

#### Session IV

Chair: Prof. Dr. Edwin Kreuzer

(*Technische Universität Hamburg-Harburg*)

- 14:15    **Identification of Kinetic Models  
by Incremental Refinement**  
Prof. Dr. Wolfgang Marquardt  
(*RWTH Aachen*)
- 15:00    **Philosophical commentary**  
Dr. Robin F. Hendry (*Durham University*)
- 15:30    **Coffee break**
- 15:45    **Modelling Complexity – the Case of  
Climate Science**  
Dr. Valerio Lucarini (*University of Reading*)
- 16:30    **Philosophical commentary**  
Prof. Dr. Georg Betz (*Universität Stuttgart*)
- 17:00    **Discussion**
- 17:45    **Closing remarks**  
Prof. Dr. Ulrich Gähde (*Universität Hamburg*)

Registration for the conference is now open:

[www.awhamburg.de/veranstaltungen](http://www.awhamburg.de/veranstaltungen)

Please also register if you only intend to attend some of the presentations since seating at the venue is limited; in this case please write to [veranstaltungen@awhamburg.de](mailto:veranstaltungen@awhamburg.de)

Registration ends on **March 5th, 2010**.

AKADEMIE DER  
WISSENSCHAFTEN  
IN HAMBURG

### The Academy of Sciences and Humanities in Hamburg

The Academy of Sciences and Humanities in Hamburg was founded in 2004. Members of the Academy are scholars of all academic disciplines from northern Germany. One of its goals is to intensify interdisciplinary research and collaboration between universities and scientific institutions. The Academy promotes research on issues important for our future society as well as on fundamental scientific problems. Stimulating the dialogue between scholars and the public is of utmost importance to the Academy.

### Contact

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# Models, Simulations, and the Reduction of Complexity

Conference  
March 18 – 19, 2010, Hamburg

# Models, Simulations, and the Reduction of Complexity

In modern science, complexity is a common feature in models of real world systems. The complexity may be due to various factors: from the sheer size of systems (neurology, climatology), to the high resolution of small scale phenomena in otherwise well understood systems, to the challenge of controlling a system or of designing an optimal shape in engineering. No matter what the origin of such complexity may be, the goal is always to reduce the complexity in a way that makes the problem tractable. Such a reduction can be achieved by improving model assumptions based on “first principles”, by the elimination of variables, reducing the relevant subsystems etc. In any case such a reduction of complexity has implications for the validity and the precision of the theoretical findings.

The aim of this interdisciplinary conference is to discuss methodological and epistemological problems arising in this context. Eight renowned experts from climate research, cognitive science, cosmology, economics, mathematics, process technology, psychology, and sociology will introduce some of their modelling and simulation projects. Commentaries by philosophers of science will complement these presentations. There will be a focus on methodological parallels and discipline-specific differences between various approaches to modelling and simulating. We will ask: how do different disciplines manage to capture the complexity of a specific scientific phenomenon in a (relatively) simple theoretical model? Are the strategies employed essentially the same in all disciplines? If not, can any disciplines successfully import methodological strategies from other disciplines? What is the relation between a model and a simulation? And how does the availability of large-scale computers change the nature of science?

March 18–19, 2010

Main Building of the University of Hamburg,  
lecture room H  
Edmund-Siemers-Allee 1, 20146 Hamburg

Conference organisation:

Prof. Dr. Ulrich Gähde (*Universität Hamburg*)

Prof. Dr. Stephan Hartmann (*Tilburg University*)

Prof. Dr. Jörn Henning Wolf

(*Christian-Albrechts-Universität Kiel*)

The conference is held in cooperation with the Center for Logic and Philosophy of Science of Tilburg University.

## Schedule

### Thursday, March 18th

09:00 **Welcome**

Prof. Dr. Heimo Reinitzer, *President of the Akademie der Wissenschaften in Hamburg*

#### Session I

Chair: Prof. Dr. Reiner Lauterbach (*Universität Hamburg*)

09:15 **Cosmology, the largest possible model?**

Prof. Dr. Matthias Bartelmann  
(*Ruprecht-Karls-Universität Heidelberg*)

10:00 **Philosophical commentary**

Prof. Dr. Andreas Bartels  
(*Rheinische Friedrich-Wilhelms-Universität Bonn*)

10:30 **Coffee break**

10:45 **Patterns in Physical and Biological Systems**

Prof. Dr. Martin Golubitsky (*The Ohio State University*)

11:30 **Philosophical commentary**

Prof. Dr. Thomas Reydon  
(*Leibniz Universität Hannover*)

12:00 **Discussion**

**Lunch break**

#### Session II

Chair: Prof. Dr. Ulrich Gähde (*Universität Hamburg*)

14:30 **Understanding the Foundations of Society: Promises of a Multi-Disciplinary Dialogue**

Prof. Dr. Dirk Helbing  
(*Eidgenössische Technische Hochschule Zürich*)

15:15 **Philosophical commentary**

Prof. Dr. Stephan Hartmann (*Tilburg University*)

15:45 **Coffee break**

16:00 **Economic modelling as theoretical experimentation and surrogate reasoning**

Prof. Dr. Uskali Mäki (*Academy of Finland, University of Helsinki*)

16:45 **Philosophical commentary**

Prof. Dr. Julian Reiss (*Erasmus University Rotterdam*)

17:15 **Discussion**

### Friday, March 19th

#### Session III

Chair: Prof. Dr. Brigitte Röder (*Universität Hamburg*)

09:00 **The brain formula**

Prof. Dr. Peter König (*Universität Osnabrück*)

09:45 **Philosophical commentary**

Prof. Dr. Markus Werning  
(*Heinrich-Heine-Universität Düsseldorf*)

10:15 **Coffee break**

10:30 **Evaluating a Computational Model of Eye-Movement Control in Reading**

Prof. Dr. Reinhold Kliegl (*Universität Potsdam*)

11:15 **Philosophical commentary**

Dr. Martin Hoffmann (*Universität Hamburg*)

11:45 **Discussion**

**Lunch break**