

**The Department of Philosophy, the Institute of Applied Physics and Mathematics
and the Institute of Mathematics and Quantitative Methods
of the University of Pardubice**

have the pleasure of inviting you to a one-day cross-disciplinary conference

Humanity in the Era of Specialized Knowledge and Science

Friday, 2 August 2019

Since the end of 19th century, we have witnessed the immense success of the natural sciences, hand in hand with the enormous development of technology. Together, these have given rise to the fundamental civilizing transformation of the world around us, and of our attitude towards it. However, the unchallengeable fruitfulness of science and technology has also begun to reveal its dark side.

In spite of various reservations about specialized knowledge and scientific or technological advances, rigorously and critically founded natural sciences and humanities provide us with forceful instruments for the well-founded explanation and description of numberless phenomena.



University
of Pardubice
Faculty
of Arts and Philosophy

Aims of the conference:

To address cross-disciplinary scientists who are erudite in both the natural sciences and the arts, and who can step out from behind the methodology or philosophy of science in the 20th century and target a range of subsequent problems:

- The scope and limits of scientific disciplines in offering comprehensive descriptions of, or knowledge about, nature and life.
- The scope and limits of professionals educated in the natural sciences and the arts in their research and understanding of phenomena.
- The scope and limits of traditional claims to universal knowledge and their relation to the whole within specialized education at universities.
- The scope and limits of historical-philosophical reflections in scientific training and research.

The conference will be open to:

Students, professionals and the interested public. Simultaneous recordings of the conference will be made available on YouTube.

Organizers from the University of Pardubice:

Patrik Čermák, MSc: Institute of Applied Physics and Mathematics,
Faculty of Chemical Technology

Libor Koudela, MSc, PhD: Institute of Mathematics and Quantitative Methods,
Faculty of Economics and Administration

Filip Grygar, MSc, PhD: Department of Philosophy, Faculty of Arts and Philosophy

Place: University of Pardubice, Lecture room C1, Faculty of Chemical Technology

Date: Friday, 2 August 2019, from 9:30 to 14:00

Invited guests:

Professor Hasok Chang, Department of History and Philosophy of Science at the University of Cambridge, the Lakatos Award in Philosophy of Science and the Fernando Gil International Prize in the Philosophy of Science laureate.

Professor Ladislav Kvasz, Institute of Philosophy of the Czech Academy of Sciences and Pedagogical faculty of Charles University in Prague, Fernando Gil International Prize in the Philosophy of Science laureate.

Morning programme: *Two plenary lectures (2 x 45 minutes)*

- 9.30–9.40 am: *Opening* (Chairman Patrik Čermák)
- 9.45–10.30 am: Hasok Chang:
Beyond Correspondence – Realism for Realistic People
- 10.35–11.20 am: Ladislav Kvasz:
Geometry in the Development of Western Painting
- 11.20–11.55 am: *Discussion and coffee break*

Afternoon programme: *Three contributions (3 x 20 minutes)*

- 12.00–12.05 pm: *Opening* (Chairman Libor Koudela)
- 12.10–12.30 pm: Anton Markoš: „Chemistry“ of the Living
10 minutes discussion
- 12.45–13.05: Lukáš Zámečník: *The Theory of Everything for Everyone*
10 minutes discussion
- 13.20–13.40: Michal Černý: *The New Style of Thinking – the problem of Specialisation, Multiparadigmatic and the Crisis of Scientific Identity*
10 minutes discussion
- 13.55: *Closing ceremony* (Filip Grygar)

Hasok Chang: Beyond Correspondence – Realism for Realistic People

In this paper I lay down some groundwork for a pragmatist scientific realism, which will be fully consonant with actual scientific practices. Scientific realism demands that our best scientific theories should give really true descriptions of the world. Truth here is usually conceived in terms of a ‚correspondence‘ between theory and reality – ultimate, metaphysical, and mind-independent reality. However, this idea is useless in practice because such reality is inaccessible to us, and the alleged correspondence only makes sense as a metaphor based on actual representational activities, in which both the ‚model‘ and the ‚target‘ are accessible. This metaphor appears to make literal sense only because we take part in the illusion of the ‚ready-made world‘, according to which reality, independently of any conceptions we impose on it, already has well-defined parts and relations between the parts. Abandoning the illusory metaphor, I propose that realists should accept pragmatism in relation to ‚primary truth‘, which does not consist in agreement with other things that we already know to be true. Primary truth is based on the ‚operational coherence‘ of activities that we engage in; if some coherent activities rely on a certain proposition, then that proposition is true within the domain of those activities. Once we have some primarily true propositions, then correspondence to them defines the secondary truth of other propositions. However, the picture I propose is not a foundationalist one in the traditional sense: a given proposition may be true in a primary or a secondary way, or even both. ‚Truth happens to an idea‘ (William James), and the manner of that happening depends on the contingent contexts of truth-making and truth-finding activities.

