Saturday, May 4, 2019, room 1.0003 Unipark

Workshop “Formal Logic and Philosophy of Science”

Program

9:00 – 9:50 Bogdan Dicher (Lisbon) “Against Logical Nihilism”
9:50 – 10:40 Constantin Brincus (Bucharest) “Open-Ended Quantification and Alternative Models”

coffee break

11:00 – 11:50 Adrian Haret (Vienna) “What Should I Believe Now? Belief Change as a Form of Rational Choice”
11:50 – 12:40 Mariangela Zoe Cocchiaro (Salzburg) “Epistemically Different Epistemic Peers”

13:00 Lunch

14:50 – 15:40 Maria Serban (Berlin) “Searching for Modularity in Biological Networks”
15:40 – 16:30 Ana-Maria Cretu (Edinburgh) “Natural Kinds as Real Patterns”

coffee break

16:50 – 17:40 Anna Bellomo (Amsterdam) “Domain Extension and Ideal Elements in Mathematics”
17:40 – 18:30 Iulian Toader (Salzburg) “The Epistemological Argument for Idealization in Mathematics”

19:00 Dinner

Abstracts

Anna Bellomo, “Domain Extension and Ideal Elements in Mathematics”

Domain extension in mathematics occurs whenever a given mathematical domain (objects with an associated bare-bone theory) is augmented so as to include new elements. Manders (1989) argues that the advantages of important cases of domain extension are captured by the model-theoretic notions of existential closure and model completion. In the specific case of domain extension via ideal elements, I argue, Manders' proposed explanation does not suffice. I then develop and formalise a different approach to domain extension based on Dedekind (1854), to which Manders' account is compared. I conclude with an examination of three possible stances towards extensions via ideal elements.

Constantin Brincus, "Open-Ended Quantification and Alternative Models"

The existence of the non-normal interpretations discovered by [Carnap 1937, 1943] for the standard classical propositional and first-order calculi has recently drawn the attention of the logicians, but they have been mainly analyzed only for the propositional operators. [Bonnay and Westerståhl 2016], by adapting [Antonelli 2013]'s *general models* for the first-order quantifiers (FOQs), also provided an account of the non-standard models for the FOQs that are consistent with the relation of logical consequence in first-order logic. However, the class of *non-standard models* for the quantifiers that the mentioned authors describe leaves aside one important type of non-normal interpretations, precisely the one that Carnap pointed out. The recognition of this latter type of interpretation, which does not require a domain with a different cardinality than standard ones, will allow me to show that even if the open-ended formal rules for the universal quantifier make it range over absolutely everything, as [McGee 2000, 2006] argued, they still do not uniquely determine the *standard meaning* of this quantifier. Briefly, the open-ended rules eliminate at best the *non-standard models* (provided that *every-thing* is nameable), but they do not eliminate the *non-normal interpretations* of the FOQs.

Mariangela Zoe Cocchiaro, "Epistemically Different Epistemic Peers"

As an inescapable part of our lives, disagreement has been widely debated in philosophy over the past fifteen years. More precisely, epistemologists have been focusing on whether reasonable disagreement between two agents who are – or who, at least, recognize each other as being – peers on a proposition *p* is possible, i.e. whether rationality standards allow both the agents to steadfastly hold on to their initial credence on *p* or they require them to conform to a common credence, upon discovering the disagreement. Call these positions, respectively, the non-conformist and the conformist view. Some support for the latter might come from the field of information economics in which a substantial body of literature (Aumann 1976, Polemarchakis & Geneakoplos 1982) shows that, if two agents under spe- cific circumstances don't adopt a common credence upon discovering the disagreement on *p*, then at least one if them is irrational.

In this essay, I claim that the disagreement formally described in information economics can be considered as a case of peer disagreement. Firstly, I argue that the epistemic agents as they are characterized in Aumann's formal result are peers and, in doing so, I put forward a formal definition of peerhood. Secondly, I show that the technical requirements with which the epistemic agents as described by Aumann have to comply don't undermine their being peers nor do they interfere with the standard disagreement narrative. Thirdly, I claim that the peer disagreement cases for which Aumann's theorem holds not only tell against the non-conformist view, but that also show the limitations of some of the extant replies within the conformist position.

