Press, 2012), “Niklas Luhmann (Key Sociologists)” (Routledge, 2011), and “Soziologie der Nachahmung und des Begehrens: Materialien zu Gabriel Tarde” (ed. with Urs Stäheli, Suhrkamp, 2009). He is currently working on a book tentatively entitled “Avalanche Modernity: Crowds, Cities, Markets”.

## SARA Y. DEL VALLE

# AGENT-BASED MODELING APPROACHES FOR SIMULATING INFECTIOUS DISEASES

## ABSTRACT

Disease spread is a major health concern around the world and it is compounded by the increasing globalization of our society. As such, epidemiological modeling approaches need to account for rapid changes in human behavior and community perceptions. Social media has recently played a crucial role in informing and changing people’s response to the spread of infectious diseases. I will describe an agent based modeling framework that simulates the movements, activities, and social interactions of millions of individuals, and the dynamics of infectious diseases. The simulation allows for agents’ behaviors to be influenced by social media (i.e., Twitter) as well as by their neighbors. This feedback loop allows us to inject emergent attitudes in response to epidemics and quantify their impact.

## BIO

Sara Del Valle is a scientist at Los Alamos National Laboratory. She is a mathematician and obtained her PhD from the University of Iowa in 2003 in Applied Mathematics and Computational Sciences. She has worked extensively on mathematical and computational epidemiology. Her research focuses on improving our understanding of human behavior and its impact on disease spread. She has developed models for many diseases including smallpox, anthrax, HIV, pertussis, MERS-CoV, malaria, influenza, and Ebola. Her research interests also include developing and analyzing large-scale agent-based discrete event simulations for disease dynamics and social networks. Most recently, she’s been investigating the role of Internet data on monitoring and forecasting disease spread and disease-related behaviors.



ALEXANDER R. GALLOWAY

## THE COMPUTATIONAL DECISION

### ABSTRACT

This talk describes the conditions of possibility for agent-based computation. Beginning with the important experiments in cellular automata by Nils Aall Barricelli in 1953, we extrapolate more broadly about cellular and agent-based systems. Two forces are most important, the distribution of agency and the abbreviation of authority (also known as a “local scope”). Taken together these two forces constitute the great compromise of agent culture, that is, the delegation of powers within a curtailed scope. We exhume and identify these historical trends not to naturalize digital society but, on the contrary, to explore the possibility of what a non-digital society might look like.

### BIO

Alexander R. Galloway is a writer and computer programmer working on issues in philosophy, technology, and theories of mediation. Professor of Media, Culture, and Communication at New York University, he is author of several books on digital media and critical theory, including “The Interface Effect” (Polity, 2012). His collaboration with Eugene Thacker and McKenzie Wark, “Excommunication: Three Inquiries in Media and Mediation,” was recently published by the University of Chicago Press. Galloway’s newest project is a monograph on the work of François Laruelle, published in October 2014.

PETRA GEHRING

## DRAWN FROM LIFE: POWER OF A PARADIGM

### ABSTRACT

The scientific concept of material (first of all: physiological) life arises around 1800, and since at least 1900 a new, now definitely holistic discourse of life overlies the twofold paradigm of ‘Nature’ vs. ‘Culture’. Against this background not only 20th Century biology and biomedicine take shape but also modern Social and Engineering Sciences: they are Life Sciences (as well as ‘technosciences’), too. Therefore – so Gehring’s thesis – it actually is an astonishing fact that in empirical research the ideal of modeling complex phenomena like markets, eco-systems or migration in the assumption of basic “mechanisms” (like deterministic chance, the rational-choice-paradigm, or game theory) remained as the dominating paradigm for so long. Should one therefore speak of an epistemic ‘delay’ of Multi Agent Simulation? And are today’s computing capacities for such a delay the only possible reason? These are questions the talk is going to put – and to answer from a ‘history-of-concepts’ and a philosophical perspective.

