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EDITORIAL

It is a pleasure to open this issue of *The Reasoner*. The introductory material will be mostly devoted to history of logic. I am grateful to the editors for allowing me to handle this topic, and to Professor Grattan-Guinness for accepting to be interviewed for

the purpose. History of logic stands in an ambiguous position among logical studies. It would be unfair to complain about a lack of interest towards historical studies among logicians however. I think history of logic (and more generally intellectual history, be it history of philosophy, of science, etc.) is generally well appreciated and commonly read by logicians (and more generally by philosophers and scientists). The problem is rather the confusions and prejudices against what it is, how it is written, and what it is for. I would like here to highlight briefly two chief concerns that the historian of logic usually faces in his practice and that often lead to tangled misunderstandings.

First, historians of logic do not write history for logicians, neither do historians of science and philosophy write for scientists and philosophers specifically. This point has a practical importance. Indeed, we are accustomed to attend or read mathematical or logical papers, courses or talks that are difficult and boring, but we often expect from a historical work to be accessible and pleasant. Though useful and interesting for logicians, history of logic is not designed for that purpose. It is a sub-discipline in its own right and thus is first aimed at reaching its own scientific purpose which is to understand the development of logic. The historian of logic must have the right to be boring as much as the logician himself could sometimes be.

Second, history of logic is not meant to work on modern reconstructions of old theories. This is an important point that is commonly the source of confusion when it comes to writing and reading history of logic. Of course, many authors do rewrite past results from a modern view. There is no harm in that as long as one does not pretend that it describes how things happened at first. As such, modern rewriting doesn't reflect the historical development of logic, but just gives you a sort of genealogical tree of modern ideas. A well-known example to illustrate this distinction is to look at Russell's early logical investigations. If you read Russell and search for past work that looks as if it anticipated him, you may mention Frege. But if you look at the genesis of Russell's work, you will quickly observe that he discovered Frege late and that he was much more influenced by Peano. The first reading makes Frege a step towards Russell, but the second reading shows that Frege didn't open the way to Russell. In historical writing, there should be no steps; just moments.

In the following interview, Professor Ivor Grattan-Guinness addresses some of the issues mentioned above and surveys the state of history of logic today. It is certainly needless to introduce Professor Grattan-Guinness to the readers of *The Reasoner*, so I will content myself to remind our Reasoners that he is currently Emeritus Professor of the History of Mathematics and Logic at Middlesex University, England.

AMIROUCHE MOKTEFI
IRIST, Université de Strasbourg
LHSP AHP, Université de Lorraine/CNRS

Interview with Ivor Grattan-Guinness

Amirouche Moktefi: Thank you for accepting my invitation. Can you first tell us how you got interested in history of logic?

Ivor Grattan-Guinness: I did a mathematics degree and disliked it—not the theories but the way that they were taught, with motivations rarely given. We just learned these theories on faith, as worth knowing. I thought there must be other ways of teaching and learning mathematics, perhaps using history. In the mid 1960s I took a master's degree in Karl Popper's department in the London School of Economics. Half of the course was what they called correctly 'the Popperian brainwash' about knowledge being guesswork; the other half comprised courses on mathematical logic and on the philosophy of mathematics.

Popper was good at historiography. One of the main philosophical features that I detected in the histories of both mathematics and logic was the distinction that I now make between the *history* of an old theory and its *heritage*. The history of, say, Euclid's *Elements* is concerned with what we think Euclid was trying to do at the time when he produced his work. Its heritage is a completely different question, about how later people, including us, used or adapted Euclid's mathematics for their own purposes. If you look at Euclid historically he is doing arithmetic and geometry. But his heritage includes a major role in the development of algebra, for the Arabic mathematicians seem to have used him as one of their main sources. Indeed you can rewrite just about everything in Euclid in terms of algebra; but it does not mean that Euclid *himself* was thinking algebraically. On the contrary, he did nothing of the kind.
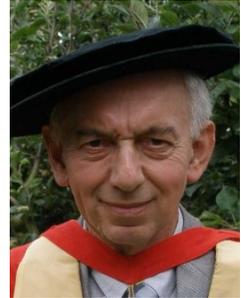
Many people in the history of mathematics and logic do not understand this distinction; but it is ubiquitous, and so deserves emphasis. Both categories involve legitimate uses of old theories, but they address different purposes. It arises prominently in the fact that many mathematicians despise historical work altogether, thinking that historians are completely mistaken in what they are doing. I have been so criticized several times. But almost always it is on the ground of people muddling up history with heritage. The question of what counts as history and what does not is a quite big issue in historiography of mathematics particularly, and in logic too; it is a much more prominent distinction than you get in other fields. In the history of logic, I found this confusion quite common too. For instance, if you are working on Peirce, you will find him interested in aspects of set theory; but it plays no role in his logic, and so it is mistaken to rewrite his logic in terms of set theory. That is a heritage approach, not historical.

AM: What about philosophy of logic?

IGG: A major philosophical interest for me, guided by both history and heritage, is what logicians thought, and think, logical knowledge was or is. I have actually been working on this question recently. It is very difficult. If you look at logic textbooks,

what do they say logical knowledge is? They do not say very much. I think it is not a very satisfactory situation when logicians do not seem to want to explain which part of logic is logical and which part is not logical. We use logic in applications all the time, be they in language, law, mathematics, writing piano sonatas, etc., but we do not bother to say what part is coming from logic and which part is coming from outside. If you read most textbooks on logic and ask yourself which of all this is logic and which is not, it is a very unclear situation, and people do not seem willing to discuss it at all.

