

# BA-LOGIC

## Workshop 4

### Workshop on Philosophy of Logic.

The fourth *Workshop on Philosophy of Logic* hosted by BA-Logic will take place 20<sup>th</sup> - 21<sup>th</sup> August 2015 in SADAF (642 Bulnes St., Buenos Aires). The series of BA-Logic Workshops aims to analyze different topics in philosophy of logic, mainly connected with semantic paradoxes, theories of truth and non-classical logics.

#### Invited Speakers

David Ripley (University of Connecticut)

Christopher Menzel (Texas A&M University)

Hitoshi Omori (Kyoto University)

#### Provisional Programme:

20<sup>th</sup> August 2015

15:00 -16:15 David Ripley (University of Connecticut) "Axiomatisation without cut".

16:30 -17:45 Eduardo Barrio & Federico Pailos (Conicet - University of Buenos Aires) "An LFI with a transparent truth predicate"

18:00 -19:15 Thomas Schindler (MCMP) "Toward Type-Free Theories of Classes"

19:30 - 21 Diego Tajer (Conicet - University of Buenos Aires) "Logical disagreement and judgement aggregation"

#### WORKSHOP DINNER

21<sup>th</sup> August 2015

15:00 -16:15 Hitoshi Omori (Kyoto University) "Title: Strengthening Goodship Project"

16:30 -17:45 Damian Szmuc (Conicet - University of Buenos Aires) "A Cartography of Logics of Formal Inconsistency and Truth"

18:00 - 19:15 Christopher Menzel (Texas A&M University) "A Structuralist Conception of Possible Worlds"

19:30 - 21 Lavinia Picollo (Conicet - University of Buenos Aires) "Disquotation and infinite conjunctions"

#### SADAF:

642 Bulnes st, Buenos Aires City, Argentina.

<https://www.google.com.ar/maps/dir//Bulnes+642,+C1176ABL+CABA/@-34.6041101,-58.4181059,17z/data=!4m13!1m4!3m3!1s0x95bcca61e8bdf84f:0xfc861dd95e8e8334!2sBulnes+642,+C1176ABL+CABA!3b1!4m7!1m0!1m5!1m1!1s0x95bcca61e8bdf84f:0xfc861dd95e8e8334!2m2!1d-58.4181059!2d-34.6041101>

Those interested in attending, please register your interest informally with Eduardo Barrio ([eabarrio@gmail.com](mailto:eabarrio@gmail.com)). There is no registration fee.

Some materials will be circulated in advance to those registered for participation. Abstracts for the talks are available here:

[ba-logic.com](http://ba-logic.com)

### **Meliño Buenos Aires Apart Hotel.**

951 Uriarte St, Buenos Aires City (005411) 4779-0880

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### **Abstracts:**

David Ripley (University of Connecticut): "Axiomatisation without cut"

Classical logic has proved remarkably useful for a wide variety of purposes. Because of this, advocates of using various nonclassical logics for certain purposes are often keen to provide "classical recapture": some justification for continuing to use classical logic in those cases where classical logic seems to work well. In previous work, I have recommended a particular logical setting in which to explore naive theories of truth and vagueness. The key to this setting is that it lacks a rule of cut, or indeed any form of transitivity of consequence; everything else is standard. Because of this, "recapturing" classical logic is easy; classical logic has several well-known formulations that do not depend on cut at all, and so it is never given up in the first place. However, there is more to classicality than the logic itself: there are also theories of various phenomena (arithmetic, sets, mereology) built on top of the logic by adding nonlogical axioms. Cut is absolutely crucial to these axiomatisations, as they are usually presented; and yet, nothing seems to go wrong in these usual cases. Something like recapture is called for: there must be some reason these axiomatisations work as well as they do. If it is not the absolute reliability of cut, then what? In this talk, I consider the role of cut in axiomatisation, showing how far we can get without it and where its effects are really needed. I will argue that a cut-free approach, while it must differ in some ways from a more usual cut-ful one, can recapture axiomatised theories appropriately.

