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§1 Editorial

It is with great pleasure that I return as guest editor. Before I leave you with this month's interviewee Luciano Floridi, I'd like to share just a quick thought.

It must have happened to other philosophers too—a slight sense of embarrassment and awkwardness when asked what philosophy is or what in fact we do when we do philosophy. Perhaps not with other academics, but this may happen in some everyday situations. Here are my favourite three situations. You are in a party and you are introducing yourself to new people; to the question "What do you do?" you proudly answer "Philosophy"; the regard is usually puzzled, so you promptly rectify: "Philosophy *of science*"; unfortunately, this doesn't do any better. I also tried with 'epistemology', 'methodology of science', 'conceptual problems in the sciences' ... Here is the second situation. You are chatting with old friends or yours, or with good acquaintances, and those people finally take the courage to ask you how you spend your day doing research *in philosophy*: "Do you sit and wait for illuminating philosophical thoughts to come?" Usually, finding out that you spend your time reading, writing, discussing, preparing seminars, talks and classes is quite disappointing to them. No philosophical 'illumination', after all ... Last, try to explain to an immigration officer that even if you do *research* in philosophy of *science*, it doesn't mean that you manipulate explosive materials or the like.

Now, step back from the hilarity of the situations above. What philosophy is, even after more than two-thousand years of philosophy, is far from being an obvious question, not to mention how contentious the answer is. I always thought that a good answer lies in the Greek origin of the word 'philosophy'—i.e., love of knowledge—which gives the perspective one takes toward 'things' without fixing either the object or the scope of philosophy (and of philosophical questions). Thus, I feel somehow uncomfortable with views according to which, for instance,

> [...] philosophy is the study of problems which are ultimate, abstract and very general. These problems are concerned with the nature of existence, knowledge, morality, reason and human purpose. (Teichmann J. and Evans K. C., *Philosophy: A Beginner's Guide*, Blackwell Publishing, 1999)

Should we then exclude very specific and concrete issues—e.g., what interpretation of probability best fits cancer epidemiology—from the realm of the philosophical problems?

I promised that I'd be brief, so it's time to wind up. This preamble was to say that I tried to turn those questions to Luciano. For him, however, the task was even more challenging. If you had hard times explaining what philosophy of science or philosophical logic is, try with philosophy *of information* ...

Federica Russo
Philosophy, Louvain & Kent

§2
Features

Interview with Luciano Floridi

Luciano Floridi is Professor of Philosophy at the University of Hertfordshire, where he holds the Research Chair in Philosophy of Information, and Fellow of St Cross College, University of Oxford. He is the founder and director of the Oxford University Information Ethics research group, and best known for his research on the philosophy of information and on information ethics. His forthcoming books are: The Philosophy of Information (OUP); Information, (OUP, VSI series); and the Handbook of Information and Computer Ethics (CUP). He is currently President of the International Association for Computing And Philosophy and principal investigator of the AHRC-funded research project on the construction of personal identities online. In 2009, he became the first philosopher ever to be appointed Gauss Professor by the Academy of Sciences in Göttingen, and was awarded the Barwise Medal by the American Philosophical Association for his foundational research in the philosophy of information.

Federica Russo: It is now established tradition that our interviewees tell us (briefly!) about their intellectual history. Luciano, would you tell us how you got into philosophy of information, or rather, how did you 'invent' it?

LF: The Philosophy of Information (PI) has many roots and it is the result of a long process of 'slow cooking' in the philosophical pot. For some time I had been searching for an approach to some key philosophical questions (the nature of knowledge, the structure of reality, the difference between mental and artificial intelligence, the ethical role of agents and so forth) which could be at the same time rigorous, in the best sense of our analytic tradition, non-psychologistic, in a Fregean sense, conversant with our scientific knowledge, capable of dealing with contemporary lively issues, and less prone to metaphysical armchair speculations and idiosyncratic intuitions. I was looking for a concept of knowledge that was not obsessed with the knowing subject. And one day I realised that what I really had in mind was information. I was at Wolfson College, seating near the bank of the river Cherwell. It was 1999 and I gave a talk in London entitled "Should there be a Philosophy of Information?". Once I saw the peak of the mountain all that remained to do was to plan the expedition as carefully as possible. So I've been climbing ever since. Deep down I'm a German philosopher, I love being systematic and I love big projects.

FR: Could you tell us what exactly 'philosophy of information' is?

LF: On the one hand, PI is a way of doing philosophy, by elaborating and applying information-theoretic and computational concepts, tools and theories to philosophical problems. So PI is a method to deal with classic and new problems. It goes hand in hand with what some colleagues call formal epistemology, for example. On the other hand, PI is a new area of research, concerned with the critical investigation of the conceptual nature and basic principles of information, including its dynamics, utilisation and sciences. PI is a new way of appropriating a very specific interpretation of the classic 'ti esti ...?' (what is ...?) question. What is information? PI seeks to answer such a basic question, not differently from the way in which epistemology, for example, seeks to answer the question 'what is knowledge?'. The great advantage is that 'information' is turning out to be a concept as fundamental and important as 'being', 'knowledge', 'life', 'intelligence', 'meaning' or 'good and evil', all pivotal concepts with which it is interdependent and so equally worthy of autonomous investigation. It is also a more impoverished concept, in terms of which the other can be expressed and interrelated, when not analysed.

FR: What does it mean that philosophy of information 'evolved' from other areas such as philosophy of artificial intelligence, logic of information, cybernetics, social theory, ethics or the study of language and information? Does it mean that philosophy of information inherits the peculiar problems of all those disciplines

or that there is a substantial re-elaboration of their respective questions, or what? In other words, are there completely new philosophical questions, or are there old questions that require new answers in the light of the advancements of information science?

LF: I would like to read the 'or' in the question as inclusive. PI is more like a philosophical paradigm. In the past, philosophers had to take care of the whole chain of knowledge production, from raw data to scientific theories, as it were. Throughout its history, philosophy has progressively identified classes of empirical and logico-mathematical problems and outsourced their investigations to new disciplines. It has then returned to these disciplines and their findings for controls, clarifications, constraints, methods, tools and insights but philosophy itself consists of conceptual investigations whose essential nature is neither empirical nor logico-mathematical. To mis-paraphrase Hume: "if we take in our hand any volume, let us ask: Does it contain any abstract reasoning concerning quantity or number? Does it contain any experimental reasoning concerning matter of fact and existence?" If the answer is yes, then search elsewhere, because that is science, not yet philosophy. Philosophy is not a conceptual aspirin, a super-science, the manicure of language, or an intellectual cleaning-lady. It is the art of identifying conceptual problems and designing, proposing and evaluating explanatory models that seek to solve them. As conceptual engineering, it is the last stage of reflection, where the effort to provide meaning to life (or, to put it more dramatically, the semanticisation of Being) is pursued and kept open. Its critical and creative investigations tackle problems that are intrinsically capable of different and possibly irreconcilable solutions, problems that are genuinely open to debate and honest disagreement, even in principle. These investigations are often entwined with empirical and logico-mathematical issues and so scientifically constrained but, in themselves, they are neither. They constitute a space of inquiry broadly definable as normative.

It is an open space: anyone can step into it, no matter what the starting point is, and disagreement is always possible. It is also a dynamic space, for when its cultural environment changes, philosophy follows suit and evolves. Having outsourced various forms of knowledge, philosophy's pulling force of innovation has become necessarily external. It has been made so by philosophical reflection itself. This is the full sense in which Hegel's metaphor of the Owl of Minerva is to be interpreted. In the past, the external force has been represented by factors such as Christian theology, the discovery of other civilisations, the scientific revolution, the foundational crisis in mathematics and the rise of mathematical logic, evolutionary theory, the emergence of new social and economic phenomena, the crisis of Newtonian physics, quantum physics and the theory of relativity, just to mention a few of the most obvious examples. Nowadays, the pulling force of innovation is represented by the complex world of information and communication phenomena, their corresponding sciences and technologies and the new environments, social life, existential and cultural issues that they have brought about. This is why PI can present itself as an innovative paradigm. It does inherit much of the past problems, but it re-shapes and models them in the light of our contemporary life.

FR: Do you think that computer science has also changed the way we do philosophy, besides leading to a new discipline? How?