For instance, if you look at rules of substitution, are they a part of logic or something alongside logic? Nothing is said about this! I think you can argue that it is a logical rule of inference though not a formal one. Maybe that is wrong, but there should be discussion about these things. Russell is perceptive here; he had no rules at all in *Principia mathematica*, and apologized later, when he called them 'non-formal rules of inference'. This is a nice name; why is it not common parlance among logicians?

I prefer some older views on logic to more modern ones, especially the emphasis on logic as forms of reasoning rather than the matter. I think logic is basically concerned about propositions, connectives, quantifiers, inference and assertion (which is particularly badly neglected). To develop a characterization I am using some ideas from phenomenology. Logical knowledge is what we call in phenomenology *momental*. Take a book, and regard it as a multiplicity. It has a weight, it has a price, for example. But there is no price in isolation, it has to be the price *of* something; similarly we have the weight *of* something. Phenomenology makes a great deal of play with this distinction in many contexts. For instance, in logic itself the compound proposition "*P* And *Q*", is a multiplicity: part of it is *P*, part is *Q* but the "And" is a moment; you do not have an "And" by itself, you have an "And" between *P* and *Q*. So it belongs to "*P* And *Q*" in a different way from how *P* and *Q* belong to it. And I think that is being "logical". Logic is always the logic of something else that is not logic, apart of course when you refer logic to itself in metalogic.

But there is such a tangle: logic, metalogic, model theory, meta-mathematics, theories of collections (of which set theory is only one), and definitions theory (itself a seriously neglected topic). Sorting them all out is very hard.

AM: You just mentioned set theory, which is often given a prominent role in the development of modern logic and the foundations of mathematics...

IGG: I do not regard set theory as part of logic although deeply influenced by it. I think the place of set theory in both logic and mathematics is overrated. There are a lot of places where set theory is not good enough for mathematical purposes, because of its insistence on *single* membership; in many contexts you need multisets, which allows multiple membership. I do not understand why multiset theory is not routinely considered in logic and the foundations of mathematics. When set theory rose in prestige from the late 1890s, a kind of bible preaching grew up, in favour of set theory as the fundament of mathematics (I paraphrase Felix Hausdorff—who despised logic!). One consequence is that nobody built upon a long paper on finite multisets by the English mathematician A.B. Kempe published in 1886 by the Royal Society. It only impacted on Peirce, who had used multisets in his logic though not clearly; but even he did not modify his logic in any substantial way. The near absence of multisets is to me a mysterious question in both the history of logic and mathematics and their contemporary

state.

Another major feature of both the history of mathematics and the history of logic is the relationships between the two disciplines. One might assume that the importance of proof in mathematics would make logic a guide, philosopher and friend to it. However, the history is much closer to dislike, disdain and even divorce. Euclid applies again: organized mathematical knowledge, detailed proofs (that is within his conception of rigour)—but of the attendant logic not a word is said.

The same near-silence applied in later periods too. Boole's algebra of logic was just a curiosity to his mathematical contemporaries. The increased attention to rigour from around 1900 led to the metamathematics of Hilbert; but even his publicity and reputation did not have much impact upon mathematics even in his own country apart from the talented group around him. Peano had quite a gang at Turin, but most other Italians passed it by. *Principia Mathematica* was pooh-poohed by mathematicians who, in their ignorance, thought that there was no mathematics in it. Gödel's 1931 theorems did not enter the consciousness of mathematicians in general for 25 years, and moreover its chief publicist was neither a mathematician nor a logician. The French despised logic to the extent of blocking proposed theses in it; so when they had a star, Jacques Herbrand, they left him to publish his thesis in Poland. Now there is a country where logic did remarkably well from the late 1910s onwards, and moreover they also developed a powerful group of mathematicians, many of whom made much use of set theory. So it is not surprising that they set up a joint journal, *Fundamenta mathematicae*, in the early 1920s. But that was the end of the good news: very few logic papers appeared in it, and within a decade the logicians had broken away to form their own journal.

The importation of mathematical logic into the United States of America occurred around 1900, with two main sources. One was the Chicago mathematician E.H. Moore, who used Peano's logic to articulate his 'general analysis'. This interest in logic passed through a sequence of doctoral students: Veblen, then Church, then Rosser and Kleene. Model theory also profited from this initiative, and for some time even became rather an American speciality. The other source arose from Peirce informing the Harvard philosopher Royce about multi-sets in the 1900s. This drew Royce to formal logic where he supervised theses by Sheffer, Lewis, Wiener and Eaton. Even there logic developed rather in isolation from mathematics, so that in the mid 1930s another Royce student, the philosopher Ducasse, initiated the founding of the Association for Symbolic Logic and its *Journal*, of which Church was the leading editor.

AM: You said earlier that the state of historical studies in mathematics and logic was not fully recognized when you first entered the field. Now, if we look at the ongoing career of a journal like *History and Philosophy of Logic* that you founded and long edited, would you say the situation has changed?