**mecs**  
MEDIA CULTURES OF  
COMPUTER SIMULATION

 LEUPHANA  
UNIVERSITY LÜNEBURG

 DFG Deutsche  
Forschungsgemeinschaft

## BIO

Petra Gehring is teaching philosophy at Technische Universität Darmstadt, Germany. Her research fields are poststructuralist philosophy, the history of philosophical concepts/metaphors, and theories of power. Furthermore she is interested in techno-scientific topologies. She is working on the biotechnological alteration of the concepts of 'life' and 'death', on problems of biopolitics, on the idea of reality, and on computer simulation as a technological and as a 'rhetorical' phenomenon. Petra Gehring published a.o. "Was ist Biomacht? Vom zweifelhaften Mehrwert des Lebens" 2006 (Campus); "Traum und Wirklichkeit. Zur Geschichte einer Unterscheidung" 2008 (Campus), "Theorien des Todes" 2013 (Junius), and numerous essays.

## RAINER HEGSELMANN

# THOMAS SCHELLING AND JAMES M. SAKODA: HOW TO BECOME AN UNKNOWN PIONEER?

## ABSTRACT

Schelling's model has become a classical reference in many scientific contexts: explanation of residential segregation, unintended consequences, micro-macro relations, clustering, social phase transitions, invisible hand explanations, and emergence of spontaneous order. The model has also become a paradigmatic case for the study of mechanisms and the discussion of the status of models in general. Schelling's model is often considered as the earliest and pioneering example for an agent-based computer simulation.

Without any doubt, Schelling's model is a wonderful model: It is very simple, it generates surprising results, that ex post can easily be understood.

However, there is a model, developed by James Minoru Sakoda, that is much more general, much more flexible, and generates much more surprising results. In a certain sense it is fair to say that Sakoda's model contains Schelling's model as an instance. And even more, Sakoda's model was developed decades earlier than Schelling's – a first version already by the end of the 1940s. In the 1970s Sakoda's model was a well known pioneering model in the small but growing community of computational social scientists.

But today Sakoda and his model is basically forgotten. How could that happen? The answer to that question is a thrilling story, but it is not a thriller. Something went wrong, but nobody did something wrong. The talk will solve the puzzling case.

## BIO

Rainer Hegselmann (born 1950) studied philosophy, political sciences, and sociology at the Ruhr Universität Bochum. 1974–1986 he was scientific assistant (assistant professor) at Universität Essen (now Universität Duisburg-Essen). 1986–1988 he was Heisenberg scholar of the German National Science Foundation (DFG). 1988–1996 he was Professor of philosophy at Universität Bremen. Since 1996 he is Professor of Philosophy at Universität Bayreuth. There he is also director of the Bayreuth Research Center for modeling and simulation of socio-economic phenomena (MODUS). His work focuses on the development of agent based models of fundamental social dynamics as, for instance, the formation of networks of mutual support, the evolution of morality, and the dynamics of opinions.

**mecs**  
MEDIA CULTURES OF  
COMPUTER SIMULATION

SVEN OPITZ

## **SIMULATING THE WORLD: THE DIGITAL ENACTMENT OF PANDEMICS AS A MODE OF GLOBAL SELF-OBSERVATION**

### **ABSTRACT**

If the 20th century was the age of the world picture taken as a photograph of the whole earth from outer space, today's observations of the planet are produced by means of computer simulation. Pandemic models are of paramount sociological interest in this respect, since modeling contagion is closely intertwined with modeling the material connectivities of social life. By envisioning the global dynamics of disease transmission, pandemic simulations enact the relationscapes of a transnational world. This article seeks to analyze this enactment: It asks how the method of simulation establishes a particular relation towards the social from within the social. In order to provide an answer to this question, and adopting Niklas Luhmann's theory of world society, pandemic simulations are described as modes of global self-observation that can be specified factually, socially, spatially and temporally. They instantiate a 'doubling of reality' (Luhmann) for apprehending the potential future threat of disease transmission along the pathways marked by global infrastructures. In this sense, they constitute scopic regimes that virtually synthesize a global situation of universal communicability in such a manner as to turn it into the object of actual political intervention.