LF: I do not think so, at least not in the sense that we shall ever do 'computational philosophy'. I take computer science to play a leading role in making our reflection focus on new aspects of old issues and new problems. I also believe that it often provides a better approach to philosophical questions. But I would not like to see this confused with some sort of calculemus ("let's calculate") dear to Leibniz. As I mentioned above, genuinely philosophical problems are those that remain intrinsically open to informed and rational disagreement, if we could compute their answers they would not be philosophical in the first place.

FR: I guess you strongly encourage your students to plunge into philosophy of information. What's so exciting about that?

LF: I have actually done that but only very recently, and with plenty of warnings. Philosophy is a very conservative discipline. She might fancy knowledge but she would rather marry the status quo of whatever current Weltanschauung (comprehensive world view) is available. So it can be risky to be a bit too innovative, or ahead of one's time, or unorthodox if one does not have the support of the philosophical establishment. The recent change in my attitude is due to a number of positive signs from many academic venues. Whether one's research is considered to be fringe and marginal or advanced and cutting-edge depends sometimes on the observer's position. Since that seems to have changed, I feel I'm less irresponsible in inviting graduates to work on PI. What is exciting about it? It's like having a whole unexplored continent at one's disposal. It does not happen often in philosophy. If a graduate student would like to work on issues that are relevant to our contemporary world, or on classic problems without treating them as mummified diatribes, and that may provide insights into our lives as we know them today, PI is a great area of research.

FR: I know you long fought the heavy historical perspective of much Italian and continental philosophy. Yet, one might argue that the key issues of philosophy of information were anticipated in the works of e.g. Charles Sanders Pierce, Alan Turing, or Claude Shannon & Warren Weaver. Do you think there's something

we can or should learn from them? If so, what is, in your view, the right way a philosopher should approach historical issues?

LF: Years of work within the analytic tradition have taught me that the history of philosophy is an essential part of a philosopher's training, because too often I see brilliant students reinvent the wheel or end up in well-known blind alleys. Reading the classics is also a great way to unhinge one's ideas when they become dogmatic or sterile, and challenge them with alternative views. It remains one of the best mental gyms one can join to exercise the brain. But the history of philosophy is only one tool among many in the bag of a good researcher. Too much of it stifles one's reflection and undermines any attempt to innovate the conceptual tradition. Culture should not become culturism, if you allow me to expand the previous metaphor. In Italy, it is most unfortunate that many graduates treat philosophy as something separate and often in conflict with science. They cannot even conceive (and they are often not allowed) to work on problems first-hand. They work on authors, whom they treat almost religiously, and often on authors speaking about other authors. I still recall my frustration when I was told that, for my master thesis in Rome, I could not work on some aspects of the anti-realism debate, as I wished, but only on Dummett's interpretation of Wittgenstein's position about semantic anti-realism. Even when graduates do finally tackle some philosophical issue, they tend to do so through some authors/authorities, as if one could do philosophy only by ventriloquising. This is a pity. Especially because anyone trained in a history-based and history-oriented way not only can find doing philosophy very hard, but looses the capacity to do it in the future, like a child who, having failed to learn a natural language at the right age, will never be able to speak it properly. Classic authors are precious sources, and need to be treated as such, but we should not build churches around them, let alone treat their texts as Holy Scriptures. Commenting on Wittgenstein is not doing philosophy, it is doing history of ideas. It is a very valuable kind of research, but it belongs to a different department.

FR: Some eight years ago you gave the Herbert A. Simon Lecture on Computing and Philosophy at CMU on the 'open' problems in philosophy of information. Have any of those problems been solved? What are the open problems today?

LF: In that lecture I listed around twenty problems. I have tackled some of them in the past few years in a series of articles. I'm delighted to say that I am completing a book, entitled *The Philosophy of Information* (to be published by OUP), where I have collected and revised such solutions. But let me qualify what I have just said. Philosophical problems are solved in the sense that solutions are provided which are acceptable by informed and rational interlocutors but can be rejected when better solutions become available. 'Better solutions' simply means solutions that are conceptually less expensive, in terms of assumptions or, for example, incompatibilities with our scientific and ordinary knowledge. I take Bacon's view of the market of ideas very seriously. So I believe that some of the open problems in PI have been solved economically so far, but there is room for huge improvements. This particular market of ideas is not mature yet.

FR: Between 1995 and 2008, you were the founder and editor of the SWIF, the Italian online journal of philosophy, a publication that worked both as a national portal and as an e-publisher for the discipline. Now that the project is concluded, is there any fond or dreadful experiences or any learnt lessons that you might wish to share?

LF: The SWIF was a great project, but in the end it had to be completed and closed because, after more than ten years, it had stopped being innovative. When I started designing it, in the early nineties, I had envisioned a gopher (a distributed system for Internet documents, predating the Web). But when I presented the project to several institutions nobody showed any interest and I met with a lot of skepticism. In the end, I discovered some unused funding that nobody was applying for, got some vital and enlightened support from the University of Bari, and with a small grant I started working on the first few web pages (by then the Web had become the standard). It was a rudimentary website, but one of the first in Italy. Some years later, SWIF even won a national prize by the Sole 24 Ore (the equivalent in Italy of the Financial Times). At some point we were hundreds of volunteers working on tens of projects. The basic idea might be compared today to a mix between Wikipedia and the Stanford Encyclopedia of Philosophy: a way of collecting common knowledge and channelling energies into a free-for-all service, that could rely on the contribution of a thousand drops of user-provided content, and that, by being peer-reviewed, could serve the philosophical community effectively. What became soon clear, however, was that the project required a full-time commitment, and that the lack of funding, of serious technical support, and hence the total dependency on volunteers' time, energy, good will and skills was going to be an increasingly tighter bottleneck for any future growth. Some of the lessons I learnt were negative. People will rather have fixed rules and protocols than have to use their intelligence to take decisions and then be forced to be directly accountable for them. Some academics would rather die than have the courage of disagreeing with their peers and interact critically with each other in public. I remember an academic threatening us to send a legal complaint from her lawyer, if we did not modify a negative review of a text she had published (the

review had been kind, I have to say, and no, we did not change it of course). Another sent me some long and elaborate emails, to illustrate how unjust a reviewer had been towards a collection of essays he had published. When I offered him the opportunity to reply, he declined the invitation as out of the question, but kept bothering us anyway. As editor, you see some of the pettiest and ugliest corners of academia. But then you also encounter wonderful colleagues, ready to volunteer their time, energy and skills for a project, enthusiastically collaborative, or entirely and fully reliable even in the worst moments. And this is the human side of the SWIF that I like to remember. For many years, I used to say that we managed the SWIF as a (very idealised, don't get me wrong) British Island: meritocracy, no favours to friends, responsibility and accountability, no exploitation of younger people, a transparent editorial strategy, peer-reviewing, no position guaranteed (those who failed to deliver were in the end gently asked to leave). I even had a ready text with a long reference to the famous film "The Bridge on the River Kwai", which I used to send to potential volunteers in order to explain the spirit with which we were building the SWIF. For some years, we felt we were making a difference. I'm no longer sure we did, but I certainly learnt a lot from it.

Doxastic synonymy vs. logical equivalence

Say two sentences A and B are doxastically synonymous ($A \sim_d B$) iff it is not possible for someone who understands A and B to believe one of them without believing the other. Consider the following two principles:

> **(Log)** Logically equivalent sentences are co-referential.

> **(Dox)** Doxastically synonymous expressions are co-referential.