Eduardo Barrio & Federico Pailos (Conicet - University of Buenos Aires) "An LFI with a transparent truth predicate"

We will present a matrix logic, called Matrix for Semantic Closure (MSC), that will help us to build an LFI with a transparent truth predicate. MSC avoids triviality and has wide expressive power. In particular, it can express a strong negation without turning trivial. The way it reaches that goal is by relaxing the conditions to get self-referentiality. In particular, with biconditionals that are equal to conjunctions of sentences that have a non-classical conditional as the main constant, we can build sentences that can be read as expressing in the language The Liar or a Curry sentence. We will present a disjunctive sequent system called LSC, and prove that MSC's complete with respect to it. Finally, we will present MSC's non-triviality proof. MSC matrix is non-monotonic, and this makes harder finding a fixed-point interpretation of the truth predicate, and thus proving the non-triviality of the theory. This proof will involve a cut-elimination proof for LSC.

Thomas Schindler (MCMP) "Toward Type-Free Theories of Classes"

In previous work, Timo Beringer and I developed a framework for a graph-theoretic analysis of the semantic paradoxes (such as the liar or Yablo's paradox). In our next project (with Lavinia Picollo), we want to extend this analysis to the logical paradoxes (such as Russell's) and build new axiomatic theories of type-free properties or classes (within classical first-order logic) based on that analysis, i.e. theories that allow the existence of "big" and non-well-founded properties/classes. Our program can be seen as an explication and vindication of Gödel's often quoted but rather cryptic remark that we may assume "every concept to be significant everywhere except for certain "singular points" or "limiting points", so that the paradoxes appear as something analogous to

dividing by zero.” (Gödel 1944) In this talk, I will present some of the main results of our work on the semantic paradoxes and explain some of the main ideas of our new project.

Diego Tajer (Conicet - University of Buenos Aires) “Logical disagreement and judgement aggregation”

Logical disagreement is not an exceptional phenomenon (as it was some decades ago), but a very usual one. In particular, there are many discussions (e.g. semantic paradoxes, vagueness, etc.) in which equally famous/good/smart logicians argue for different logics. Even though we all play the same game, i.e. “my logic is better than yours”, in most of the cases everyone admits that there are no conclusive arguments in favor of any logic in particular. Given this situation, it might be rational for logicians to take into account what the others think, and try to reach some partial agreements. In the last decade, a much discussed topic was Judgment Aggregation, a discipline which studies different mechanisms for obtaining a set of collective beliefs out of the beliefs of the different individuals of a group. In this paper, I analyze logical disagreement using the concepts and results of judgement aggregation. In particular, I develop some methods to reach a “collective logic” from the logics that different individuals accept. I prove a version of the discursive paradox (Pettit & List 2002), in which structural logicians give rise to a collective substructural logic. Then I analyze some possibility results (based on the restriction of the profiles), and a number of solutions.

Hitoshi Omori (Kyoto University): “Strengthening Goodship Project”

Dialetheic solutions to paradoxes are based on the metaphysical view which claims that there are true contradictions. And for this purpose, one needs a system of paraconsistent logic, such as Logic of Paradox (LP) developed by Graham Priest, which serves as an underlying logic of the theory. But in some contexts, such as naive set theory, the paraconsistent logic was supposed not to contain classical negation. It turns out, however, that classical negation is less problematic if one makes appropriate use of non-detachable biconditional in formulating axioms for naive theories. The approach based on non-detachable biconditional was outlined by Laura Goodship. I will refer to this approach as the Goodship project, following the terminology coined by Jc Beall and Graham Priest. Based on these, the aim of the paper is twofold. First, I fill in some details of the Goodship project based on stronger paraconsistent logic. Here, the stronger paraconsistent logic is an expansion of LP obtained by combining connectives from different tradition of paraconsistency, and has some distinctive features such as being functionally complete. Second, I explore some of the implications and advantages of the Goodship project with richer vocabulary from a philosophical perspective. The issues I discuss will include Curry's paradox, expressive limitations and trivialism.

