



# Science and its Limits: Contemporary and Kantian Perspectives

April 11 – 12, 2019

TU Dortmund, Germany

**Organizers: Kristina Engelhard (TU Dortmund University) and Claus Beisbart (University of Bern)**

## Conference description:

Does science have its limits? Are there principled bounds to what humans can know, grasp or understand using scientific methods? Or will the success story of scientific discoveries continue until everything is known in scientific terms? Given the spectacular breakthroughs that the history of science has seen, it may first seem unlikely that there are principled limitations of scientific inquiry. In philosophy, a naturalistic worldview is popular, which leaves no space for things that are not in principle accessible to scientific inquiry. But at closer inspection of various special sciences, there are reasons to become more skeptical. For instance, in fundamental physics, researchers got stuck in their attempts to represent gravitation and the other forces in a unified theory. In cosmology, there is an intensive debate about the question of whether a scientific case for the multiverse can be made. John Horgan, in his 1996 book, went as far as to claim the end of science.

This conference aims to contrast and compare contemporary perspectives on science and its limits with Kant's view on this topic. Relating Kant's arguments to science as it is done nowadays is very natural since many of his skeptical points have a predictive component: they foretell that certain kinds of knowledge will not become feasible. Were Kant's predictions right? Or do advances in, e.g., modern cosmology or molecular biology show that he got it wrong? If so, is there still any value in his verdicts on cosmology and mechanistic explanation? May he even have succeeded in calling attention to fundamental problems that are still relevant today? And does his oeuvre contain resources for a convincing critique of naturalism? These are some of the questions that shall be addressed by the contributions to this conference. One focus lies on some special sciences, e.g., cosmology, but furthermore the conference covers aspects of Kant's general philosophy of science, e.g., unification and its limitations.

The conference is organized in honor of **Brigitte Falkenburg**.

## Speakers:

Claus Beisbart (Bern)

Andreas Hüttemann (Cologne)

Silvia De Bianchi (Barcelona)

Katharina Kraus (Notre Dame)

Nancy Cartwright (San Diego, Durham)

Wolfgang Rhode (Dortmund)

Kristina Engelhard (TU Dortmund)

Gregor Schiemann (Wuppertal)

**Conference Venue:**

Emil-Figge-Str. 50, Room EF50, R. 0.442, 44227 Dortmund, Germany

**Participation:**

Interested scholars are welcome to attend the conference. Attendance is free of charge, but only a limited number of places are available.

To register, please send an email to [Claus.Beisbart@philo.unibe.ch](mailto:Claus.Beisbart@philo.unibe.ch) by April 4, 2019.

**Weblink:** <https://bit.ly/2T7yt48>

## Program

### Day 1 (April 11, 2019)

14:00–14:15 Kristina Engelhard, Claus Beisbart  
Welcome and Introduction

#### *Limits of the Special Sciences: The Examples of Psychology and Cosmology*

14:15–15:30 Katharina Kraus  
Kantian Perspectives on Personhood and Psychology

15:30–16:00 Coffee Break

16:00–17:15 Silvia De Bianchi  
Space, Time and World. Kant's Philosophy of Cosmology

17:15–18:30 Gregor Schiemann  
The Emptiness of the Universe.  
Cosmology from the Perspective of Philosophy of Nature

18:45–19:45 Concert: A Spanish-Canadian Journey

20:00 Conference Dinner: Tapas & More, Hansastr. 30, 44137 Dortmund

### Day 2 (April 12, 2019)

#### *The Quest for Unification*

09:15–10:30 Claus Beisbart  
What Can Kant's (first) Antinomy of Pure Reason Teach Us about the  
Limits of Science? Reflections on Present-Day Cosmology and Naturalism

10:30–11:00 Coffee Break

11:00–12:15 Wolfgang Rhode  
Unification, Big Data and Artificial Intelligence

#### *From Science to Metaphysics?*

13:45–15:00 Kristina Engelhard  
Foundationalism in Metaphysics and the Role of Science  
from a Kantian Perspective

15:00–15:30 Coffee Break

15:30–16:45 Nancy Cartwright  
In Defense of Physics as an Instrument

16:45–18:00 Andreas Hüttemann  
How Laws Explain

## **Abstracts**

### **Claus Beisbart: What Can Kant's (first) Antinomy of Pure Reason Teach Us about the Limits of Science? Reflections on Present-Day Cosmology and Naturalism**

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### **Nancy Cartwright: In Defence of Physics as an Instrument**

Many picture physics as a body of knowledge. I picture it as a body of practice. On the knowledge picture, we navigate the world by deriving new claims about what happens from already established law claims. This parallels Nature's methods: to fix what happens. Nature looks to see what a set of pre-established laws imply. I will tell a different story. Predictions cannot be derived from laws. Rather, we construct them by artful modelling. If that's how we do it, I shall urge, we have little reason to think Nature does it differently. Nature too is an artful modeler.