(Log) is used as one of the premises in classical variants of the so-called *slingshot arguments* (those are arguments to the effect that all true sentences denote the same object, if sentences denote at all). Recently, Drai (2002: The Slingshot Argument: an Improved Version, *Ratio* (new series), XV(2)) objected to (Log):

> The main objection to this argument is that (Log) is unjustified. Logically equivalent sentences have, by definition, the same truth value in every possible world. But only by begging the question about reference can we claim that they have the same reference in every possible world. The only way to justify [the assumption] that logically equivalent sentences have the same reference, is by presupposing that sentences refer to their truth values, and this presupposition is not independently plausible. (2002: 196)

Drai also put forward a slingshot argument which employs (Dox) instead of (Log) (see "Slingshot arguments: two versions", *The Reasoner*, 3(4)). The reason that Drai gives for preferring (Dox) over (Log) is that (Dox) is supported by the analogy between sentences and names, whereas (Log) is not. Drai, having explained what it means for two sentences to be doxastically synonymous, hasn't really defined how doxastic synonymy of names or other sub-sentential expressions is to be understood, though. There are a few ways these details can be filled in and I won't discuss and compare them all. For instance, we could say that a name α is doxastically synonymous to a name β if and only if it is impossible that someone who understands these names (=grasps their descriptive content) believes that $\alpha \neq \beta$. Now, indeed, it seems plausible that:

> **(SN)** Doxastically synonymous names are co-referential.

Drai argues that (Log) cannot be justified as an extension of a rule applying to names:

> This is because the rule in the old domain must be: logically equivalent expressions have the same reference. But the notion of logical equivalence applies only to sentences and not to sub-sentential expressions such as proper names. That is, it does not apply to expressions in the old domain…it is meaningless when applied to sub-sentential expressions. (2002: 198)

Drai also explicitly opts for the descriptive theory of proper names:

> I assume with Frege two basic theses about the reference of names: 1) names have sense, 2) the sense of a name determines its reference […] It is not my aim in this paper to contribute to the century-long controversy about the sense of names. My aim is to show that a valid version of the slingshot argument can be constructed based on a Fregean conception of names. (2002: 198)

Thus, for the sake of argument, I will assume the descriptive theory of proper names. I do believe, however, that even on the direct reference theory of names, difficulties analogous to those discussed in this paper can be raised against Drai's view.

So, the problem seems to be that we cannot meaningfully claim:

> **(LN)** Logically equivalent names have the same denotation.

Given the descriptive theory of proper names in the background, how does one go about justifying the claim that (SN) is meaningless? I'm not sure. Although attempts at solving philosophical problems by saying that some claims are meaningless does have a venerable tradition, no decisive methodology is available. On the other hand, I'm inclined to say that if one can give a fairly intuitive explication of what is meant when it is said that two names are logically equivalent, and the linguistic intuitions of competent language users aren't deeply offended by this proposal, this shows that logical equivalence claims about names are meaningful.

Let's stimulate our intuitions with the following example. Say we have four proper names n_1, n_2, n_3, n_4 (respectively) associated with the following descriptions:

(N1) $(\iota x)(P(x) \rightarrow Q(x))$

(N2) $(\iota x)(P(x) \wedge \neg Q(x))$

(N3) $(\iota x)(\neg Q(x) \rightarrow \neg P(x))$

(N4) $(\iota x)\neg(P(x) \rightarrow Q(x))$

When asked what the pairs: n_1 and n_3, n_2 and n_4 have in common, a plausible answer seems to be that they are, well, in some sense logically equivalent, because the formulae in the scopes of definite description operators in the definite descriptions associated with the names are logically equivalent.

Hence, the following seems like a sensible explication of the notion of logical equivalence of names:

> **(EN)** Names α and β, associated (respectively) with descriptions $(\iota x)\phi(x)$ and $(\iota x)\psi(x)$ are logically equivalent iff
>
> $$\forall_x(\phi(x) = \psi(x))$$
>
> is logically necessary.

(the notion of logical equivalence can be extended to other sub-sentential expressions).

The notion of logical equivalence of names thus defined is different than the notion of doxastic synonymy—there can be logically equivalent names that are not doxastically synonymous. For instance, we can introduce proper names associated (respectively) with descriptions $(\iota x)(x = a \wedge \phi)$, $(\iota x)(x = a \wedge \psi)$ such that ϕ and ψ are logically equivalent, and nevertheless ϕ is not doxastically synonymous to ψ if ϕ and ψ are so complex that one can understand ϕ and ψ without believing they are equivalent.

The above considerations, however, do not show that either (Log) or (Dox) is in fact plausible—the claim is only that if Drai's justification of (Dox) is compelling, so is a parallel justification of (Log).

Drai's slingshot raises also another interesting question that pertains to reference of singular terms and doxastic synonymy of expression containing them. It will be discussed in detail in "Bogus singular terms and substitution *salva denotatione*" (*The Reasoner*, 3(6)).

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Gödel and the Material Conditional

In the lecture notes for his course "The Introduction to Logic" at the University of Notre Dame (P. Cassou-Nogues, 2009: 'Gödel's Introduction to Logic in 1939', *History and Philosophy of Logic*, 30: 69-90) Gödel introduces an interesting addition to the standard reading of the truth table for the propositional connectives. Thus for example, the truth table for the conjunction 'p and q' may be read: true, iff it is consistent with p and q both being t(rue), and is inconsistent with either being f(alse). The distinction between this and the standard reading comes into play with the material conditional.

Gödel writes:

> ...assume that ...we know 'If p then q', but nothing else ....[I]t may certainly happen that p is false, because [...] 'if p then q' says nothing about the truth or falsehood of p. And in this case where p is false, q may be true as well as false, because the assumption 'If p then q' says nothing about what happens to q if p is false, but only if p is true. So we have both possibilities p false, q true; and, p false, q false ...." (p. 82)

That is to say, it is not that if 'if p then q' is true then if p is f, the conditional is true whether q is t or f; but rather, if the conditional is true then it is consistent with p being f whether q is t or f. Thus the explanation for the truth value assignments given to the material conditional in one direction, is transparently clear. Gödel continues: "But we have also vice versa" (Ibid).

However, the rationale for the truth value assignment to the conditional from its truth table that Gödel chooses to give is the traditional one; namely, that the only lines of the truth table relevant to the truth of the conditional are the two where p is t. And if q is t where p is t, the conditional is true; and if q is f where p is t, the conditional is false. But the traditional approach leaves unexplained why is it then that a conditional with a false antecedent is true.

An answer is forthcoming if we apply Gödel's novel approach in this direction as well. For it is hardly disputable that,

(i) If p is consistent with the denial of 'if p then q',

then p is true. For the denial of 'if p then q', is 'p and not q'.

And (i) is equivalent to

(ii) if p is false then p is inconsistent with the denial of 'if p then q'. That is, if p is false then 'If p then q' is true.

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Divine Liars: The Answer

"The famous paradox of C may well be resolved by noticing that the former is (demonstrably) nonsense and the latter (consequently) true" writes Martin Cooke (*The Reasoner*, 3(3):7). Yes, the paradox indeed *is* so resolved. The paradox in question is the two line puzzle:

C: The sentence C is not true

D: The sentence C is not true

Cooke continues: "But even so one might wonder how C and D could differ so much in what they mean, the natural presumption being that the words of D mean the same, there, as they do in C." The presumption is correct—the words of D mean the same, there, as they do in C. So why do C and D have different meanings? Because the meaning of a sentence is not the sum of the meanings of its parts. Rather the truth value of a sentence is determined by an *algorithm* (below) applied to the parts. The algorithm yields different results for C and D.

"The naming of an object isn't normally the sort of activity that could change its content" (Ibidem). Why can the *naming* of an object change its content? In our case the object is a sentence. It refers to an object (a sentence) by its *name*. The naming of the sentence determines if the sentence does or does not refer to itself. It alters its property of being self-referential. This in turn changes the meaning.

"Let '[4***]' name the sentence-type of the following sentence-token (of modern English): No omniscient being believes that a token of the sentence-type [4***] could be expressing a literal truth during March 2009 AD. . . . its truth would clearly imply its untruth and its untruth its truth." (Ibidem, p.7) But its meaninglessness would imply nothing.

Let us streamline the problem:

Def: 'C*' is the name of the sentence-type of the following sentence-token: "All the sentence-tokens of the sentence-type C* are not true."

The token is meaningless and we can therefore say

"All the sentence-tokens of the sentence-type C* are not true" is not true.

We could have done the same thing with the strengthened Liar:

This sentence is not true $-M$

"This sentence is not true" is not true $-T$

where 'M' means meaningless and 'T' means true. But the problem can be reformulated as a two line puzzle.