Ana-Maria Cretu, “Natural Kinds as Real Patterns”

This paper identifies a particularly fraught problem for realism about natural kinds – i.e., the commitment problem – which emerges from the dialectic between realists and nominalists. The commitment problem is shown to reside in an alleged incompatibility between a substantial ontological commitment to objective mind-independent natural kinds and the observation that classifications are practice-relative, that is, they are indexed to interests or scales. Neither realist nor naturalist accounts can solve the commitment problem, and thus a solution is sought elsewhere. The solution is a novel view – the natural kinds as real patterns view – which implies the following substantial philosophical contributions.

First, it is shown that making certain conceptual distinctions constitutes the first step towards resolving the commitment problem. In particular, it is shown that one must distinguish between objectivity and mind-independence on the one hand, and between two different notions of mind-independence, on the other hand. Second, it is shown how the real patterns strategy, originally proposed by Dennett (1991) and developed in detail by Ladyman and Ross (2007), can be improved by adapting a framework proposed by Laudan (1978). Laudan’s framework, which distinguished between ‘research traditions’ and ‘theories’ is used to obtain a substantial ontological commitment to real patterns. The third contribution of the paper consists in improving the real patterns strategy once more in order to apply it to natural kinds. Finally, it is shown how, with these relevant distinctions and improvements in hand, the commitment problem for natural kinds can be resolved.

Bogdan Dicher, “Against Logical Nihilism”

Logical nihilism, as articulated by Gillian Russell in, e.g., 'Logical nihilism' (Philosophical Issues: A Supplement to Nous, 2018), is the claim that the relation of logical consequence is empty. I argue that the nihilistic arguments are unsuccessful. Moreover, I will argue that minimalism, which is, roughly, the claim that the logical consequence relation is populated by useless and uninteresting arguments, and serves as an ersatz nihilistic position ought to be sharply distinguished from nihilism proper. Finally, I argue that nihilism does not threaten the fulcral properties of the consequence relation (reflexivity, monotonicity, transitivity), if one opts to characterise logical consequence as a certain metainferential relation holding between hypothetical assertions.

Adrian Haret, “What Should I Believe Now? Belief Change as a Form of Rational Choice”

The topic of belief change is focused on the dynamics of knowledge: how to update, revise and combine information of diverse origins. One prominent approach to belief change, called the AGM approach, is axiomatic: start by formulating properties that a rational belief change operator is expected to satisfy, and then study concrete functions that satisfy the properties. Historically, this has led to various ways of representing belief change operators, some of which employ concepts that will be familiar to economists working on

foundational topics. I will argue that, when we look under the hood of most belief change operators, we find the same kind of machinery that powers results in Social Choice Theory. I will talk about the significance and prospects of this fact for Belief Change.

Maria Serban, "Searching for Modularity in Biological Networks"

The theoretical framework of network science is currently widely used to investigate the structure, organization and function of biological organisms. In this paper I focus on applications of methods from network science to discover, characterize and explain the role of modular organization in neurobiological systems. I argue that network models of biological modularity play at least three important exploratory roles: they provide starting point characterizations (both qualitative and quantitative) of different types of modular organizations, they constitute proofs of principle for specific modular hypotheses, and they are sources of potential explanations.

Drawing on examples from network neuroscience, I describe how graph-theoretical representations of structural and functional connections in biological systems enable the visualization of the hierarchical or nested organization of biological modules. These visualizations also play a key role in guiding the characterization of some of the defining features of biological modules (e.g., what it means for a module to be tightly integrated yet relatively independent or dissociable from other modules; what it means for a module to persist as an identifiable unit). I briefly explain how the quantitative measurements of these features are used to support theoretical accounts of hierarchical modularity as a gradual property of biological systems. I also suggest that the framework of network science can be applied to differentiate between modularity as a property of how systems are built (in terms of organization principles of self-maintaining systems) and modularity as an evolved property resulting from processes of parcellation or differential integration.

Iulian Toader, "The Epistemological Argument for Idealization in Mathematics"

Over and above their mathematical value, the epistemic value of transfinite axioms has been often defended by analogy with the epistemic value of ideal elements like points at infinity, irrational numbers, ideal divisors, and the like. I discuss here the case of complex numbers: what exactly explains the epistemic value induced by the fundamental theorem of algebra? Several answers are provided, in terms of model-theoretical properties of algebraically closed fields, but each of them is deemed explanatorily insufficient, for each is available on more modest extensions of the reals than algebraic closure.