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2025 SPRING MEETING
OF THE ASSOCIATION FOR SYMBOLIC LOGIC

2025 APA Central Division
Virtual Meeting

February 27 – March 1, 2025

This program is a draft for the 2025 Spring Meeting of the ASL to be held within the 2025 APA Central Division Meeting. The APA meeting is entirely virtual and will take place over two weekends, February 20–22 and February 27–March 1, 2025. The invited and contributed talks for the ASL portion of the program will be on the second weekend. Registration for the meeting is available through the APA website at `https://www.apaonline.org/mpage/2025central`.

Abstracts of invited plenary lectures

► DOUGLAS BLUE, *Philosophical aspects of Nairian models.*
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Nairian models are a new species of model satisfying the Axiom of Determinacy. What distinguishes them from the models of AD heretofore known is that they have determinacy-like cardinal structure above Θ, the supremum of the lengths of prewellorderings of the reals.

Just as $L(\mathbb{R})$ and larger models of AD have implications for the foundations of set theory, Nairian models bear on central problems in research programs investigating strong theories. We will survey recent theorems to this effect and discuss conjectures about the cardinal structure of Nairian models that would change our understanding of the relative strength of some of those theories.

► CURTIS FRANKS, *Relational definition and substructure.*
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We compare the "essential" and "relational" definition schemes [1, 5] and review some early logical results (e.g. from [2, 4]) in these terms. Observing that Gentzen's (1935) natural deduction calculus is a realization of the relational definition scheme, we ask if this realization is absolute. The alternative realization we describe illustrates that the relational definition scheme leads naturally to the distinction between additive and multiplicative connectives familiar from linear logic [3].

[1] Bergman, G.M., ***An invitation to general algebra and universal constructions (second edition)***, Springer, 2015.

[2] Gentzen, G., *Untersuchungen Über das logische Schließen I, II*, ***Mathematische Zeitschrift***, vol. 39 (1935), no. 2, pp. 176–210 and no. 3, pp. 405–431.

[3] Girard, J.-Y., *Linear logic*, ***Theoretical Computer Science***, vol. 50 (1987), no. 1, pp. 1–101.

[4] Gödel, K., *Zum intuitionistischen Aussagenkalkül*, ***Anzeiger der Akademie der Wissenschaften in Wien***, vol. 69 (1932), pp. 65–66.

[5] Samuel, P., *On universal mappings and free topological groups*, ***Bulletin of the American Mathematical Society***, vol. 54 (1948), pp. 591–598.

► SÉBASTIEN GANDON, *Logicism and the architecture of mathematics.*
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Logicism was (still is?) a program to reduce mathematics to logic. The debate generally focused on the question of how far logic had to go for this program to be considered a success. In my contribution, I will be looking at another, less-discussed issue: what representation of mathematics did logicism have to provide in order to be considered a success? By studying the case of Russell's project and contrasting it with Carnap's, I intend to show that there are several answers to this question. I will argue that Russell's intention was not only to derive mathematics from logical principles, but also to derive the differences between mathematical disciplines from those principles.

► VOLKER HALBACH, *Possible worlds semantics for syntactic predicates.*
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A primitive predicate N that applies to codes of sentences is added to a language expressive enough to describe its own syntax, such as the language of arithmetic. This predicate can be understood as a predicate expressing modal notions such as logical or metaphysical necessity, truth, or analyticity. This is in contrast to the usual treatment of modal notions in philosophical logic as sentential operators, which have the same grammar as negation, that is, they are combined with formulae rather than terms.

I present a possible worlds semantics for such a language containing a syntactic predicate. Of course, a sentence of the form $N\overline{\ulcorner\phi\urcorner}$ ought to be true at a world w iff ϕ is true at all worlds accessible from w, where $\overline{\ulcorner\phi\urcorner}$ is closed term for the (code of) the sentence ϕ. While the truth of a formula with a sentential operator at a world can be defined by recursion on the complexity of the formula, no such definition is available for the language with a corresponding syntactic predicate.

Suitable interpretations of the syntactic predicate can be given on some frames, that is, non-empty sets of possible worlds with an accessibility relation, but not on others. Many known paradoxes can be turned into limitative results: The liar paradox shows that a frame with a single world seeing itself does not admit an interpretation; Yablo's paradox shows that a frame with a transitive infinitely descending chain of worlds does not either. All these results can be subsumed under the following observation: The class of frames that admit such an interpretation of N as truth in all accessible worlds is exactly the class of all converse wellfounded frames.

The characterization of frames that admit an interpretation relies on the availability of contingent vocabulary as in [1]. In the absence of contingent vocabulary, the situation is much more complicated, as shown in [2].

[1] Volker Halbach and Graham Leigh, ***The road to paradox: A guide to syntax, truth, and modality***, Cambridge University Press, 2024.