IGG: Founding that journal was not my idea. A publisher came to me with the idea in 1979 because it had recently published a history of logic book by Dumitriu that sold very well. There was obviously an interest in history of logic, so they asked me whether we could do a book in history of logic, which I would edit. I thought it an interesting idea, and suggested that it should cover both history and philosophy of logic, because it was difficult at the time to publish in both areas. They were too logical for historians, too historical for logicians, and too logical and historical for philosophers or mathe-

maticians. It was not an easy situation, but *HPL* is still going. The page count is now around 400 per volume; it was 250 when it started. Thanks to the current editor Volker Peckhaus, the editorial board has representatives on it of all the principal traditions in the history of logic, including the non-Western ones.

Today some other journals, such as *BSL*, publish historical papers as well. So I think the field is better shaped than it was those years ago, and I hope *HPL* played a role in its development. It does not have a career path, but at least it has some place now. One influence has been large-scale editions, such as for Russell, Peirce and Bolzano, as they made available works of people who made important contributions to logic. So, although there are hardly any jobs in either the history or the philosophy of logic, I think it is better recognized than it was when I started working in the field. Then people would ask me what I was doing it for, and advise me instead to do what mathematicians do, that is prove more and more theorems.

When I started working on nineteenth-century mathematics and logic, there was virtually nothing going on. Now, there is plenty going on. So I think history of mathematics and logic has been transformed. One cause is in mathematics education where there is a movement among mathematicians and mathematics educators to use historical and heritage information or sources in the teaching. (I do not know what the situation in logic teaching is.) So the field is still limited but it is better practised and recognized than it used to be. I just wish that this distinction between history and heritage were better understood.

AM: That makes a good conclusion to our interview. Thank you again.

Induction and Supposition

Here's a fairly quick argument that there is contingent a priori knowledge. Assume there are some ampliative inference rules. Since the alternative appears to be inductive scepticism, this seems like a safe enough assumption. Such a rule will, since it is ampliative, licence some particular inference *From A infer B* where *A* does not entail *B*. That's just what it is for the rule to be ampliative. Now run that rule inside suppositional reasoning. In particular, first assume *A*, then via this rule infer *B*. Now do a step of →-introduction, inferring $A \rightarrow B$ and discharging the assumption *A*. Since *A* does not entail *B*, this will be contingent, and since it rests on a sound inference with no (undischarged) assumptions, it is a priori knowledge.

This argument is hardly new; John Hawthorne suggested a similar argument ten years ago (2002, "Deeply Contingent A Priori Knowledge", *Philosophy and Phenomenological Research*, 65, 247–269). But it is a quick argument for a striking conclusion, and deserves close scrutiny. I'm going to argue that it fails because it falsely assumes that we can treat rules of ampliative inference like rules in a natural deduction system, and hence as rules that we can apply inside the scope of a supposition. That assumption has recently been defended by Stewart Cohen (2010, "Bootstrapping, Defeasible Reasons and *A Priori* Knowledge", *Philosophical Perspectives*, 24, 141–159) and Sinan Dogramaci (2010, "Knowledge of Validity", *Noûs*, 44, 403–432), but I'm going to argue, using a construction similar to one found in Dogramaci, that it leads to absurdity given other plausible premises.

Here's the main argument. If any ampliative inference is justified, I think the following rule, called 'IR', is justified, since this is a very weak form of an inductive inference.

IR From *There are infinitely many Fs, and at most one is not G* and *a is F* infer *a is G* unless there is some *H* such that it is provable from the undischarged assumptions that *a is F and H* and *There are finitely many things that are both F and H, and one of them is not G.*

Note that the rule doesn't say that merely one $F \wedge \neg G$ has been observed; it requires that just one such thing exists. So this seems like a very plausible inference; it really is just making an inference within a known distribution, not outside it. And it is explicitly qualified to deal with defeaters. And yet even this rule, when applied inside the scope of suppositions, can lead to absurdity.

In the following proof, we'll let *N* be the predicate 'is a natural number', and *P* be the predicate 'is the predecessor of', and I'll appeal to the fact that there are infinitely many natural numbers, and each number has at most one predecessor. I'll use a version of the proof system in E.J. Lemmon's *Beginning Logic* (1978, Hackett), but it should be easy to transform the proof into any other proof system.

1	(1)	Na	assumption
2	(2)	Nb	assumption
1, 2	(3)	$\neg Pab$	(1), (2), IR
1	(4)	$Nb \rightarrow \neg Pab$	(2), (3), CP
1	(5)	$\forall y(Ny \rightarrow \neg Pay)$	(4), UI
	(6)	$Na \rightarrow \forall y(Ny \rightarrow \neg Pay)$	(1), (5), CP
	(7)	$\forall x(Nx \rightarrow \forall y(Ny \rightarrow \neg Pxy))$	(6), UI
	(8)	$N2 \rightarrow \forall y(Ny \rightarrow \neg P2y)$	(7), UE

So we get the absurd result that if 2 is a number (which it is!), then it is the predecessor of no number. But that's absurd, since obviously 3 is a number and 2 is the predecessor of it. Note that at step 3 we use rule IR with *F* being the predicate *is a natural number*, *G* being the predicate *does not have a as a predecessor*, and *b* being *x*.

What could have gone wrong? I think the problem is using IR in the context of a suppositional proof, as we've done here. But let's check if there is another guilty suspect.