C: The sentence C is not true $-M$

D: The sentence C is not true $-T$

which leads us to the conclusion that sentence-token C has a different meaning than the sentence-token D. If we did the same thing with C*, e.g.:

C*: 'No sentence-token of sentence-type C* is true" $-M$

D*: "No sentence-token of sentence-type C* is true" $-T$

D* would cause a contradiction. But we of course cannot do so because C* does not refer to a token.

We have concluded above that "All the sentence-tokens of the sentence-type C* are not true" is not true, and we ought to be able to generalize it to all the tokens of the same type. So we do just that:

G: All the sentence-tokens of the same type as "All the sentence-tokens of the sentence-type C* are not true" are not true.

The sentence-token G has different meaning than the sentence-token H.

H: All the sentence-tokens of the sentence-type C* are not true.

Let us now return to the evaluation "algorithm" mentioned at the beginning. The semantics proposed by Gaifman resembles the semantics of the programming languages (Gaifman 2000: Pointers to Propositions, Circularity, Definition, and Truth, pp. 79-121). "The sentence x is not true" is evaluated as follows:

1) Go to the label x

2) Evaluate the sentence next to it

3) If the sentence is not true then

"The sentence x is not true" is true

else

"The sentence x is not true" is false

We see that if we substitute C for x and we evaluate the sentence token C, the "program" will go into infinite recursion. In this case we assign the value M to C.

We can prove by mathematical induction that the evaluation procedure for C will *not* halt. Whether the procedure halts or not is thus decidable; either it will halt or we prove by induction that it will not. So an algorithm exists that returns either T, F or M.

Let's try to evaluate D. We go to the label C. We evaluate the sentence next to it. It has the value M, i.e. it is not true. Then according to 3), D is true.

1. Go to the label H
2. Evaluate the sentence next to it

When we apply this procedure to H we find that H is not true:

According to Gaifman's semantics if $v(\alpha(a)) = T$ for all α in the range of 'x', then $v((x)\alpha(a)) = T$ (Gaifman 2000: pp. 79-121). It means that we have to evaluate all the sentence-tokens of the same type as H. Assume there are three such tokens: $H1$, $H2$, H. We continue:

3.1) Evaluate the sentence token $H1$.

3.2) Evaluate the sentence token $H2$.

3.3) Evaluate the sentence token H.

No matter how many tokens there are, sooner or later we will run into the token H and we will be in an infinite loop again. Hence we assign M to H.

According to Gaifman, the sentence C *does* have a meaning but it does not express a proposition.

He takes the evaluation procedure to be the meaning of the sentence. The difference is mainly terminological. The practical result is the same.

X.Y. Newberry

§3 News

Choice & Inference

Choice & Inference is a new group blog providing a forum for dialogue and news within the fields of formal epistemology and decision theory, broadly construed. Topics include (but are not limited to) uncertain and ampliative inference, coherence, paradoxes of belief and / or action, belief revision, disagreement and consensus, causal discovery, epistemology of religion, etc. And the formal tools used to pursue questions within these topics include (but are not limited to) game theory and decision theory, formal learning theory, probability theory and statistics, networks and graphs, and formal logic.

Confirmed Choice & Inference contributors include: Alan Hájek, Franz Huber, Gregory Wheeler, Horacio Arló-Costa, Jake Chandler, Jan Sprenger, Jan-Willem Romeijn, Jeffrey Helzner, Jon Williamson, Katie Steele, Kevin Zollman, Luc Bovens, Richard Bradley, Stephan Hartmann, Ted Poston, Tomoji Shogenji, Trent Dougherty, and Vincenzo Crupi. Also, Choice & Inference is run with the support of three external affiliates: (1) Carnegie Mellon University; (2) The Formal Epistemology Project, Katholieke Universiteit Leuven; and (3) The Tilburg Center for Logic and Philosophy of Science, Tilburg University.

The blog is shaping up to be a wonderful resource to those doing formal work related to rationality! Anyone working within the relevant fields who is interested in becoming a contributor to Choice & Inference is welcome to contact either of the blog administrators, Jake Chandler or Jonah Schupbach.

Jonah Schupbach
TiLPS, Tilburg

Models and Fiction, 12–13 March

Recent philosophy of science has seen a growing interest in the practice of scientific modelling. And yet some feel that this literature lacks a comprehensive account of models. A number of authors have begun to look to parallels between models and works of fiction for such an account. The aim of this workshop was to explore these parallels in detail in order to address two main questions: What are models? And how do they represent the world?

The conference began with a welcome address by Barry Smith (Institute of Philosophy) and an overview of the literature by the conference organisers, Roman Frigg (LSE) and Michael Weisberg (Penn State). Frigg ('Why we need fictions to understand models') then argued against the view that models are mathematical structures and presented an alternative account based on Kendall Walton's 'make-believe' theory of fiction. On Frigg's account, the descriptions scientists write down when they model a system prescribe imagining a 'model-system' (or 'imaginary object') which, in turn, represents the system being modelled. Peter Godfrey-Smith (Harvard, 'Models and mongrels') adopts a sim-

ilar account, describing models as 'imagined concrete objects', while aiming to remain non-committal on the nature of these objects.

Adam Toon (Cambridge, 'Models, fiction and imagination') offered an account of modelling which was also based on Walton's theory but which differed from Frigg's. On Toon's account, there are no imaginary objects that satisfy scientists' modelling assumptions; instead, the descriptions scientists write down when they model a system represent that system directly, by prescribing imaginings about it. Arnon Levy (Harvard, 'Idealization, fiction and causal understanding') focussed on the problem of understanding how idealised models, which misrepresent the world, can nevertheless be explanatory. Levy suggested that such models provide causal information in a form that is useful for forming predictions.

Deena Skolnick Weisberg (Rutgers, 'A psychologically realistic account of models as fictions') presented empirical work suggesting that the same cognitive processes underlie reasoning about reality and what is 'true in fiction'. Chris Pincock (Purdue, 'Discerning the truth in fiction') argued that fiction-based accounts of models cannot meet 'the export challenge', that is, they cannot specify how the fictional content of a model is related to its representational content. Martin Thomson-Jones (Oberlin, 'The adventure of missing systems') criticised Frigg and Godfrey-Smith's talk of 'imagined concrete objects' before exploring some alternative accounts of the ontology of models based on realist accounts of fictional entities. In the final talk, Michael Weisberg ('Maths and Fictions') acknowledged the important role played by scientists' 'folk ontology', which leads some to take models to be 'imagined concrete objects'; nevertheless, he argued, models are mathematical, not imagined, objects.

Each day ended with a productive comment and discussion session. In the first, Tim Crane (UCL) distinguished more 'inflationary' positions, such as that proposed by Frigg, from 'deflationary' accounts, such as that put forward by Toon. In the second session, Stacie Friend (Heythrop) suggested that in order to develop a coherent theory of modelling, 'deferral strategies' on the ontology of models must eventually be abandoned, either by providing a realist account of the nature of 'model-systems' or else by adopting an anti-realist, deflationary position.

Adam Toon
History and Philosophy of Science, Cambridge

Evidence, Science and Public Policy, 26–28 March

The second Sydney-Tilburg conference took place 26–28 March 2009 in Sydney, and focused on an interdisciplinary topic: "Evidence, Science and Public Policy". To represent the variety of perspectives on the topic adequately, three speakers with different backgrounds were invited: John Worrall (LSE) from the home discipline of the organizers, philosophy of science, the ecologist and risk analyst Mark Burgman (U/Melbourne), and John Quiggin (U/Queensland) who works on the economics of climate change. Approximately 30 contributed talks in two parallel sessions complemented the program.

A few days before the conference two major shocks occurred: Mark Burgman had to cancel his participation due to illness, and host organizer Mark Colyvan could not be present due to urgent family issues. Despite these potential setbacks, Mark's assistant Rodney Taveira helped the organizers to make final preparations and the conference became a real success. The variety of the participants' backgrounds could have been an obstacle, but it turned out that interdisciplinary communication went smoothly, and we had a lot of exciting discussions. One major focus was on evidence-based medicine, in the line of John Worrall's opening talk. Many talks discussed evidence-based policy in general, with a lot of applications from environmental decision-making in general and the challenge of climate change in particular. Here, philosophical and conceptual issues were dealt with as well as practical, problem-oriented questions. To that end, it was helpful that some speakers did not work in academia, but were affiliated with governmental agencies, and could enrich theoretical discussions with their experiences from practice. Finally, there were a couple of analyses of group decision-making focusing on reaching agreement among a group of decision-makers. It is safe to say that the quality of talks was quite high, and the two keynotes deserved that moniker.

