

Saturday, 2nd July 2016

Dorint Hotel am Goethepark
Beethovenplatz 1-2 | 99423 Weimar

9:00 – 10:30 | Session 5

Chair: Bärbel Friedrich ML
German National Academy of Sciences Leopoldina

Modeling viral infections and the development of drug resistance
Thomas Lengauer ML
Max Planck Institute for Informatics, Saarbrücken

Global connectivity and the spread of infectious diseases
Dirk Brockmann
Humboldt University Berlin

[Discussion \(speakers and chair\)](#)

10:30 – 12:00 | Session 6

Chair: Thomas Lengauer ML
Max Planck Institute for Informatics, Saarbrücken

Modelling the economy as a complex interactive system: unintended consequences
Alan Kirman
GREQAM, Aix Marseille University, Ecole des Hautes Etudes en Sciences Sociales

The dream to control the world – and why it often fails
Dirk Helbing ML
ETH Zurich

[Discussion \(speakers and chair\)](#)

Closing Remarks:

Thomas Lengauer ML
Max Planck Institute for Informatics, Saarbrücken

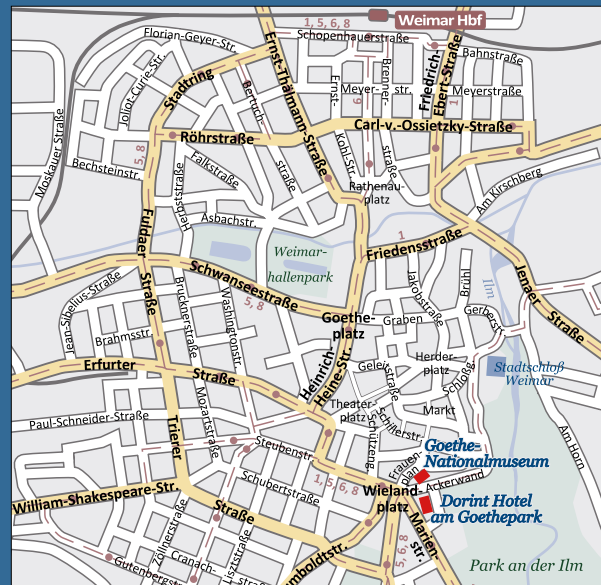
12:00 | Lunch

13:00 | Weimar City Tour

Registration

Please register via:
www.leopoldina.org/de/crossing-boundaries

How to get there



Venue Evening Lecture (30 June 2016):

Goethe-Nationalmuseum
Frauenplan 1 | 99423 Weimar

Venue workshop (1-2 July 2016):

Dorint Hotel am Goethepark
Beethovenplatz 1-2 | 99423 Weimar

Arrival by plane:

Erfurt (ERF) is the closest airport to Weimar

Arrival by train:

ICE-main station Weimar

Arrival by bus:

Bus stop Wielandplatz, lines 1, 5, 6, 8 from the main station

Please note that we have reserved rooms that you can book until 23 May 2016 by referencing "Leopoldina" at the Leonardo Hotel Weimar, Belvederer Allee 25, 99425 Weimar.

Founded in 1652, the Leopoldina brings together some 1,500 outstanding scientists from about 30 countries. It is dedicated to the advancement of science for the benefit of humankind and to shaping a better future. In its role as the German National Academy of Sciences, the Leopoldina represents the German scientific community in international committees. It offers unbiased scientific opinions on political and societal questions, publishing independent studies of national and international significance. The Leopoldina promotes scientific and public debate, supports young scientists, confers awards for scientific achievements, conducts research projects, and campaigns for the human rights of persecuted scientists.



Leopoldina
Nationale Akademie
der Wissenschaften

Crossing Boundaries in Science

Modeling Nature and Society –
Can We Control the World?

Leopoldina-Workshop

30 June – 2 July 2016

Dorint Hotel am Goethepark
Beethovenplatz 1-2
99423 Weimar

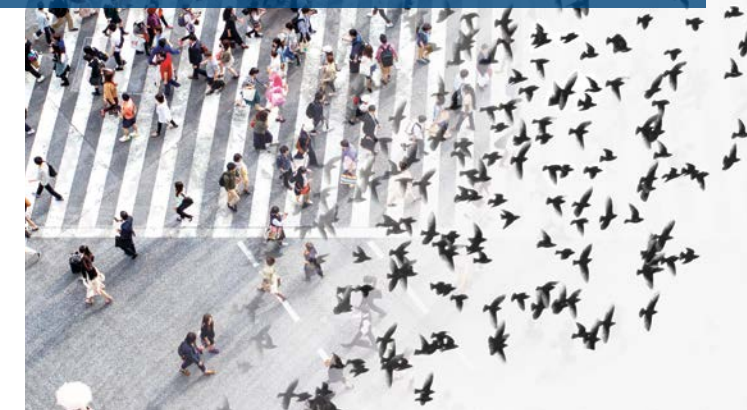
Contact:

Yvonne Borchert
German National Academy of Sciences Leopoldina
Phone: +49 (0)30 203 8997 - 416
E-Mail: yvonne.borchert@leopoldina.org
www.leopoldina.org

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Crossing Boundaries in Science

Modeling Nature and Society – Can We Control the World?