Damian Szmuc (Conicet - University of Buenos Aires) “A Cartography of Logics of Formal Inconsistency and Truth”

The goal of this paper is to begin the investigation on the minimal and maximal LFIs (Logics of Formal Inconsistency) that can be non-trivially extended with a transparent truth predicate. For that purpose, we will work, from a semantic perspective, with two different kind of frameworks: *infectious* and *non-infectious* logics. We define a logic to be infectious if every operation that takes a certain non-classical value as an input gives that value as an output, and define it to be non-infectious otherwise. In this paper we look for the set of paraconsistent infectious and non-infectious logics that can meaningfully talk about truth. Moreover, we compare all the obtained logics of formal inconsistency and truth presented, taking into account axioms, rules and principles governing both the truth predicate and the consistency operator. Finally, we end with some concluding remarks and highlights for issues that might be discussed in further research.

Christopher Menzel (Texas A&M University) “A Structuralist Conception of Possible Worlds”

Let ‘ $Ex$ ’ mean that  $x$  exists, or is *actual*. *Possibilism* is the thesis that there are *mere possibilia*, objects that *could have existed* but, in fact, do not; symbolically,  $\Diamond x (\Diamond Ax \wedge \neg Ax)$ . *Actualism* is possibilism's denial. For the actualist, there could not have been any mere *possibilia* — to *be* is simply to exist, to be actual; there is no division among the things there are into different “modes” of being, the robustly actual and the merely possible. Basic possible world semantics (BPWS) for quantified modal languages is widely thought to provide the most powerful and illuminating model theoretic analysis of our ordinary modal discourse. But for actualists, for all its power and appeal, BPWS is problematic. In its simplest and most intuitive form, BPWS validates both the propositional modal logic S5 as well as the so-called Barcan formula (BF),  $\Diamond \exists x Fx \rightarrow \exists x \Diamond Fx$ , which tells that if there simply could be an  $F$ , then there is in fact something that is possibly  $F$ . This leaves the actualist in a dilemma: most actualists embrace S5 as the system corresponding most closely to our strongest logical

intuitions about modality; but BF, together with other strong and widely shared modal intuitions, appears to entail possibilism. After rehearsing several unacceptable proposals for solving the actualist's dilemma, I will approach the problem by drawing upon ideas from the literature on mathematical structuralism to sketch a structuralist conception of possible worlds and the metaphysics of modality generally. Briefly, the idea is that certain models of a modal language can be viewed as structural representations of ways things could have been. I will argue that, by analogy with *ante rem* mathematical structuralism, the "positions" in the structures these models exhibit can play the role of *possibilia* and, hence, that the actualist can accept BPWS and the validity of BF without incurring the undesirable metaphysical commitments of possibilism.

Lavinia Picollo (Conicet - University of Buenos Aires) "Disquotation and infinite conjunctions"

The truth predicate has expressive powers akin to those of logical connectives, for it allows to express infinitely many sentences at once via generalizations or, as it is usually said, infinite conjunctions, that cannot be expressed otherwise neither in natural language nor in most formal languages. For instance, it allows us to express the infinitely many theorems of arithmetic by uttering "All theorems of arithmetic are true". This capacity prompts the search for 'logics' or, better, formal theories of truth that give the truth predicate the necessary features to perform its task. Authors working on the topic believe such theories should consist (partly) of transparency principles, the most famous of which is the T-schema. Since these principles are inconsistent in classical logic plus some required syntactic assumptions, most opt either to weaken classical logic or to resign part of the expressive power of truth. In this paper we show that transparency is neither necessary nor sufficient to grant this expressive power. In classical logic a weaker subprinciple that is *ceteris paribus* consistent and even conservative over the syntax theory suffices, while in other logical systems none of the transparency principles does the job. Thus, there is no need (and it is generally not well-advised) to abandon classical logic in order to guarantee the logical role of truth or sacrifice part of it to remain classical.