The atmosphere at the conference was very friendly and cheerful, and the setting at the veranda of the Veterinary Science Conference Center and the pleasant weather certainly contributed to its success. Participants spent a lot of time with each other when the official program was over, and quite a few future collaborations were formed. On the evening of 26 March, a delicious conference dinner took place in a Thai restaurant on King Street. The general success of the conference encourages the Sydney Centre for the Foundations of Science and the Tilburg Center for Logic and Philosophy of Science to continue their efforts, and to organize a third conference in Tilburg, in Spring 2010. Finally, we would also like to thank the Australian Centre of Excellence for Risk Analysis (ACERA) and the Applied Environmental Decision Analysis research hub (AEDA)

once more for their generous support of the event.

Jan Sprenger
Tilburg Center for Logic and Philosophy of Science

Computational Linguistic Aspects of Grammatical Inference, 30–31 March

The International Community of Grammatical Inference organizes biennial conferences, called ICGI, in the even years and in the odd years it organizes co-located workshops or tutorials. These events are typically co-located with conferences that fall within the application areas of grammatical inference: in previous occasions machine learning or artificial intelligence conferences were chosen. This year, a workshop, called Computational Linguistic Aspects of Grammatical Inference (CLAGI) was organized by Menno van Zaanen and Colin de la Higuera. This event was co-located with the triennial conference of the European Chapter of the Association Computational linguistics in Athens, Greece.

The CLAGI workshop consisted of eight talks, an invited talk and a panel session. The talks were divided into three sessions. The invited talk was given by Damir Cavar. He gave an overview of work in the field of grammatical inference applied to linguistics. This illustrates the search for the holy grail: a general grammar induction model that learns all aspects of natural languages.

The first session contained three talks on transduction. Jeroen Geertzen presented a novel grammatical inference system that finds regularities in (human) dialogs and uses these regularities to predict future dialog acts. Dana Angluin and Leonor Becerra-Bonache concentrated on a formal description of the language learning task where the focus lies on incorporating semantics. Finally, Jorge Gonzalez and Francisco Casacuberta described their machine translation toolkit that uses a transducer inference system.

The second session was on language models and parsing. Alexander Clark, Remi Eyraud and Amaury Habrard discussed properties of the class of contextual binary feature grammars (which are known to be efficiently learnable) in comparison to the class of natural languages. Next, Herman Stehouwer and Menno van Zaanen illustrated an application of parallel n-gram language models in the context of typographical error correction. This was followed by a presentation by Marie-Hélène Candito, Benoit Crabbé and Djamé Seddah describing experiences with statistical parsing of French. Finally, Franco M. Luque and Gabriel Infante-Lopez investigated the performance of unambiguous non-terminally separated grammars in the context of natural language learning.

The last session on morphology contained one talk. Katya Pertsova analyzed a collection of learners that analyze boolean partitions. These learners are applied to the task of learning morphological paradigms.

Following the talks, Jeroen Geertzen, Alexander Clark, Colin de la Higuera and Menno van Zaanen briefly presented their experiences and ideas on competitions in the areas of computational linguistics and grammatical inference. This lead to a panel discussion with much interaction from the audience on possibilities of future competitions and their impact.

Overall, the workshop contained a wide variety of talks, ranging from technical and theoretical research on learnability of language to descriptions of practical natural language learning experiments. This variety illustrated the wide applicability of grammatical inference, but at the same time the workshop showed that people in the field of computational linguistics are unfamiliar with the field of grammatical inference and vice versa, even though their research is highly relevant to both fields. This workshop should be seen as an initial attempt at bringing these fields closer together.

Menno van Zaanen
ILK, Tilburg

Colin de la Higuera
Laboratoire Hubert Curien, Sait-Etienne (France)

Sparsity in Machine Learning and Statistics, 1–3 April

Sparsity has emerged as one of the most important modelling tools of the past decade. Its popularity is easy to grasp; it is both conceptually simple, and the estimation methods that follow as its consequence have already been implemented for several decades in geophysics, as well as in image estimation, signal processing, statistics and machine learning.

The aim of the workshop on Sparsity in Machine Learning and Statistics, organized by the UCL Centre for Computational Statistics and Machine Learning (CSML) and sponsored by the PASCAL Network of Excellence and the Royal Statistical Society, was not only to highlight research questions that are currently receiving particular attention, but also to draw the common threads from different fields, in particular statistics, signal processing and machine learning. This second aim of the workshop aligns closely with the CSML Centre that is working to promote cross-fertilisation between these fields as well as application of relevant techniques across the sciences.

The concept of sparsity is simple; in whatever family of models we may assume our data was generated

by, the true model can be described by a small number of parameters. Sparsity can therefore be thought of as a mathematical version of Occams razor. It is not hard to understand why sparsity has become so important; with our capacity for collecting larger volumes of data, superficial model complexity must grow. However, implicit in the notion of trying to explain the observed data is the assumption that some simple(r) mechanism for its generation must exist.

For physically unrealistic degrees of simplicity, with some chosen estimation methods, we can in some instances be sure to recover the true sparse model. Unfortunately, in real life, we rarely have such extreme degrees of simplicity or lack of interconnectedness between explanatory variables for which results have been shown. This often leads to overestimating the degree of complicatedness of the model. The answer to this problem seems to be to abandon the simplicity of commonly used methods, for harder optimization problems.

Of great interest are also more intricate notions of sparsity which are being developed to analyse heterogeneous datasets. Here, different data of similar phenomena are obtained, possibly under different observation modalities, and we may try to estimate common sparsity patterns across the data; in machine learning this is known as multitask or multiview learning.

Sparsity as an area of research is transitioning from completely virgin territory to a more established area, gradually following the path of neural networks, or wavelets. The next decade will see considerable developments in this area, and as remarked by a participant, results developed for particular learning or estimation methods, as more general theory will undoubtedly lead to very crude bounds of performance. As our data collection continues to increase sparsity becomes a necessity, and will continue as a fundamental theoretical tool in our understanding of the world we live in.

Sofia Olhede
Statistics, UCL

Massimiliano Pontil
Computer Science, UCL

John Shawe-Taylor
Computer Science, UCL

Calls for Papers

Intuitionistic Modal Logics and Applications: Special issue of *Information and Computation*, deadline 31 May.

Logic and the Foundations of Physics: Special issue of *Studia Logica*, 31 May.

Deconstruction and Science: Special issue of *Derrida Today*, 30 June.

Causality in the Sciences

A volume of papers on causality across the sciences
Deadline 1 July

Is Logic Universal?: Special issue of *Logica Universalis*, 31 August.

Logic and Social Interaction: Special issue of *Synthese KRA*, 1 September.

Experimental Philosophy: Forthcoming issue of *The Monist*, deadline April 2011.

§4
What's Hot in ...

We are looking for columnists willing to write pieces of 100-1000 words on what's hot in particular areas of research related to reasoning, inference or method, broadly construed (e.g., Bayesian statistical inference, legal reasoning, scientific methodology). Columns should alert readers to one or two topics in the particular area that are hot that month (featuring in blog discussion, new publications, conferences etc.). If you wish to write a "What's hot in ...?" column, either on a monthly or a one-off basis, just send an email to features@thereasoner.org with a sample first column.

Formal Epistemology

Handy tips and helpful advice from the Formal Philosophy Seminar series at the Formal Epistemology Project, University of Leuven.

Adam Rieger's *Indicative Conditionals* defended a material conditional account of indicative conditionals via an elaboration on the assertability conditions account that side-steps some problems for Jackson's view. The suggestion is that speakers' confusions between narrow and wide scope of operators plays as large a role in explaining the problem cases as do confusions between truth and assertability conditions.

Ofra Magidor's (co-authored with John Hawthorn) *Assertion, Context, and Epistemic Accessibility* argued that Stalnaker's metasemantic framework has problems when it interacts with extra-theoretical facts about epistemic access.