If the problem is Conditional Proof (CP in Lemmon's system), then that's about as bad for the proof in the first paragraph that there are contingent a priori truths as if the problem is IR. Since we're interested in whether that proof works, we won't investigate this option further. In any case, if $\rightarrow$ is material implication, that rule seems unobjectionable. A referee suggested that if we've used an ampliative rule earlier, then $\rightarrow$ should be weaker than material implication, and under that interpretation (5) through (8) may be plausible. I think that claim is basically right, but note that if we do this the argument for contingent a priori knowledge with which I started will fail, since the contingency of $A \supset B$ will not imply the contingency of $A \rightarrow B$ if $\rightarrow$ is weaker than $\supset$.

It is hard to imagine that Universal Elimination (UE) is the problem. In any case, line (7) is obviously bad anyway, so something must have gone wrong in the proof before that.

Perhaps the problem is with Universal Introduction (UI); this is what Dogramaci suggests. One objection he offers is that although we can prove every instance of the universal quantifier, inferring the universal version creates an undue aggregation of risks. Even if line (4) is very probable, and it would still be probable if a were replaced with c, d or any other name, it doesn't follow that the universal at line (5) is very probable. But I think this is to confuse defeasible reasoning with probabilistic reasoning. The only way to implement this restriction on making inferences that aggregate risk would be to prevent us making any inference where the conclusion was less probable than the premises. That will rule out uses of ∀-introduction as at (5). But it will also rule ∧-introduction, and indeed any other inference with more than one input step. To impose such a restriction would be to cripple natural deduction.

Another objection he offers (UI) is simply that it is the least plausible, or least intuitive, of the rules used here. But in fact (UI) is extremely intuitive. If we can prove every instance of a schema, we should be able to prove its universal closure. On the other hand, allowing ampliative rules to be used inside the scope of a supposition allows a quick proof of contingent a priori knowledge, as shown in the first paragraph. Now maybe there is such knowledge, but its existence is hardly intuitive.

So I conclude the weakest link in the argument is step (3). Although IR is a good rule, it can't be used inside the scope of a supposition. And since IR is about as weak an inductive rule as we can imagine, I conclude that ampliative inference rules can't in general be used inside the scope of suppositions.

The general lesson here, as was made clear many years ago by Gilbert Harman (1986, *Change in View*, Bradford Books) is that there is a difference between rules of inference and rules of implication. The quick proof that there is contingent a priori knowledge uses a rule of inference as if it is a rule of implication. Not respecting this distinction between inference and implication leads to disaster, as we've shown here, and should be shunned.

BRIAN WEATHERSON
Philosophy, University of Michigan

Lucky Decisions: A Reply to Marouf

In *The Reasoner* 1(3), I argued that luck is not toxic to moral responsibility and that the kind of chance associated with indeterminism does not undermine free will and control of the kind required for moral responsibility. Marouf has replied that my argument rests "on one groundless assumption and one arbitrary conditional claim" (*The Reasoner* 6(2), p. 23). Before I reply to this charge it would be as well that I sketch my original argument.

We make torn decisions in cases where we take ourselves to have equally compelling reasons for competing courses of action yet must choose one. For instance, today I found myself in a situation where I believed that a certain type of act morally ought to

be done, and was motivated to perform it (stopping and signing a petition for a cause I believe in), but also had a self-interested desire to perform an action of a type that was incompatible with my doing what I believed to be right (rushing into the nearby bakery to buy their last doughnut). I was torn. I just decided (to buy the doughnut). There is no need to conceive of torn decisions as exclusively concerning important issues such as whether to act morally or self-interestedly. For instance, when I got into the bakery I found myself torn between whether to buy the doughnut or the éclair next to it.

When it comes to our torn decisions it *appears* to us that our resulting decision is a matter of the purest luck. We just decide. And it seems abundantly clear to us that we might just as easily have made the alternative decision, consistent with all past states. This is the character of torn decisions. Yet, even in light of their apparent luck, we still consider the resulting decision to be our own and consider ourselves morally responsible for having made it. It appeared to me to be a matter of luck that, having been torn, I decided to go to the bakery rather than stop and sign the petition. Yet I did not consider this a reason to disown my decision or deny my moral responsibility for having made it.

A common criticism of incompatibilist conceptions of free will is that if any of our decision making process involve indeterminism (and note it is often torn decision making processes that are seen as providing a possible non-disruptive location for indeterminism), it will simply be a matter of pure chance which decision gets made, and thus the decision cannot be one that is authentically the agent's own: it cannot be one for which the agent bears moral responsibility. Far from grounding moral responsibility, indeterminism seems toxic to it or, at best, unhelpful.

I challenged this criticism by appealing to the experience of torn decision-making and our subsequent judgements about our moral responsibility for having made them. Regardless of whether our torn decision-making processes actually involve indeterminism or not (an empirical matter on which I took no stand) our torn decisions appear to us to be matters of luck. If chance really is toxic to free will and moral responsibility, then one would expect the apparent pure luck of our torn decisions to lead us to disown them and to deny responsibility for having made them. This does not happen. It appears to us that our torn decisions are matters of pure luck, yet we do *not* disown them or deny responsibility for having made them. This, to my mind, is very good evidence that luck, of the kind our torn decisions appear to exhibit, is not toxic to free will and moral responsibility.