[2] Volker Halbach, Hannes Leitgeb, and Philip Welch, *Possible-worlds semantics for modal notions conceived as predicates*, ***Journal of Philosophical Logic***, vol. 32 (2003), pp. 179–223.

► OFRA MAGIDOR, *New Zeno and the logic of counterfactuals.*
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New Zeno cases purport to show how an infinite number of agents can seemingly bring about some surprising effects merely by having the right intentions or dispositions. A growing literature has used these cases to argue for some substantive philosophical conclusions about (*inter alia*) infinity, motion, causation, ability, the laws of physics, and the logic of counterfactuals. In this talk, I will explain why these conclusions are unwarranted, focusing in particular on the latter application.

▸ GIL SAGI, *What is and what should never be: conventionalism and the availability of alternative logics.*
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Conventionalism is often presented as a form of pluralism. The most recent extensive defense of logical conventionalism is by Jared Warren [4], who claims that his conventionalism entails logical pluralism. In the main, first part of the talk I shall take issue with this claim. In a nutshell, Warren's naturalistic, metaphysically lightweight conventionalism is not enough to entail the demanding pluralism to which he is committed—his arguments at most show that conventionalism and pluralism are consistent. The point is significant because it bears on fundamental questions on the nature of language. In the second part of the talk, as time permits, I'll explore a different kind of conventionalism, of a more Carnapian flavor, and how it may relate to logical pluralism.

[1] Yemima Ben-Menahem, ***Conventionalism: From Poincaré to Quine***, Cambridge University Press, 2006.

[2] Rudolf Carnap, ***The Logical Syntax of Language***, Routledge and Kegan Paul, London, 1937.

[3] Noam Chomsky, *What is language?*, ***The Journal of Philosophy***, vol. 110 (2013), pp. 645-662.

[4] Jared Warren, ***Shadows of syntax: Revitalizing logical and mathematical conventionalism***, Oxford University Press, 2020.

[5] Jared Warren, ***The a priori without magic***, Cambridge University Press, 2022.

Abstracts of contributed talks

▸ JASON ZESHENG CHEN, *Practical uses of the Church-Turing Thesis, revisited.*
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Appealing to the Church-Turing Thesis in a proof, implicitly or explicitly, has long been a familiar tool in any logician's repertoire. At bottom, what facilitates its use is confluence: the fact that numerous distinct attempts to capture the notion of computability all yield the same class of functions. This talk will begin with an extensive overview of the technical literature that attests to the ubiquity of such appeals to confluence in print, cutting across multiple mathematical disciplines, from computability theory to Borel equivalence relations.

Along the way, special attention will be paid to the justificatory roles such appeals are supposed to play in each case. In doing so, I shall reveal two subtly distinct facets concerning the practical use of the Church-Turing Thesis (and other confluence arguments), which are sometimes conflated in philosophical discussions: one that guarantees the formal rigor of a proof, and another that ensures the results obtained are not a mere artifact of the coding that is used.

I will then tease these two facets apart with actual examples in print, citing crucial evidence witnessing the distinction. With this setup in place, we will see how certain recent philosophical debates about the practical use of the Church-Turing Thesis may naturally dissolve, as the combatants do not share the same assumptions of the roles confluence arguments play in each case, and thus end up merely talking past each other.

▸ RONALD FULLER, *Existential import? Not today.*
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John Corcoran wrote of his paper *Existential import today* (2015), with Hassan Masoud: "Shortly after it was published in History and Philosophy of Logic, it gained first place on its journal's most-read list with over 1500 readers. At the moment (2018) it is still first with over 6000 readers, the second place paper has yet to reach 1500." But Corcoran and Masoud fail to distinguish logical truth from mathematical truth and they do not demonstrate existential import. The recurring historical failure to distinguish logic from the things people use logic to reason about—in other words, to distinguish structure from content—is a mistake older than logic itself. It appeared first with the Sophists, again with the Platonists, then the latter Abbasids and the latter Scholastics. The collapse of these societies is traceable to their corruption of logic. In modern times Hilbert, Carnap, Tarski, and others have made the same mistake. Russell believed logic is concerned with questions about the existence of unicorns and golden mountains. This madness will not stop until we learn to respect the limits of logic.