Paul Egre's Soritical Series and Fisher Series led a radical argument for unifying vagueness and ambiguity, two categories traditionally kept distinct. The key is to examine perceptual ambiguity, as opposed to the purely lexical cases.

Relatedly, I have just finished teaching my half of a graduate class on Formal Epistemology (Richard Dietz is taking part-2). Fun was had by all! I took the

intrepid grads through Vincent F. Hendricks's *Mainstream and Formal Epistemology*. Philosophers among you will recall that, back when you began philosophy, you were told that epistemology was about knowledge. Then, somehow, it stopped being about knowledge, and was suddenly about our concept of knowledge ... This happens everywhere in philosophy (consider consciousness, and mental representation). It is a mark of his methodological sobriety that Vincent goes to the lengths in his book that he does in order to keep epistemic and doxastic phenomena on the one hand, and our concepts of such phenomena on the other, distinct.

Next month, Hannes Leitgeib, Wiebe van der Hoek, Richard Bradley, and Luc Bovens.

Click for the pics of the FPS seminars and for the full FPS program.

Sebastian Sequoiah-Grayson
Formal Epistemology Project, Leuven

Logic and Rational Interaction

The Logic and Rational Interaction (LORI) website is intended at gathering information for all researchers working at the intersection of logic and the theory of rational interaction. In this monthly column I summarize for the readers of *The Reasoner* some of the key items that appeared on the website. You can read more about each of them on `http://loriweb.org`.

For almost two years, the Danish police kept an eye on Vincent Hendricks. Indeed, he has been teaching logic to officers and investigators, and has even put it to use to track and catch suspects! You can read more about this in a short interview he gave to LORI.

Some interesting new publications that have been announced on the website this month: a new book by Christian List and Philip Petit, a working paper on learning theory and dynamic epistemic logic by Cédric Dégremont, Nina Gierasimczuk, and a summary of a recent work by Gaelle Fontaine and Johan van Benthem on (dynamic epistemic) mu-calculus. On the functionality side, let me point out that you can now register to the LORI newsletter, to receive by periodical email summaries of the new entries on the website. Simply visit `http://loriweb.org` and fill-in your email-address!

Logic and Rational Interaction is a collaborative venture. We welcome any contributions relevant to the theme, and are also constantly looking for new collaborators. So, if you would like to joint the team, of if you have information to share with the broader research community, please do not hesitate to contact our web manager, Rasmus Rendsvig.

Olivier Roy
Philosophy, Groningen

§5
Introducing ...

In this section we introduce a selection of key terms, texts and authors connected with reasoning. Entries will be collected in a volume *Key Terms in Logic*, to be published by Continuum. If you would like to contribute, please click here for more information. If you have feedback concerning any of the items printed here, please email features@thereasoner.org with your comments.

Theory of Argumentation

Argumentation theory is the study of argument, particularly those aspects which resist deductive formalization. It is often taken to coincide with or subsume informal logic and critical thinking. Aristotle's Organon, famous as the first study of formal logic, actually pays greater attention to informal reasoning. Notably, Aristotle introduces 'enthymemes', latterly over-simplified as syllogisms with missing premisses, to characterize plausible non-deductive inferences. Logic retained this broader scope into the early twentieth century, until the increasingly successful mathematical approach eclipsed all others.

The modern revival of argumentation theory began with two works: Chaim Perelman and Lucie Olbrechts-Tyteca's *La Nouvelle Rhétorique* (1958: Paris) and Stephen Toulmin's *The Uses Of Argument* (1958: Cambridge). Both emphasize jurisprudential over mathematical approaches to reasoning. Toulmin's major contribution was the 'layout' which analyzes arguments into six components. The data (or grounds) provide qualified support for the claim in accordance with a warrant, which may in turn be supported by backing or admit exceptions or rebuttals.

Toulmin's influence was greatest outside philosophy, and recent work is strongly interdisciplinary, encompassing communication theory, artificial intelligence, and law. For instance, 'pragma-dialectics', the influential programme of Amsterdam communication theorists Frans van Eemeren and Rob Grootendorst, advocates a normative ideal for critical discussion. This is characterized by 'Ten Commandments': rules claimed to increase the likelihood of reaching a reasonable outcome in a disagreement. Conversely, some artificial intelligence research connects argumentation to formal accounts of defeasible reasoning, such as non-monotonic

logic.

Much recent attention has focused on 'argumentation schemes': stereotypical patterns of plausible reasoning. These may be seen as reinventing Aristotle's 'topoi', which linked the premisses to the conclusion in his enthymemes. Argumentation schemes are important to the long-standing problem of characterizing informal fallacies. Fallacies may be understood as pathological instances of plausible but not invariably sound schemes. This programme has been developed at length by the prolific Canadian logician Douglas Walton.

Andrew Aberdein
Florida Institute of Technology

Brouwer's Programme

Brouwer's Programme, which he called 'Intuitionism', aims to provide a philosophical foundation for pure mathematics. The idea is that mathematics is first of all the activity of making exact constructions in the mind. The material out of which these constructions are made is abstracted from the intuition of the flow of time in consciousness. Accordingly, there is no mathematical reality outside the mind, and with every new construction grows not only our mathematical knowledge but also the mathematical universe itself. Brouwer sharply distinguished Intuitionism from psychology, logic, and the study of languages and formal systems, which he all considered to be forms of applied mathematics.

As it turns out, various parts of classical mathematics cannot be reconstructed intuitionistically. Conversely, Brouwer introduced objects and principles of reasoning about them that are not acceptable in classical mathematics. For example, Intuitionism rejects Cantorian set theory and the universal validity of the Principle of the Excluded Middle, but introduces choice sequences. Brouwer used these to develop a constructive theory of the continuum that does not let it fall apart into atoms, as a set-theoretical analysis does.

Mark van Atten
IHPST, Paris

§6 Events

May

Foundations of Mathematics: Philosophy and Foundations of Mathematics—Epistemological and Ontological Aspects, SCAS, Uppsala, 5–8 May.

Logic of John Duns Scotus: 44th International Congress on Medieval Studies at Western Michigan University, 7–10 May.

Metaphysical Indeterminacy, the State of the Art: University of Leeds, 9 May.

AAMAS: The Eighth International Joint Conference on Autonomous Agents and Multi-Agent Systems, Budapest, 10–15 May.

Understanding Human Nature: University of Antwerp, 11 May.

Conditional Logic: University of Düsseldorf, 11 May.

ACL2: International Workshop on the ACL2 Theorem Prover and Its Applications, Northeastern University, Boston, 11–12 May.

MSDM: Multi-agent Sequential Decision-Making in Uncertain Domains, AAMAS, Budapest, 11 or 12 May.

Philosopher's Rally: University of Twente campus, Enschede, the Netherlands, 12–13 May.

PhiLang: International Conference on Philosophy of Language and Linguistics, Lódź, Poland, 14–15 May.

Carnap Colloquium: Carnap's Ideal of Explication: Logic, Metalogic, and Wissenschaftslogik, Paris, 14–16 May.

Philosophy and Cognitive Science: The XIXth edition of the Inter-University Workshop, Zaragoza, 18–19 May.

Benelearn: 18th Annual Belgian-Dutch Conference on Machine Learning, Tilburg University, 18–19 May.

UR: Uncertain Reasoning, Special Track of FLAIRS, Island, Florida, USA, 19–21 May.

Philosophy of Biology: Madison, 21–23 May.

Evidence in Context: Fifth annual conference of the Graduate Student Society at the Institute for the History and Philosophy of Science and Technology, University of Toronto, 23 May.

AI: The twenty-second Canadian Conference on Artificial Intelligence, Kelowna, British Columbia, 25–27 May.

Science and Values—The Politicisation of Science: Center for Interdisciplinary Research (ZiF), Bielefeld, Germany, 25–30 May.

CSHPS: The Canadian Society for History and Philosophy of Science, annual conference as part of the Congress of the Humanities and Social Sciences (CFHSS), Carleton University, Ottawa, 26–28 May.

Causality in Statistical Investigation: Royal Statistical Society, London, 27 May.

Preference Change Workshop: London School of Economics, 28–30 May.

Second Formal Epistemology Festival: Causal Decision Theory and Scoring Rules, University of Michigan, 29–31 May.