Imagine neuroscientists contact me. They tell me that their investigations into my brain operations (they've been secretly monitoring me) revealed that the physical brain processes correlated with torn decision-making processes involve indeterminism such that it is genuinely indeterministic on such occasions whether I decide one way or another. Given that my impression was that my torn decisions were matters of pure luck, why should the news that my decision was correlated with physical processes that involved indeterminism lead me to disown the decision and deny responsibility for having made it?

In addressing my argument Marouf says that my main mistake (the "groundless assumption") is "to assume that torn decisions are real and can arise" (*The Reasoner*, p. 23). But torn decisions, as I defined them, are cases where we take ourselves to have equally compelling reasons for competing courses of action yet must choose one.

I often take myself to have equally compelling reasons for two competing courses of action and I strongly suspect that most people have experienced such situations. So why does Marouf think otherwise? Because he seems to attribute to me the view that such decisions actually involve causal indeterminism, and then proceeds to explain why they might not. He points out that "what may appear as a torn decision may in fact already be fully determined, but in a manner in which it is not possible for a person to consciously know" (*The Reasoner*, p. 23). And "neuroscience provides sufficient data for doubting that persons are aware of the complete range of inner mental functions" (*The Reasoner*, p. 24). I'm puzzled why Marouf thinks I would deny any of this. I don't. My definition of a torn decision made no mention of causal indeterminism. Whether our torn decision-making processes involve indeterminism or not is an empirical matter on which I took no stand whatsoever. As I hope is now clear, my argument assumed that our torn decisions *appear* lucky to us. That is all. So long as such decisions *appear* lucky to us, yet are still ones we deem ourselves fully responsible for having made, we have a counterexample to the idea that luck and free will are incompatible. In short then, my argument in no way conflicts with any of the claims Marouf makes. Perhaps it was my fault for not having made my case clear enough.

Marouf says that the "other questionable element in Harrison's argument is the arbitrary claim that it is 'reasonable' to consider chance as 'not toxic' to moral responsibility" (*The Reasoner*, p. 24). But it was not an arbitrary claim. I gave an argument for it: an argument Marouf's reply does not challenge.

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Gerald Harrison
Philosophy, Massey University

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News

Axiomatic vs Semantic Truth, 14–16 March

On March 14–16, 2012 the Munich Center for Mathematical Philosophy (LMU, Munich) hosted a conference on *Axiomatic versus Semantic Truth*, organised by Martin Fischer (Munich) and Julien Murzi (Kent & Munich), and generously supported by the Alexander von Humboldt Foundation and the Carl Friedrich von Siemens Stiftung.

Day 1 started with *Volker Halbach*'s 'Axiomatic and Semantic Theories of Truth'. Volker discussed the role of semantic theories from the perspective of axiomatic approaches. He considered three possible interpretations: as a way of providing a model-theory for axiomatic theories; as a way to elucidate the 'real' meaning of truth; and as a tool for developing axiomatic theories. Next up was *Andrew Bacon*, with 'A General Approach to Revenge Paradoxes'. Andrew discussed the revenge problem in a general form in the context of linguistic theories and non-linguistic theories. He argued that linguistic theories must either prove sentences that are not 'healthy', or they must accept that there are 'healthy' sentences which do not satisfy the T-schema. The topic of *Luca Incurvati*'s talk 'A Conception of Set-Theoretical Truth' was Isaacson's thesis. Luca first discussed the standard version of the thesis for arithmetic, and then considered whether there can be a set theoretic version, i.e., whether there is a set theory which is

sound and complete with respect to basic set-theoretical truths. He considered ZF$^+$ as a case study, and concluded that in this case we only get a stable conceptual boundary but not an adequate characterization of truth in the iterative conception. *Dora Achourioti*'s presentation ('Modelling the Use of 'true' in Natural Language') concentrated on the question how the notion of truth manifests itself in natural language. She presented a formalisation in a multi-agent setting, and used a proof-theoretic framework, namely a sequent calculus for linear logic to model concessive uses of truth. *Jc Beall* argued in 'Truth without Detachment' that paracomplete and paraconsistent logicians can make do with, respectively, the logics K3 and LP, thus giving up the quest for a 'suitable conditional'. He suggested that the extra-logical power lost in such logics is fully restored once non-logical principles of reasoning are considered taken into consideration.

Day 2 kicked off with *Andrea Cantini*'s 'Stratified Truth'. The talk focused on a typed approach to truth applying Quinean ideas and was understood as an answer to a challenge posed by Feferman: 'is there a consistent axiomatization of stratified form of the Tarskian hierarchy, where stratification is meant in the sense of Quine's NF?'. Cantini presented a theory of Stratified Fregean Truth which he showed to be interpretable in NF and classical type theory with the axiom of infinity. *Leon Horsten* ('Truth and conditionals') pursued the project of adding a suitable conditional to paracomplete logics of truth based on the logic K3. He gave model-theoretic grounds for rejecting Field's preferred suitable conditional, and proposed a refinement of Yablo's conditionals, whose semantics is more Kripkean in spirit than Field's. *Stewart Shapiro* ('How we theorize about truth and other things') argued (among other things) that revisionary theories of truth must be really revisionary, in the sense that it is implausible to take them to describe the One True consequence relation, supposing there is one. *Carlo Nicolai*'s 'Truth, Syntax and Conservativeness' focused on some little discussed but important aspects of the conservativeness argument, in the context of deflationism. Carlo showed that, once we disentangle the syntactical part from the mathematical part of our truth-theories, induction plays a twofold role in consistency proofs. *Hannes Leitgeb* closed the day with an exciting talk, 'A theory of propositions and truth', jointly written with Philip Welch. Hannes and Philip presented a theory of propositions that is structurally identical to ZFC, the main difference being that the elementhood relation is now interpreted as an aboutness relation.