### **Silvia De Bianchi: Space, Time and World. Kant's Philosophy of Cosmology**

Building upon Falkenburg's work, I shall underline the pivotal aspects of Kant's philosophy of cosmology and their relevance for both the historical and the philosophical understanding of this fundamental branch of Western culture and science. I shall emphasize how the guideline of the concept of "World" connects Kant's pre-critical and critical works. Then I shall show how this guideline is still present in the third Critique and the Opus postumum. I shall conclude with an overview of the main features of Kant's philosophy of cosmology that can play an important role in shaping our current understanding of cosmology in relationship with the foundations of mathematics and anthropology.

### **Kristina Engelhard: Foundationalism in Metaphysics and the Role of Science from a Kantian Perspective**

The claim that metaphysics is concerned with the fundamental structure of the world is common among contemporary metaphysicians and also metaphysicians of science. It is pertinent in questions about which entities a metaphysical theory takes to be fundamental. It is also relevant for questions concerning grounding. However, the concept of fundamentality is ambiguous; there are at least three senses that have to be distinguished: fundamentality in an absolute sense, in a relativized sense and in a relativized yet invariant sense. Since most metaphysicians of science today take it that metaphysics should be informed by the empirical sciences and make use of methods used in the sciences, it seems that good sense of fundamentality in these contexts can only be made of relative fundamentality. It is however an issue whether the project of metaphysics is compatible with this shift away from absolute fundamentality and how metaphysics relates to science in this picture. These issues are advanced from a Kantian perspective.

### **Andreas Hüttemann: How Laws Explain**

In this paper I argue that laws explain in terms of what has been called "internal generalisations". A consequence of this view is that laws don't explain their instantiations.

### **Katharina Kraus: Kantian perspectives on personhood and psychology**

The human person is the central subject matter of psychology. But which notion of a human person does psychological research in fact presuppose and how can psychology contribute to a deeper understanding of what a human person is? The aim of this paper is to shed new light on these issues by drawing on central insights from Kant's accounts of personhood and psychology. The paper comes in two parts. First, it explores the conceptual resources that Kant's transcendental philosophy is able to offer to empirical psychology. In particular, it specifies a set of distinctive conditions that give regulative (or heuristic) guidance to any empirical study of human persons. Secondly, as a case study, it applies these insights drawn from Kant to present-day studies of personality traits. By way of conclusion, it points out some general lessons regarding the relationship between conceptual analysis and empirical studies in psychology.

### **Wolfgang Rhode: Unification, Big Data and Artificial Intelligence**

The physical fundamental research combining an experimental reading in the book of Nature and the theoretical description of these findings is to a large part motivated by the goal to end in one unified theoretical description of all processes. For a long time, this process was successfully driven by the application of the "Galilean" synthetic-analytic method based on the preparation of as simple-as-possible experimental situations and its relation to simple, if possible predictive, theories. Due to the gigantic data volumes recorded in particle and astroparticle physics, this "Galilean" approach is superimposed by a holistic "Baconian" view on the as-complete-as-possible simulated Monte Carlo description of the experiment. Using data mining methods, probability clouds connecting the measured data with theoretical predictions are propagated through complex data analysis chains and condensed. Finally, the contained information collapses into projected human and physical readable data points, used to restrict the huge parameter range of modern classes of theories. Thus, this new access opens a new window on understanding physics in philosophical terms.

### **Gregor Schiemann: The proximity and remoteness of cosmic emptiness**

The cosmic emptiness extends from the closer cosmic environment to the most distant future states of universe. The discussion of the proximity of emptiness reveals a difference between human beings' small scope for acting on a cosmic scale and their impressive observational capabilities. With regard to the distant emptiness, however, there is the possibility of a drastic restriction of observational capabilities. This prospect relativizes the truth claim of contemporary knowledge. The assumption that modern cosmology can make predictions extending into the most distant future calls for an extended concept of natural philosophy whose scope encompasses not only existing human beings.