June

IRMLeS: Inductive Reasoning and Machine Learning on the Semantic Web, Heraklion, Crete, 1 June.

Argument Cultures: Ontario Society for the Study of Argumentation, Windsor, Canada, 3–6 June.
O-Bayes: International Workshop on Objective Bayes Methodology, Wharton School of the University of Pennsylvania, Philadelphia, PA, 5–9 June.
MODGRAPH: Probabilistic graphical models for integration of complex data and discovery of causal models in biology, Nantes, France, 8 June.
Philosophy of Probability II: Graduate Conference, Centre for Philosophy of Natural and Social Science, London School of Economics, 8–9 June.
CNL: Controlled Natural Languages, Marettimo Island, Sicily, 8–10 June.
Groups and Models: Cherlin Bayrami, Bilgi University, Istanbul, Turkey, 8–12 June.
Formal methods in the Epistemology of Religion: KULeuven (Leuven, Belgium), 10–12 June.
Toward a Science of Consciousness: Hong Kong, 11–14 June.
Vagueness: Predication and Truth: Workshop on Vagueness organised by the Vagueness Research Group, University of Navarra, 12–13 June.
Society for Philosophy and Psychology: Indiana University, Bloomington, 12–14 June.
NA-CAP: Networks and Their Philosophical Implications, Indiana University in Bloomington, 14–16 June.
NAFIPS: 28th North American Fuzzy Information Processing Society Annual Conference, University of Cincinnati, Cincinnati, Ohio, 14–17 June.
ICML: The 26th International Conference On Machine Learning, Montreal, Canada, 14–18 June.
SPSP: Society for Philosophy of Science in Practice, University of Minnesota, Minneapolis, 18–20 June.
Formal Epistemology Workshop: Carnegie Mellon University, 18–21 June.
UAI: The 25th Conference on Uncertainty in Artificial Intelligence, Montreal, Canada, 18–21 June.
Non-Classical Mathematics: Hejnice, Czech Republic, 18–22 June.
Pragmatism & Science Conference: Center for Inquiry, Amherst, NY, 19–20 June.
PNSE: International Workshop on Petri Nets and Software Engineering, Paris, 22–23 June.
WoLLIC: 16th Workshop on Logic, Language, Information and Computation, Tokyo, Japan, 21–24 June.
LOGICA: The 23rd in the series of annual international symposia devoted to logic, Hejnice (northern Bohemia, 22-26 June.
Consciousness and the Self: Department of Philosophy, University of Liverpool, 25 June.
Metaphysics of Physics: Department of Philosophy, University of Birmingham, 25 June.

Multiplicity and Unification in Statistics and Probability

University of Kent, Canterbury, UK, 25–26 June

Annual Conference: Society for Applied Philosophy, University of Leeds, 26–28 June.
ACM SIGKDD International Workshop: Knowledge Discovery from Uncertain Data, Paris, France, 28 June.

July

Two Streams in the Philosophy of Mathematics: Rival Conceptions of Mathematical Proof, University of Hertfordshire, Hatfield, UK, 1–3 July.
EDM: Educational Data Mining, Cordoba, Spain, 1–3 July.
ECSQARU: 10th European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty, Verona (Italy), 1–3 July.
E-CAP: Computing and Philosophy, Universitat Autònoma de Barcelona, 2–4 July.
Metaphysics of Science: University of Melbourne, 2–5 July.
Proof Theory and Constructivism: Leeds, 3–16 July.
Set Theory Meeting: in Honour of Ronald Jensen, Mathematical Research and Conference Center, Bedlewo, Poland, 5–10 July.
CALCULEMUS: 16th Symposium on the Integration of Symbolic Computation and Mechanised Reasoning, Ontario, Canada, 6–7 July.
FTP: International Workshop on First-Order Theorem, Oslo, Norway, 6–7 July.
TARK: Twelfth Conference on Theoretical Aspects of Rationality and Knowledge, Stanford University, 6–8 July.
Information Fusion: 12th International Conference, Grand Hyatt, Seattle Washington, 6–9 July.
TABLEAUX: Automated Reasoning with Analytic Tableaux and Related Methods Oslo, Norway, 6–10 July.
SPT: Converging Technologies, Changing Societies, 16th International Conference of the Society for Philosophy and Technology, University of Twente, Enschede, The Netherlands, 8–10 July.
IC-EpsMsO: 3rd International Conference on Experiments / Process / System, Modelling / Simulation / Optimization, Athens, Greece, 8–11 July.
Interdisciplinary Social Science: Athens, 8–11 July.
ARCOE: Automated Reasoning about Context and Ontology Evolution, Pasadena, 11-12 July.
Aim of Belief: Centre for the Study of Mind in Nature, University of Oslo, 11–13 June.
IJCAI: 21st International Joint Conference on Artificial Intelligence, Pasadena, CA, 11–17 July.
ISHPSSB: International Society for the History, Philosophy, and Social Studies of Biology, Emmanuel College, St. Lucia, Brisbane, Australia, 12–16 July.
Logic and Heresy in the Middle Ages: Leeds Medieval Congress, 13–16 July.

DMIN: International Conference on Data Mining, Las Vegas, 13–16 July.
ICAI: International Conference on Artificial Intelligence, Las Vegas, 13–16 July.
ICLP: 25th International Conference on Logic Programming, Pasadena, California, 14–17 July.
ISIPTA: 6th International Symposium on Imprecise Probability: Theories and Applications, Durham University, 14–18 July.
DGL: Third Workshop in Decisions, Games & Logic, HEC Lausanne, Switzerland, 15–17 June.
ISSCSS: First Graduate International Summer School in Cognitive Sciences and Semantics, University of Latvia, Riga, 16-26 July.
AIME: 12th Conference on Artificial Intelligence in Medicine, Verona, Italy, 18–22 August.
ViC: Vagueness in Communication, Bordeaux, France, 20–24 July.
IWSM24: 24th International Workshop on Statistical Modelling, Cornell University in Ithaca, NY, 20–24 July.
LMSC: Workshop Logical Methods for Social Concepts, Bordeaux, France, 20–31 July.
ICCBR: Eighth International Conference on Case-Based Reasoning, Seattle, Washington, 20–23 July.
ESSLLI: 21st European Summer School in Logic, Language and Information, Bordeaux, France, 20–31 July.
Buffalo Ontology Week: A series of events relating to ontology, and the first International Conference on Biomedical Ontology, Buffalo, 20–27 July.
Case-Based Reasoning in the Health Sciences: Seattle, Washington, 21 July.
History of Science and Technology: XXIII International Congress of History of Science and Technology: Ideas and Instruments in Social Context, Budapest, Hungary, 28 July–2 August.
Logic Colloquium: Sofia, 31 July–5 August.

August

CADE-22: 22nd International Conference on Automated Deduction, McGill University, Montreal, 2–7 August.
Logic and Mathematics: University of York, 3–7 August.
Science in Society: University of Cambridge, United Kingdom, 5–7 August.
Meaning, Understanding and Knowledge: 5th International Symposium of Cognition, Logic and Communication, Riga, Latvia, 7–9 August.
LICS: Logic in Computer Science, Los Angeles, 9–11 August.
FSKD: 6th International Conference on Fuzzy Systems and Knowledge Discovery, Tianjin, China, 14–16 August.
ICNC: The 5th International Conference on Natural Computation, Tianjin, China, 14–16 August.
ASAI: X Argentine Symposium on Artificial Intelligence, Mar del Plata, Argentina, 24–25 August.
ICSO: Issues in Contemporary Semantics and Ontology, Buenos Aires, 26–28 August.
LGS6: Logic, Game Theory, and Social Choice 6, Tsukuba Center for Institutes, Japan, 26–29 August.
PASR: Philosophical Aspects of Symbolic Reasoning in Early Modern Science and Mathematics, Ghent, Belgium, 27–29 August.
EANN: Artificial Neural Networks in Engineering, University of East London, 27–29 August.
Practice-based Philosophy of Logic and Mathematics: ILLC, Amsterdam, 31 August–2 September.