Hasok Chang studied Theoretical Physics and Philosophy and is the Hans Rausing Professor in the Department of History and Philosophy of Science at the University of Cambridge. He was the laureate of the Lakatos Award in Philosophy of Science (2006), and won the Fernando Gil International Prize in the Philosophy of Science (2013) for his book *Is Water H₂O? Evidence, Realism and Pluralism*.

Ladislav Kvasz: Geometry in the Development of Western Painting

In the past painting and geometry interacted in many ways. The most extensively studied example is the discovery of perspective. Nevertheless, there are other points of historical contact between painting and geometry. The main thesis of the paper is that some painters of the Baroque era used the same pictorial form (in the sense of Wittgenstein), as Lobachevski and Beltrami in non-Euclidean geometry. A similar analogy can be found also between Impressionism and Klein's Erlanger program, and between Cubism and combinatorial topology.

Ladislav Kvasz studied Theory of Systems and Philosophy at Comenius University in Bratislava and is Professor of Didactics of Mathematics, Associate Professor of Philosophy, and Doctor of Science (DSc). He works at Charles University in Prague and the Institute of Philosophy of the Academy of Sciences of the Czech Republic. He was the laureate of the Fernando Gil International Prize in the Philosophy of Science (2010) for his book *Patterns of Change: Linguistic Innovations in the Development of Classical Mathematics*.

Anton Markoš: „Chemistry“ of the Living

What is the pH inside a bacterial cell? If you approximate its volume as $1 \mu\text{m}^3$, and assume that the cell is filled with water solution only, then at pH 7.0 it would contain about 100 hydrated protons.

1. Can we speak of pH at such conditions, when the quantity is defined for much greater volumes?
2. Respiration is generation of electrochemical potential of protons across a cell membrane. A respiring bacterium would pump several hundreds protons per second to the external medium; yet maintaining its internal pH constant.
3. Pumping hydrated protons into bulk external medium would bring about no effect – they would simply disappear, without creating any electrochemical potential at the membrane; it means that they must be somehow retained in the vicinity of the membrane, to be able to drive cellular processes. Even the Gibbs free energy can be calculated corresponding to theoretical value.
4. The cell is not filled with water solution. Most of its volume (about 0.8) make up proteins and nucleic acids interwoven into sophisticated structures. Some authors even doubt any presence of water solutions inside the cytoplasm (save vacuoles).

What is the pH inside, how to calculate the membrane potential and its free energy? Yet, in vitro studies allow quite reliable measuring and calculating such variables.

Anton Markoš is a theoretical biologist and an associate professor at Department of Philosophy and History of Science of the Faculty of Science, Charles University in Prague. In his writings, he focuses on cell and evolutionary biology and biosemiotics from the hermeneutical, historical and philosophical point of view. Among his many scientific and popular books and articles, we can mention e.g. *Epigenetic Processes and the Evolution of Life* (CRC Press 2019), *Reders of the Book of Life* (Oxford University Press 2002), or *Life as its own Designer: Darwin's Origin and Western Thought* (Springer 2009).

Lukáš Zámečník: The Theory of Everything for Everyone

This paper introduces the view of a new form of the philosophy of physics based on a reassessment of contemporary approaches to philosophy of science and popularization of science (physics). The result aims to be a „textbook“ of the conceptual analysis of basic physical concepts, inter alia space, law, and constant. The use of selected physical concepts in fundamental theories of physics will be investigated. However, the analysis will not be limited by the current boundaries of experimental knowledge. Rather it will introduce to the layman a philosophical approach called „metaphysics within physics“, namely basic physical concepts that are not based on our empirical knowledge but rather conceived as forms of our empirical knowledge themselves.

Lukáš Zámečník explores the themes of philosophy of science, especially the problems of scientific explanation in physics and linguistics. He works at the Department of General Linguistics at Palacký University in Olomouc. He is the author of the monograph *Nástin filozofie vědy* (Brno 2015).

Michal Černý: The New Style of Thinking – the Problem of Specialisation, Multiparadigmatic and the Crisis of Scientific Identity

I can observe a series of movements that suggest that modernity is over. Universities emphasise interdisciplinary research and later specialisation of students. The class society is over, party and religious identification with the group has fallen apart. With the dynamic development of science, it is less and less possible to write a clear identification of the profession we perform on the door of the office. Thus, specialisation leads to a paradoxical overcoming of disciplines and disciplines, to the search for interdisciplinary cooperation and also to the ultimate end of the scientist, like a solitaire. Science is a team-based, but not unified and mono-disciplined matter. The specialisation and technology of science ultimately led to the definitive breakdown of the paradigm concept as the only or strictly dominating thought structure.

The paper attempts to reveal what such a move – a transition from early to late modern – can mean to natural, technical and social sciences, and why it should also be interested in philosophy. To what extent is science still formed only by man?

Michal Černý works at the Department of Information Science and Librarianship at Masaryk University in Brno. He focuses on philosophy of information, philosophy of education, technologies in education and philosophy and history of natural sciences (especially physics and informatics). He is the author of more than ten monographs.