Day 3 started with a presentation by *Jeff Ketland*, 'Deflationism vs Representationalism'. Jeff argued, among other things, that interpretations are essential to languages. He compared representationalist and deflationist accounts of truth, and offered considerations in favour of representationalism. Next up was *Toby Meadows*' 'Let three flowers bloom'. Toby distinguished three approaches to truth—axiomatic theories of truth, semantic theories of truth, and logics of truth—and argued that they are each worth exploring. *Michael Glanzberg* ended the conference with a talk on 'Semantic truth and correspondence theory'. Michael suggested that Tarski's theory of truth provides a good way to make sense of the old Aristotelian idea that truth involves a relation of correspondence between words or thoughts and the world, thus defending Hartry Field's influential 1972 reading of Tarski.

All in all, it was a terrific conference: the talks were highly stimulating, and the discussion was very lively. All the talks have been recorded and will be available for

download on Itunes U shortly.

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Conference on Integrated History and Philosophy of Science, 15–18 March

Integrated history and philosophy of science (&HPS) has a distinguished pedigree, going back to the 19th century. In recent times, however, the relationship between history and philosophy of science, particularly in the Anglophone world, was rather troubled. Despite some attempts in the 1960s and 1970s to integrate the two fields, in the 1980s and 1990s history and philosophy of science drifted apart.

In the past few years there has been a revival of interest in drawing the two fields closer. This interest has crystallized in the establishment of an international committee of historians and philosophers of science, whose aim is to cultivate the dialogue between the two fields and to advance their integration. To that effect the committee has launched a series of conferences. The first three were hosted by the University of Pittsburgh, the University of Notre Dame, and the University of Indiana in Bloomington. The fourth conference in the series was hosted by the Department of Philosophy and History of Science, at the University of Athens.

&HPS has many faces. The talks of the two keynote speakers in the Athens conference, the historian Jed Buchwald and the philosopher Thomas Ryckman, were characteristic of two main strands of &HPS: philosophical history of science and historical philosophy of science.

The former makes use of general philosophical categories to narrate particular historical episodes. In that vein, Buchwald employed Thomas Kuhn's taxonomic approach to incommensurability to illuminate the development of 19th century optics and electromagnetism. Buchwald argued that Kuhn's philosophical framework can deepen our understanding of the developments in those fields, showing thus the historiographical fruitfulness of that framework.

The latter addresses epistemological and metaphysical issues about science in light of its historical development. In that vein, Ryckman placed under scrutiny the prevailing idea that the task of philosophy of physics is to offer interpretations of contemporary scientific theories, such as quantum mechanics and general relativity. He argued against "naturalized metaphysics", that is, against drawing ontological conclusions from those theories. He suggested, instead, that the historical development of those theories, which shows their temporary and contingent character, should be the main target of philosophical analysis.

Most talks in the conference fell under these two strands: they either reconstructed historical episodes in light of philosophical issues (concerning, e.g., scientific methodology); or drew upon history of science for addressing philosophical problems (e.g., the

underdetermination of theories by evidence).

Some talks, however, exhibited a more dialectical way of doing &HPS, by developing a philosophical framework in tandem with providing an interpretation of specific historical episodes. Hasok Chang, for instance, stressed the importance of operationalism for understanding how concepts function in scientific practice and argued that this approach sheds new light on the development of atomic chemistry during the 19th century. Chang presented that development by focusing on the plurality of methods that chemists devised for operationalizing the concept of atom. Conversely he drew upon the history of atomic chemistry for addressing some of the problems faced by operationalism, such as a dubious proliferation of concepts.

In all, the conference exhibited a healthy pluralism of different approaches to integrating history and philosophy of science, blending in various ways philosophical analysis and historical interpretation.

Theodore Arabatzis
Department of Philosophy and History of Science
University of Athens

Empirical Philosophy of Science, 21–23 March

Scholars of philosophy are turning to empirical methods in order to study scientific practice. The qualitative methods used range from interviews through fieldwork to text analysis. The results produced through such empirical work are, however, different from those gained through the more typical introspective conceptual analysis. Drawing on empirical insights in philosophy comes both with challenges and benefits. The workshop "*Empirical philosophy of science—qualitative methods*", held at Sandbjerg Estate (Denmark), 21–23 March 2012, addressed these challenges, as well as the methods and motivations of the philosophers who draw on qualitative empirical data in their work.

The workshop provided a forum for discussion of a wide variety of empirically inspired philosophy of science studies and the questions that arose from using a qualitative approach. The short presentations revealed that the participants found myriad ways to interweave philosophical concepts with empirical data: 'Empirically immersed' philosophers have chosen to do empirical work themselves, whereas 'empirically informed' philosophers see themselves in the role of 'second-order observers' and draw on empirical data that others have established. It also became clear that empirical data of interest to the philosopher arise from a range of different empirical methods: Historical analyses, ethnography, in-depth interviews and quantitative statistical analyses are just some examples. Each method comes with its advantages and limitations upon which both the empirically immersed and the empirically informed philosopher need to reflect.