Abstracts of talks presented by title

▸ JOACHIM MUELLER-THEYS, *On Characterization and Axiomatization of Single Structures.*
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I. *Abstract Semantics.* Let $W \neq \emptyset$, $w, v \in W$ (worlds); $L \neq \emptyset$ (language), $f, g \in L$, $F \subseteq L$; and $T \subseteq L \times W$ (*Wahrheitsbegriff*). $F\ Seq_T\ f :\Leftrightarrow \forall w\ (F\,T\,w \Rightarrow f\,T\,w)$ (consequence). $w \sqsupseteq v :\Leftrightarrow \forall f\,(f\,T\,v \Rightarrow f\,T\,w)$ (entailment), $w \equiv v :\Leftrightarrow w \sqsupseteq v\ \&\ v \sqsupseteq w$. $F\ CharEnt\ w :\Leftrightarrow F\,T\,w\ \&\ \forall v\,(F\,T\,v \Rightarrow v \sqsupseteq w)$. $th\,(w) := \{f : f\,T\,w\}$. $\mathrm{th}(w)\ \mathrm{CharEnt}\ w$. $F\ SemAx\ w :\Leftrightarrow \forall f\,(F\,\mathrm{Seq}\,f \Leftrightarrow f\,T\,w)$. *Characterization up to entailment implies semantic axiomatization*: Let $F\,\mathrm{CharEnt}\,w$. If $F\,\mathrm{Seq}\,f$, by $F\,T\,w$, $f\,T\,w$; if $f\,T\,w$, assume $F\,T\,v$, whence $v \sqsupseteq w$, whereby $f\,T\,v$. Hence F SemAx w.

II. *Model Theory.* Now let $\mathcal{M} \models \sigma$ be satisfaction between L-models and L-sentences, where L is any first-order language. It is not profound that $\mathrm{Th}\,(\mathcal{M})$ characterizes and axiomatizes $\mathcal{M}$. First-order logic is not atomistic. Infinite models cannot be characterized up to isomorphy.

The situation changes with named logic. We say that $a \in |\mathcal{M}|$ is *named* if there is a closed L-term t such that $a = t^{\mathcal{M}}$. Accordingly, $\mathcal{M}$ is *(completely) named* if all $a \in |\mathcal{M}|$ are named. $\mathcal{M} \models\!\!\equiv \sigma$ if $\mathcal{M}$ is named and $\mathcal{M} \models \sigma$.

Let $\mathcal{M}$ be named. We can now define that $\Sigma \subseteq L_0$ *characterizes* $\mathcal{M}$ *(up to isomorphy)* if $\mathcal{M} \models\!\!\equiv \Sigma$ and $\mathcal{N} \cong \mathcal{M}$ for all $\mathcal{N} \models\!\!\equiv \Sigma$, and that Σ *(semantically) axiomatizes* $\mathcal{M}$ if for all σ: $\Sigma \models\!\!\equiv \sigma$ if and only if $\mathcal{M} \models\!\!\equiv \sigma$ (where $\Sigma \models\!\!\equiv \sigma \Leftrightarrow \forall \mathcal{N}\,(\mathcal{N} \models\!\!\equiv \Sigma \Rightarrow \mathcal{N} \models\!\!\equiv \sigma)$). We now gain that Σ *axiomatizes* $\mathcal{M}$ *if* Σ *characterizes* $\mathcal{M}$. We had found and proven the fundamental result that *named models are isomorphic if they are atomically equivalent.* Consequently, since $\mathcal{N} \models\!\!\equiv \mathrm{Th}_{\mathrm{bas}}\,(\mathcal{M})$ implies $\mathcal{N} \equiv_{\mathrm{at}} \mathcal{M}$, the *basic theory* $Th_{bas}\,(\mathcal{M})$, consisting from all basic (atomic or negated-atomic) sentences that are true at $\mathcal{M}$, *characterizes and axiomatizes* $\mathcal{M}$. For example, arithmetical structures like $(\mathrm{IN}, 0, ')$ are named and thus characterized–axiomatized by their basic theories.

Any L-model $\mathcal{M}$ has some named $\hat{L}$-expansion $\hat{\mathcal{M}}$. We say that $\hat{\Sigma} \subseteq \hat{L}_0$ *named characterizes* $\mathcal{M}$ if $\hat{\mathcal{M}} \models\!\!\!\!\equiv \hat{\Sigma}$ and $\mathcal{N} \cong \mathcal{M}$ for all $\hat{\mathcal{N}} \mid\!\equiv \hat{\Sigma}$, and that $\hat{\Sigma}$ *named axiomatizes* $\mathcal{M}$ if for all $\sigma \in L_0$: $\hat{\Sigma} \mid\!\equiv \sigma$ iff $\mathcal{M} \models \sigma$. Now, $\mathrm{Th}_{\mathrm{bas}}(\hat{\mathcal{M}})$ (resembling the *Robinson diagram* of $\mathcal{M}$) *named characterizes and axiomatizes* $\mathcal{M}$.

Notes. This précis bases on the elaborated script of the talk “Named Logic as a Natural Way to Grasp Worlds” given on April 29, 2024 at the *1st Pan African Logic Congress*, chaired by Jean-Yves Béziau. Several abstracts in *The Bulletin of Symbolic Logic* reflect previous work. In particular, we thank ‘Peana Pesen’ and Wilfried Buchholz.