September

Foundations of Uncertainty: Probability and Its Rivals, Villa Lanna, Prague, Czech Republic, 1–4 September.
Trends in Logic VII: Trends in the Philosophy of Mathematics, Goethe-University Frankfurt, 1–4 September.
SOPHA: Triannual congress of the SoPhA, the Société de Philosophie Analytique, University of Geneva , 2–5 September.
Naturalism and the Mind: Kazimierz Dolny, Poland, 4–8 September.
UC: 8th International Conference on Unconventional Computation, Ponta Delgada, Portugal, 7-11 September.
CLIMA: 10th International Workshop on Computational Logic in Multi-Agent Systems, Hamburg, Germany, 9–10 September.

Mechanisms and Causality in the Sciences
University of Kent, Canterbury, UK, 9–11 September

Phloxshop II: Humboldt-Universität, Berlin, 9–11 September.
MATES: Seventh German Conference on Multi-Agent System Technologies, Hamburg, Germany, 9–11 September.
MoS: Grand Finale Conference of the Metaphysics of Science AHRC Project, Nottingham, 12–14 September.
The New Ontology of the Mental Causation Debate: Old Shire Hall, Durham University, 14–16 September.
ISMIS: The Eighteenth International Symposium on Methodologies for Intelligent Systems, University of Economics, Prague, Czech Republic, 14–17 September.
LPNMR: 10th International Conference on Logic Programming and Nonmonotonic Reasoning, Potsdam, Germany, 14–18 September.
KI: 32nd Annual Conference on Artificial Intelligence, Paderborn, Germany, 15–18 September.
FroCoS: Frontiers of Combining Systems, Trento, Italy, 16–18 September.

PROGIC

4th Workshop on Combining Probability and Logic,
special focus: new approaches to
rationality in decision making,
Groningen, The Netherlands, 17–18 September

LOGIC, LANGUAGE, MATHEMATICS: A Philosophy Conference in Memory of Imre Ruzsa, Budapest, 17–19 September.

EVOLUTION, COOPERATION AND RATIONALITY: Bristol, 18–20 September.

ICAPS: 19th International Conference on Automated Planning and Scheduling, Thessaloniki, Greece, 19–23 September.

INTERNATIONAL DARWIN CONFERENCE: Universitys Norcroft Centre, University of Bradford, 24–26 Semptember.

PASR: Philosophical Aspects of Symbolic Reasoning in Early Modern Science and Mathematics, University of Ghent, Belgium, 28–29 August.

KES: Knowledge-Based and Intelligent Information & Engineering Systems, Santiago, Chile, 28–30 September.

ASCS: The 9th conference of the Australasian Society for Cognitive Science, Macquarie University, Sydney, 30 September–2 October.

OCTOBER

JOINT ATTENTION: Developments in Philosophy of Mind, Developmental and Comparative Psychology, and Cognitive Science, Bentley University, Greater Boston, 1–3 October.

KMIS: International Conference on Knowledge Management and Information Sharing, Madeira, Portugal, 6–8 October.

THE HUGH MACCOLL CENTENARY CONFERENCE: Boulogne sur Mer, 9–10 October.

EPIA: 14th Portuguese Conference on Artificial Intelligence, Universidade de Aveiro, Portugal, 12–15 October.

CASE STUDIES OF BAYESIAN STATISTICS AND MACHINE LEARNING: Carnegie Mellon University, Pittsburgh, PA, 16–17 October.

BREAKING DOWN BARRIERS: Blackwell Compass Interdisciplinary Virtual Conference, 19–30 October.

EPSA: 2nd Conference of the European Philosophy of Science Association, 21–24 October.

RR 2009: Third International Conference on Web Reasoning and Rule Systems, 25–26 October.

DARWIN CONFERENCE: Chicago, Illinois, 29–31 October.

NOVEMBER

ACML: 1st Asian Conference on Machine Learning, Nanjing, China, 2–4 November.

AAAI: Fall Symposium on Complex Adaptive Systems, Arlington, VA, 5–7 November.

AICI: The 2009 International Conference on Artificial Intelligence and Computational Intelligence, Shanghai, China, 7–8 November.

EPISTEMOLOGY, CONTEXT, AND FORMALISM: Université Nancy 2, France, 12–14 November.

SPS: Science and Decision, Third Biennial Congress of the Societe de Philosophie des Sciences, Paris, 12–14 November.

M4M-6: 6th Workshop on Methods for Modalities, Copenhagen, Denmark, 12–14 November.

VI CONFERENCE: Spanish Society for Logic, Methodology and Philosophy of Science, Valencia, Spain, 18–21 November.

LENLS: Logic and Engineering of Natural Language Semantics,Campus Innovation Center Tokyo, Minato-ku, Tokyo, 19–20.

ISKE: The 4th International Conference on Intelligent Systems & Knowledge Engineering, Hasselt, Belgium, 27–28 November.

DECEMBER

ICDM: The 9th IEEE International Conference on Data Mining, Miami, 6–9 December.

INTERPRETATION AND SENSE-MAKING: University of Rouen, France, 9–11 December.

MBR: Abduction, Logic, and Computational Discovery, Campinas, Brazil, 17–19 December.

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JOBS

POST-DOC POSITION: Behavioural Health and Technology, University of Viriginia, Department of Psychiatry and Neurobehavioral Sciences, position open until filled.

TWO VISITING POSITIONS: Department of Philosophy at Grand Valley State University in Allendale, Michigan, review of applications starts 1 May.

ASSISTANT PROFESSOR: Algebra & Logica group, Nijmegen, The Netherlands, review of application starts 1 May.

POST-DOC POSITION: in philosophy, sociology and history of science, Henri Poincar Archives, Nancy, France, 1 May.

2 LECTURERS IN PHILOSOPHY: Department of Philosophy, University of Leeds, 1 May.

POST-DOC POSITION: in the project "Cognitive Origins of Vagueness", Institut Jean-Nicod, Paris, 13 May.

2 POST-DOC POSITIONS: CAUSAPROBA project, IHPST, Paris, 14 May.

POST-DOC POSITIONS: Instituto de Investigaciones Filosficas, UNAM, Mexico, 14 May.

Post-doc position: in the research project "Tarski's Revolution: A New History—Semantics and Axiomatics from Bolzano to Tarski against the background of the Classical Model of Science", Faculty of Philosophy, University Amsterdam, 1 June.

Visiting Fellowships: Joseph L. Rotman Institute of Science and Values, University of Western Ontario, 1 July.

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Courses and Studentships

Courses

HPSM: MA in the History and Philosophy of Science and Medicine, Durham University.

Master Programme: Philosophy of Science, Technology and Society, Enschede, the Netherlands.

MSc in Mathematical Logic and the Theory of Computation: Mathematics, University of Manchester.

> MA in Reasoning
>
> An interdisciplinary programme at the University of Kent, Canterbury, UK. Core modules on logical, causal, probabilistic, scientific, mathematical and machine reasoning and further modules from Philosophy, Psychology, Computing, Statistics, Social Policy and Law.

MSc in Cognitive & Decision Sciences: Psychology, University College London.

Master of Science: Logic, Amsterdam.

Summer Institute on Argumentation: University of Windsor, Canada, contact H.V. Hansen or C.W. Tindale, 25 May–6 June.

Summer School in Logic and Formal Epistemology: Canergie Mellon University, 8–26 June.

NN: Summer School in Neural Networks in Classification, Regression and Data Mining, Porto, Portugal, 6–10 July.

ACAI: Advanced Course in Artificial Intelligence, School of Computing and Mathematics, University of Ulster, Northern Ireland, 23–29 August.

Fourth Cologne Summer School: Reliabilism and Social Epistemology: Problems and Prospects, Cologne, 24–28 August.

Studentships

PhD Scholarship in Logic: University of Groningen, The Netherlands, deadline 1 May.

PhD Position in cognitive science: Department of Philosophy in Lund, Sweden, 13 May.

3 PhD fellowships: Department of Economics (IRES) and the Hoover Chair in Economic and Social Ethics, Louvain-la-Neuve, 15 May.

PhD Position: Project "Context and Communication", Instituto de Filosofia da Linguagem, Universidade nova de Lisboa, Portugal, 20 May.

PhD Studentship: 3-year AHRC studentship in the Foundations of Logical Consequence project, University of St Andrews, until filled.