The workshop comprised short presentations by participants and lectures given by invited speakers. The papers given by Lisa Osbeck and Nancy Nersessian highlighted two important issues: What are empirical questions in the context of the philosophy of science? And what is the appropriate 'unit of study' for any empirical philosophy of science? Meanwhile, Erika Mansnerus pointed to the tension between philosophical theorizing and ethnographic sensitivity which she has encountered in her work. In order to address this tension, she proposed that Philosophy of Science might need to adopt a different vocabulary. Hauke Riesch analyzed the discrepancies between philosophy of science and social scientific Science and Technology Studies (STS) from a sociological perspective. He pointed to the ongoing 'boundary work' between the two fields and the dynamics of social identity at play. This allowed the attendees to revisit the relationship between History and Philosophy of Science: What lessons can be learnt from HPS with regard to an empirical Philosophy of Science?

In the course of the discussion, a number of recurrent themes emerged: What should empirical insights be based upon, i.e., what methods can be used to generate the empirical data? How does the choice of method influence the significance of empirical data? What kind of methodological reflections does a philosopher need to engage with if she is drawing on empirical insights? What is the data-theory relationship that a philosopher

wishes to create? How do philosophers themselves deal with the fact that the observations they draw upon are theory-laden? How can empirical insights help to diversify and extend philosophical accounts? How can the applicability of prescriptive accounts be improved? How exactly do and should the normative and descriptive interact in empirically based theorizing?

Good answers were found to some of these questions during the workshop—others remain unanswered. But the overriding message from the workshop was that empirically based philosophy is worth pursuing. For this reason, proceedings will follow in the SAPERE series.

More information about the workshop can be found here. The workshop was organised by Hanne Andersen and Susann Wagenknecht.

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HANNE ANDERSEN
SUSANN WAGENKNECHT
Aarhus University

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Dynamics of Argumentation, Rules and Conditionals, 2–3 April

The workshop on the Dynamics of Argumentation, Rules and Conditionals (DARC), was held at the University of Luxembourg on April 2–3. It was organized by Richard Booth, Emil Weydert and Tjitze Rienstra. Its aim was to bring together people interested in the dynamics of formal argumentation in a broad sense, and to exchange ideas, techniques and results.

Joao Leite opened the workshop with an overview of the problem of updating logic programs. Applying the Katzuno and Mendelzon postulates for knowledge base update to logic program update is problematic, so a different set of postulates is required. Several postulates were presented and discussed with respect to a number of approaches to updating logic programs.

Ringo Baumann addressed the problem of revising a Dung-style argumentation framework, with the aim of enforcing a set of arguments to be accepted. Pierre Bisquert looked at the duality between operations of removing and adding arguments in an argumentation framework. Dov Gabbay addressed the problem of evaluating odd cycles in argumentation frameworks, presenting a novel interpretation of odd cycles which he calls the "Shkop approach".

Tjitze Rienstra described a generalization of the concept of an acceptance function which allows evaluation of argumentation frameworks given a set of constraints, opening up the possibility of applying Dung-style argumentation in a more dynamic way. Martin Caminada argued for natural interpretations of dialog games for the various argumentation semantics. Johannes Wallner dealt with the problem of updating Abstract Dialectical Frameworks in the light of new information.

Henry Prakken reviewed the ASPIC framework, which combines assumption-based and defeasible rule based reasoning, before pointing out the problem of representing preferences on the abstract level. When information is represented on the abstract level, care must be taken that this does not lead to problems on the instantiated level.

Alexander Bochman pointed out that rules (conditionals) constitute the core of epis-

temic states, the concept underlying the AGM model. He discussed the possibility of representing evolutionary rule change via expansions of argumentation systems.

Jan Sefranek considered the problem of updating assumption-based argumentation frameworks, focussing on the problem of removing rules that cause conflict, and properties the update operation should satisfy. Martin Balaz presented a number of principles for MDLP, such as causal rejection and immunity to cyclic updates. Several existing semantics for MDLP were characterized and the effect of adding explicit negation was discussed.

Brian Logan presented a method of belief contraction for rule-based agents that satisfies the AGM postulates, respects preferences over facts and can be computed in polynomial time. Beishui Liao proposed the concept of a layered argumentation framework with subargument relations, allowing the structure of arguments to be expressed at the abstract level.

In sum, the workshop proved to be a successful event. The quality of the contributions was high and the discussions were lively. The discussions centered around topics such as the connection between dynamics of argumentation, dynamics of logic programming and belief change, and the issue of abstract vs. instantiated or structured argumentation.

TJITZE RIENSTRA
University of Luxembourg

British Colloquium for Theoretical Computer Science, 2–5 April

The 28th British Colloquium for Theoretical Computer Science (BCTCS) was held at the University of Manchester from April 2nd to April 5th, 2012. This year, BCTCS was collocated with the 19th Workshop for Automated Reasoning (ARW). Fifty-five people attended BCTCS and thirty more attended ARW. The local organizers were Ian Pratt-Hartmann (BCTCS) and Renate Schmidt (ARW).