### **BIO**

Sven Opitz is Professor for Political Sociology at Philipps University Marburg. From 2010-2015, he was lecturer at the Institute for Sociology at Hamburg University. After graduating in Political Sciences, Sociology and New German Literature at Hamburg University he obtained his PhD in Sociology at the University of Basel 2010. In 2013 he was Visiting Researcher at the School for Social and Political Science at the University of Edinburgh. His main research focuses on the relation between security and law in cases of global states of emergency such as pandemics. Since 2008 he is Co-Editor of the international Journal "Foucault Studies". Among his recent publications are: "An der Grenze des Rechts: Inklusion/Exklusion im Zeichen der Sicherheit" (Velbrück 2012), "Global Territories: The Offshore as a Zone of Dis/Connectivity", in: *Distinktion. Scandinavian Journal for Social Theory* 13 (3), 2012: S. 261-282

### **HANNO PAHL**

## **AGENT-BASED MODELING IN MACROECONOMICS: OPPORTUNITIES AND OBSTACLES. SOME EVIDENCE FROM THE FIELD**

### **ABSTRACT**

The advancement of agent based modeling is unequally distributed among the various academic disciplines. While these micro-based simulations already have a strong impact in disciplines like biology and also in much trans-disciplinary research (on traffic-jams, the spread of epidemics etc.), their use in mainstream-economics is more contested. This

**mecs**  
MEDIA CULTURES OF  
COMPUTER SIMULATION

seems to be especially true for macroeconomics: Many observers maintain a changing face of mainstream-economics for microeconomics, arguing that lines of research like behavioral economics or experimental economics are quite successful in repelling the former holy trinity of neoclassical general equilibrium-style economics (selfishness, rationality, equilibrium). However, contemporary macroeconomics seems to be more orthodox and more hostile towards models with heterogeneous agents. My input elaborates on possible reasons for why this is the case, referring to in-depth expert interviews with economists. Cognitive path-dependencies (rational expectations, representative agents), disciplinary power structures (elite economists) as well as external constraints (forms of knowledge that serve policy-making) that function as obstacles to a more widespread use of agent based modeling are discussed. The case of agent based modeling thus serves as an ideal example to analyze contemporary politics of method in economics.

## **BIO**

Dr. Hanno Pahl, Postdoc-Researcher at LMU Munich. BMBF-Project, From Modeling to Governance: The Influence of Economics on the Political Regulation of Financial Markets by Central Banks. Areas of Research: Sociological Theory, Economic Sociology, Sociology of Economics. Former Affiliations: University of Bremen (1996-2002, Diploma in Sociology), University of Bielefeld (2003-2006, PhD-Thesis on the Sociology of Money), University of Zurich (2007-2011), University of Jena (2012), University of Lucerne (2012-2015, SNF-Project, Structural Changes of Centre and Periphery in Economics, 1970-2010. A Sociology of Science Perspective). Latest Publication: Jens Maeße, Hanno Pahl, Jan Sparsam (Eds.): "Die Innenwelt der Ökonomie. Wissen, Macht und Performativität in der Wirtschaftswissenschaft" (SpringerVS, 2016).

## **CLAUS PIAS**

### **BIO**

Claus Pias is Professor for History and Epistemology of Media at the Institute for Culture and Aesthetics of Digital Media (ICAM) at Leuphana University Lueneburg. He studied Electrical Engineering in Aachen and Art History, German Studies and Philosophy in Bonn and Bochum. In 1993 he became research assistant for History of Architecture at Bauhaus-University Weimar. 1996, he became scientific assistant at the chair of History and Theory of Artificial Worlds. In 2002 he was appointed an assistant professor for Media-Technology and Media-Philosophy at Ruhr-University Bochum. From 2006 to 2010 he was full professor for Epistemology and Philosophy of Digital Media at the University of Vienna. Since 2010 he works and teaches in Lueneburg. He was Senior Fellow at the International Research Institute for Cultural Technologies and Media Philosophy (IKKM) Weimar, the International Research Centre for Cultural Studies (IFK) Vienna, the Institute for Advanced Study / Wissenschaftskolleg zu Berlin, and the Institute for Advanced Study Konstanz. Claus Pias is currently the director of the Institute for Advanced Study in Media Cultures of Computer Simulation (MECS), the Centre for Digital Cultures (CDC) and the Digital Cultures Research Lab (DCRL) at Leuphana University in Lueneburg. Main areas of interest are the media history and epistemology of computer simulations, the history of media studies, and the history and epistemology of cybernetics.