The new Leopoldina workshop format *Crossing Boundaries in Science* is meant to stimulate discussions, without any pre-conceived views as to their outcome, on trendsetting scientific fields which are particularly dependent on new forms of interdisciplinary cooperation and/or interdisciplinary method transfer. Expected or already emerging social transformations correlated to scientific developments are also meant to be taken into consideration as well as their ethical implications.

The first workshop *Modeling Nature and Society – Can We Control the World?* will take place in Weimar – the hub of the classical period in German cultural history and the residence of Johann Wolfgang von Goethe who also conducted significant research in several scientific disciplines. The workshop will focus on scientific modeling of complex biological and social networks and implications for a targeted and strategic intervention in these systems. Workshop topics will be complex systems such as molecular gene networks, the immune system, epidemiological phenomena, traffic dynamics, financial systems or the man-made climate change. These systems and their complexity are hardly intelligible for the individual citizen. Even scientists who try to create models of complex

correlations and connections with different approaches in order to understand them and make them more predictable achieve merely limited understanding for many of these systems so far.

This is reflected for example in the rather insufficient knowledge of widespread multifactorial diseases or vague economical predictions regarding the consequences of different approaches in new macroeconomic policies. Nevertheless, we try to interfere and control these systems repeatedly.

Crossing Boundaries in Science is meant to approach these challenges and discuss the following questions from an interdisciplinary point of view:

- Which analogue conceptual bases can be used to analyze complex biological and social networks?
- Which and how many variables are relevant or even reasonable for appropriate modeling and understanding complex systems?
- Which advantages do simplified reductionist models provide in contrast to far more comprehensive ones (Big Data)?
- Is science able to deliver reliable instructions for target-oriented strategic intervention in complex cross-linked systems?
- Which principles of self-organization can be utilized for creating resilient fault-tolerant system architectures (e.g. road traffic and financial systems)?

Program

Thursday, 30th June 2016

Goethe-Nationalmuseum | Frauenplan 1 | 99423 Weimar

19:00 – 20:00 | Evening Lecture (German language)

Welcoming Speech (Grußworte)

Jörg Hacker ML

German National Academy of Sciences Leopoldina

Vom Modell zur Steuerung – Sind wir überfordert von der Komplexität der Welt?

Peter Schuster ML

University of Vienna

20:00 – 20:30 | Discussion

20:30 | Reception

Friday, 1st July 2016

Dorint Hotel am Goethepark

Beethovenplatz 1-2 | 99423 Weimar

09:00 – 9:15 | Introductory Remarks

Bärbel Friedrich ML

German National Academy of Sciences Leopoldina

09:15 – 10:45 | Session 1

Chair: Jörg Hacker ML

German National Academy of Sciences Leopoldina

Gradient models in developmental biology:

a historical perspective

Christiane Nüsslein-Volhard ML

Max Planck Institute for Developmental Biology, Tübingen

Systems biology of infection

Marc Thilo Figge

Leibniz Institute for Natural Product Research and Infection Biology, Jena

Discussion (speakers and chair)

10:45 – 11:00 | Coffee Break

11:00 – 12:30 | Session 2

Chair: Angela Friederici ML

Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig

Real neuronal networks: Resilience despite or because of complexity?

Wolf Singer ML

Max Planck Institute for Brain Research, Frankfurt

Autonomous intelligent systems in robotics

Wolfram Burgard ML

Albert-Ludwigs-University Freiburg

Discussion (speakers and chair)

12:30 – 13:30 | Lunch

13:30 – 15:00 | Session 3

Chair: Carmen Buchrieser ML

Institut Pasteur, Paris

Host microbiome interactions in health and disease

Eran Elinav

Weizmann Institute of Science, Rehovot

Modeling ecosystem – From plant to animal communities

Thorsten Wiegand

Helmholtz Centre for Environmental Research, Leipzig

Discussion (speakers and chair)

15:00 – 16:30 | Session 4

Chair: Axel Brakhage ML

Leibniz Institute for Natural Product Research and Infection Biology, Jena

Modeling biodiversity and collective behavior

Iain Couzin

Max Planck Institute für Ornithology, Constance

Self-organization and controllability of society

Armin Nassehi

Ludwig-Maximilians-University Munich

Discussion (speakers and chair)