Institute of Philosophy
Slovak Academy of Sciences

Empirical and Formal Aspects of Science

14:30-15:30
Patrick Fraser
(University of Toronto)
(Institute for the History and Philosophy of Science and Technology, Toronto)
"The Ontology and Dynamics of Scientific Change:
The Scientonomic Approach"

15:30-16:30
Lukáš Bielik
(Department of Logic and Methodology of Science, Comenius University)
"Arguments from ignorance, Bayesian confirmation theory and explanatory considerations"

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Abstracts:

The Ontology and Dynamics of Scientific Change: The Scientonomic Approach

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There is a long tradition in the Philosophy of Science in attempting to understand how and why scientific theories change in the way that they do. Early attempts, such as those of the Logical Positivists, Popper, Lakatos, and others, sought to uncover an underlying rationality of science that could account for this process of change. Such an underlying scientific rationality often took the form of a universal method of science. By the 1970's, Kuhn, Feyerabend and others made it clear that the task of finding a universal method of science was flawed in its very foundations because there does not exist a single, trans-historical method of science; any proposed scientific method that is closely adhered to by one particular epistemic agent in one particular era is violated by some other epistemic agents in some other era. Hence, it became clear that, in order to properly understand scientific change, one must keep in mind that scientific change is not strictly about theories, but pertains to methods as well. While the likes of Shapere and Laudan attempted to explain how scientific theories and methods evolve in a co-dependent manner, it is safe to say that their attempts were unsuccessful. This is the gap that is filled by scientonomy, the empirical science of science that attempts to uncover the mechanism of changes in both theories and methods of their evaluation. First, the current theory of scientific change accepted by the scientonomy community comes with a well-defined *ontology* of scientific change, i.e. it tells us what types of epistemic stances can be taken by different epistemic agents towards different types of epistemic elements. Using this ontology, the theory explains precisely how scientific theories and methods change in time. It does so by postulating four axioms, the laws of scientific change, and deducing more than twenty theorems which shed light on different aspects of scientific change, including theory acceptance and rejection, method employment, scientific inertia, compatibility, authority delegation, role of sociocultural factors, and many more. Specifically, the currently accepted scientonomic ontology considers epistemic agents (which constitute scientific communities) which may take a variety of epistemic stances (such as theory acceptance, theory pursuit, or method employment) towards epistemic elements (namely, theories and methods). Collectively, these axioms and theorems make it possible to explain a number of phenomena which were puzzling for the previous theories of scientific change, such as how mutually incompatible theories can be simultaneously accepted, how mosaics split and merge, or how scientific authority is delegated between communities. By clarifying the ontology and dynamics of scientific change, scientonomy presents the first historically contextual, full-fledged theory of scientific change that is capable of simultaneously treating changes in theories and methods, and which precisely lays out the mutual co-dependence of these two processes.

Arguments from ignorance, Bayesian confirmation theory and explanatory considerations

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Argumentum ad ignorantiam has been traditionally construed as a kind of a reasoning fallacy. However, some of the recent discussions (Stephens 2011; Oaksford & Hahn 2004; Hahn & Oaksford 2006) has elaborated on Walton's former observation that, at least some, cases (types) of this argument are plausible instances of reasoning used in both, ordinary and scientific contexts (cf. Walton 1992; 1996). Moreover, Stephens, Hahn and Oaksford have shown that a specifically Bayesian interpretation of arguments from ignorance brings a finer-grained account of distinguishing plausible instances of arguments from ignorance from their fallacious counterparts. I agree, and I argue for a more general thesis which seems to be implicit in these discussions, namely: The plausible instances of arguments from ignorance are exactly those where the negative evidence confirms a negation of a target hypothesis. That is, Bayesian confirmation theory is a proper general framework for distinguishing fallacious from non-fallacious arguments from ignorance. Moreover, I consider an alternative interpretation of arguments from ignorance based on abductive (explanatory) considerations and I show that the plausibility of such an abductive interpretation depends on one given in Bayesian terms.