**meCS**  
MEDIA CULTURES OF  
COMPUTER SIMULATION



JUDITH SIMON

## **DELEGATE IT TO THE FRIDGE! REVERSE ENGINEERING OF DESIRED GLOBAL BEHAVIOUR INTO INDIVIDUAL BEHAVIOUR WITHIN MIXED SOCIETIES**

### **ABSTRACT**

In our talk, we will first briefly outline the differences between agent-based and equation-based modeling, in particular with regards to their specific emphasis on either group behaviour or individual behaviour. We will then showcase some methodological, epistemological and ontological problems inherent in both modeling approaches in particular if the modeling is employed to simulate human behaviour. The major shortcomings of both agent-based and equation-based modeling when applied to human agents are oversimplification and fragility, challenging both internal and external validity of the resulting simulation. As a potential solution we propose a reverse engineering approach to simulation which relies on delegation to artificial agents as a means to optimize collective behaviour while at the same time accounting for the inherent unpredictability of human behaviour. We will use the example of energy consumption and carbon-neutrality goals as a real-world scenario to illuminate our approach.

### **BIO**

Judith Simon is currently based both in Austria and Denmark. At the IT University Copenhagen she is employed as associate professor for philosophy of science and technology and at the University of Vienna (Department of Philosophy), she is leading a project on “Epistemic Trust in Socio-Technical Epistemic Systems” funded by the Austrian Science Fund (FWF). Her fields of interest comprise epistemological and ethical issues around technologies of information, communication and computation. Her approach is inspired by social epistemology, STS, Values in Design, computer ethics as well as feminist theory, currently in particular focussing on the topics of (epistemic) trust, reputation, epistemic responsibilities of different agents (e.g. user and designers of ICT) as well as the epistemology of big data practices.

She serves as executive editor of the journal “Philosophy & Technology” as well as co-editor of the journal “Big Data & Society: Critical Interdisciplinary Inquiries” and on the editorial review board of the book series “Philosophy, Technology and Society”.

**mecs**  
MEDIA CULTURES OF  
COMPUTER SIMULATION

 **LEUPHANA**  
UNIVERSITY LÜNEBURG

**DFG** Deutsche  
Forschungsgemeinschaft

**KLAUS G. TROITZSCH**

## **CAN AGENT-BASED SIMULATION MODELS REPLICATE ORGANIZED CRIME?**

### **ABSTRACT**

The aim of this talk is to discuss the possibility of using complex software agents in a simulation model in order to represent and analyse the dynamics of certain types of criminal systems via Agent Based Modelling (ABM), in particular Extortion Racket Systems (ERSs). It presents a simulation model in which agents represent Mafiosi, their victims, the police, the public (mainly in their role as consumers) and a court which – beside extorting and forming Mafia families, denouncing or satisfying Mafia requests, observing, arresting and convicting criminals, compensating victims from confiscated Mafia assets – send each other norm invocation messages to mutually modify their action propensities. Each agent type has a repertoire of norms whose salience the agents calculate from their memories before deciding to take action; besides they also calculate the utility of the actions available in the current situation. The current version of the model is event oriented such that each simulation run tells a story of the rise and possible fall of a Mafia regime in a virtual region. The results of a large number of runs are analysed to find out under which parameter constellations governing the normative behaviour of the software agents the model replicates the macro observations in a number of provinces in Southern Italy which are derived from a database of more than 600 actual cases in Sicily and Calabria and the police and judicial documents generated during the prosecution of these cases. Thus it is possible to show that certain parameterisations of the model generate extortion databases similar to the empirical database although the richness of information generated by the model is much greater than what can be documented empirically. Finally the simulation model is applied to analysing strategies and their effect on the behaviour of the agents and the system as a whole.

### **BIO**

Klaus G. Troitzsch has been a full professor of computer applications in the social sciences at the University of Koblenz-Landau since 1986. He studied sociology and political science in Cologne and Hamburg. After taking his first degree as a political scientist, he was a member of Parliament of Hamburg from 1974 to 1978. In 1979, after having taken his PhD in political science from the University of Hamburg, he returned to academia, first as a senior researcher in an election research project and from 1986 as full professor of computer applications in the social sciences. In March 2012 he retired but continues his academic activities. His main interests in teaching and research are social science methodology and, especially, modelling and simulation in the social sciences. Among his main research projects there are MIMOSE which developed a declarative functional simulation language and tool for micro and multilevel simulation (1986–1992), FIRMA, an FP5 funded international research project named Freshwater Integrated Resources Management with Agents (2000–2003) where his team was, among others, responsible for the simulation aspects, EMIL, an FP6 project on the emergence and innovation of norms in social systems (2006–2009) which also used agent-based simulation, OCOPOMO, an FP7 project on open collaboration in policy modelling (2010–2013) and GLODERS, another FP7 project on the global dynamics of extortion racket systems (2012–2015) where his team was responsible both for text and data mining and for agent-based simulation. He is author, co-author, and co-editor of a number of books on simulation, author of a number of articles in social simulation, and he organised or co-organised a number of national and international conferences in social simulation.

**meCS**  
MEDIA CULTURES OF  
COMPUTER SIMULATION

**FRANK VARENNE**

## **ON METHODOLOGICAL DISCRETICISM**

### **ABSTRACT**

Despite appearances, the applied epistemologies accompanying today the pervading practice of individual-based or agent-based computational models and simulations (IBM&S, ABM&S) in contemporary sciences do not intrinsically imply neither strong ontological atomism in physical and biological sciences, nor methodological individualism in social sciences. I suggest calling the weakest - then the most generic - version of these applied epistemologies a methodological discretism. Due to its persistent qualification as 'methodological', it could seem as if this kind of epistemology is no more than a refurbished version either of a global fictionalism or of a global instrumentalism. But it is more complex. It is an integrative epistemology in two different aspects: first, as it promotes multi-levelism on what concerns the various ontological commitments of modelers towards the different types of symbols and their different levels in the denotational hierarchies at stake in the models or submodels and in the simulation ; second, as it permits a kind of pluralism for the epistemic functions of the computational interactions between the individual symbols belonging either to the same level or to different levels at stake, and all this either at runtime or at the end of the computation. It is a discretism as it is an epistemology applying to models and simulations based on discrete symbols and on discrete clusters of discrete symbols. It is methodological to the extent that: 1. it does not commit the modeler neither to reifying nor to fictionalizing once for all and from a global standpoint the things that are denoted by the symbols or by the clusters of symbols present in the models, in the program or in the computation; 2. it does not commit the modeler neither to a pure data-driven nor to a pure concept-driven approach as it most often permits the step-by-step intertwining of data-driven and concept-driven submodels.

### **BIO**

Franck Varenne graduated as an engineer in electrical engineering and computer science at the Ecole Supérieure d'Electricité (CentraleSupélec - Paris) in 1993. He received his MA in philosophy at the University of Paris 1 (Sorbonne) and he obtained a MA in contemporary history of science at the University of Lyon 2 (2000). After his Ph.D. thesis in epistemology (University of Lyon 2, 2004), he became Associate Professor of epistemology at the University of Rouen – Normandy (2005). In 2006, he became a member of the CNRS-Lab GEMASS (UMR 8598 - Paris Sorbonne) too. Franck Varenne's research focuses on the history and epistemology of formal models and computer simulations in contemporary sciences. His method in epistemology is threefold: 1. historical, 2. comparative, 3. immersive, i.e. observational (empirical) and interactional (coactive). He has published six books on these topics and almost thirty articles, some of them in the *Revue d'Histoire des Sciences*, *Philosophia Scientiae*, *Simulation: Transactions of The Society for Modeling and Simulation International*, the *Journal of Artificial Societies and Social Simulation (JASSS)* and *Acta Biotheoretica*.

**meCS**  
MEDIA CULTURES OF  
COMPUTER SIMULATION

## **SEBASTIAN VEHLKEN**

### **BIO**

Sebastian Vehlken is a media theorist and cultural historian. Since 2013, he is Junior Director of the Institute for Advanced Study on Media Cultures of Computer Simulation (MECS), Leuphana University Lüneburg. In 2015-16, he was Visiting Professor at Humboldt University Berlin, University of Vienna, and Leuphana University, and in 2014 Research Fellow at the Internationales Zentrum Kulturwissenschaften (IFK), Vienna. His areas of interest include the theory and history of computer simulation and digital media, the media history of swarm intelligence, and the epistemology of think tanks. Sebastian's current research project Plutonium Worlds explores the application of computer simulations in West-German Fast Breeder Reactor programs from 1960-80.

## **MARTIN WARNKE**

### **BIO**

Martin Warnke was born in 1955, studied in Berlin and Hamburg, acquired his PhD in theoretical physics in 1984, and then began his affiliation with the University of Lüneburg, where he was head of the computing and media center for many years. He finished his Habilitation at the University of Lüneburg in 2008, becoming an associate professor for digital media/cultural computer science, and was the university's Director of the Institute for Culture and Aesthetics of Digital Media at the Faculty Culture. He is now Professor at the faculty. He is also a visiting professor in Vienna, Klagenfurt, and Basel and works in the fields of history, digital media, and the digital documentation of complex works of art. He is one of the directors of the DFG funded Institute for Advanced Study on Media Cultures of Computer Simulation“ (MECS). He heads the Meta-Image research project, and works with the IFIP and the Gesellschaft für Informatik, as advisor to the Zeitschrift für Medienwissenschaft.

## **RICKY WICHUM**

### **BIO**

Ricky Wichum is a Sociologist and a Postdoc Research Associate at the Institute for Advanced Study on Media Cultures of Computersimulation (MECS) at the Leuphana University Lüneburg. Ricky finished his PhD on the role of biometric technologies in modern strategies of identification in 2015 at the Institut für Soziologie at Freiburg. His work at MECS explores the social requirements and political effects of computersimulation in contemporary security dispositifs. Rickys interests lie in Governmentality Studies, Social Theory and the Sociology of Risk. Most recent publications: “Risk and Security: Diagnosis of the Present in the Context of (Post-)Modern Insecurities”, in: Historical Social Research 41 (2016), 1, 48-69 (together with Stefan Kaufmann); “Biometrie. Zur Soziologie der Identifikation”, 2016 (Wilhelm Fink Verlag, forthcoming).

**meCS**  
MEDIA CULTURES OF  
COMPUTER SIMULATION

**ERIC WINSBERG**

## **A TALE OF TWO METHODS**

### **ABSTRACT**

Simulations (both digital and analog) and experiments share many features. But what essential features distinguish them? I discuss two proposals in the literature. On one proposal, experiments investigate nature directly, while simulations merely investigate models. On another proposal, simulations differ from experiments in that simulationists manipulate objects that bear only a formal (rather than material) similarity to the targets of their investigations. Both of these proposals are rejected. I argue that simulations fundamentally differ from experiments with regard to the background knowledge that is invoked to argue for the 'external validity' of the investigation.

### **BIO**

Ph.D. Indiana, 1999. Joined the Philosophy Department faculty at USF in 2001 after a postdoctoral fellowship in History and Philosophy of Science at Northwestern University. His principal interests are in the philosophy of science, the philosophy of climate science, and the philosophy of physics. He is especially interested in the role of computer simulations in the physical sciences, and analog simulation in cosmology, and in the foundations of statistical physics and the direction of time. He has held visiting fellowships at the Center for Interdisciplinary Studies (ZiF) at the University of Bielefeld in Germany, and the Institute of Advanced Study at the University of Durham in the UK, at the University of California, Berkeley, the MCMP in Munich and at the University of Lüneburg in Germany. He is the author of "Science in the Age of Computer Simulation", which appeared in the fall of 2010 with the University of Chicago Press, and the co-editor of two forthcoming books; one on climate science and one on the arrow of time, with the University of Chicago Press and Harvard University Press, respectively.

**mecs**  
MEDIA CULTURES OF  
COMPUTER SIMULATION

 **LEUPHANA**  
UNIVERSITY LÜNEBURG

**DFG** Deutsche  
Forschungsgemeinschaft