There were thirty-three contributed talks at BCTCS, covering virtually all areas of Theoretical Computer Science. This year, there was a particular concentration of papers on mathematical/computational logic. The conference began with an invited talk by Mike Edmunds, of Cardiff University, entitled "The Antikythera Mechanism and the early history of mechanical computing." Other invited talks were given by Reiner Hähnle, of the Technische Universität, Darmstadt, ("Formal verification of software product families"), Nicole Schweikardt of the Goethe-Universität, Frankfurt am Main ("On the expressive power of logics with invariant uses of arithmetic predicates") and Daniel Kroening, of Oxford University ("SAT over an Abstract Domain"). As in previous years, the London Mathematical Society sponsored a keynote talk at BCTCS in Discrete Mathematics. This year, Rod Downey, of the Victoria University of Wellington, gave a pair of lectures on "Fundamentals of Parametrized Complexity".

IAN PRATT-HARTMANN
University of Manchester

PhDs in Logic IV, 12–13 April

The fourth edition of the PhDs in Logic graduate conference took place at the Centre for Logic & Philosophy of Science at Ghent University. Presentations were given by four invited tutorial speakers and thirteen students in various topics in philosophical and mathematical logic.

Alessandra Palmigiano (Amsterdam) gave a tutorial on modal (algebraic) correspondence theory, focusing on Sahlqvist correspondence and offering some glimpses beyond. Valentin Goranko (Copenhagen) illustrated how modal and temporal logics can be used to specify and reason in discrete computational transition systems, elaborating on how a multi-agent transition system can be set up.

Andreas Weiermann (Ghent) gave a tutorial on phase transitions for Gödel incompleteness, using the metaphor "phase transitions" from physics to denote the search for the transition point from provable to unprovable but still true statements in Peano arithmetics. The fourth tutorial was given by Heinrich Wansing (Bochum), who presented and motivated the use of generalized truth values by means of a 16-valued extension of Anderson and Belnap's well-known logic of first-degree entailment.

The contributed talks spanned a wide variety of topics ranging from more philosophically oriented to more mathematically oriented logic. Thibaut Giraud (Paris) proposed a modified version of Zalta's theory of abstract entities to talk sensibly about contradictory objects, such as the round square. Marta Sznajder (Munich) presented a dynamic model for intensional transitive verbs such as 'to look for'.

Yacin Hamami (Brussels) investigated Hintikka's model of inquiry using dynamic epistemic logics. Dominik Klein (Tilburg) continued in the tradition of dynamic logic and talked about epistemic games. Lorenz Demey (Leuven) advertised the field of logical geometry and explained why the Aristotelian square of opposition is informative to us.

Aleks Knoks and Riccardo Pinosi (Amsterdam) proposed a new tableau method for default reasoning, while Jonathan Payne (Sheffield) presented a version of natural deduction for modal logics with a backtracking operator. Antje Rumberg (Utrecht) talked about branching time semantics with sets of transitions. Jönne Speck (London) continued on grounded classes and admissible sets, while Claudio Ternullo (Liverpool) argued that contemporary set theory refutes mathematical Platonism.

Jeroen Goudsmit (Utrecht) presented his work on admissible rules for intermediate logics. Finally, Bjorn Lellmann (London) focused on the graphical construction of cut free sequent systems, while Samuele Maschio (Pavia) talked about syntactic categories, free algebras and Peano arithmetics.

The recipe of the PhDs in Logic graduate conferences, consisting of a combination of tutorial sessions in mathematical and philosophical logic with short presentations by PhD students, is familiar by now and proved fruitful once again, stimulating interdisciplinary contacts between philosophers, mathematicians and computer scientists.

As this conference is hosted each year by different PhD students from different universities (without a central steering committee), we hope that one or two PhD students

in logic step forward and continue the tradition by hosting a fifth edition in 2013.

Mathieu Beirlaen
Tjerk Gauderis
Ghent University

Calls for Papers

The Mind-Body Problem in Cognitive Neuroscience: special issue of *Philosophia Scientiæ*, deadline 1 May.

Bayesian Nonparametrics: special issue of *IEEE Transactions on Pattern Analysis and Machine Intelligence*, deadline 30 June.

Imprecision in Statistical Data Analysis: special issue of *Computational Statistics & Data Analysis*, deadline 30 June.

Bayesian Computing, Methods and Applications: special issue of *Computational Statistics & Data Analysis*, deadline 30 June.

Inforgs and the Infosphere: Themes from Luciano Floridi's Philosophy of Artificial Intelligence: special issue of *The Journal of Experimental & Theoretical Artificial Intelligence*, deadline 1 July.

Mind and Paradox: special issue of *Journal of Experimental & Theoretical Artifical Intelligence*, deadline 1 July.

The Aim of Belief: special issue of *Teorema*, deadline 15 September.

Science vs. Society? Social epistemology meets the philosophy of the humanities: special issue of *Foundations of Science*, deadline 31 October.

What's Hot in . . .

. . . Logic and Rational Interaction

Over the last few months several publications came out that are of interest to readers of *The Reasoner*. As recently announced, the compendium "A Formal Epistemology Reader" will appear in November 2012. In this volume the editors Vincent F. Hendricks, Johan van Benthem and Horacio Arló-Costa publish a collection of 42 classical articles that were seminal for the development of the field. The book is divided into into five key areas: Bayesian Epistemology, Belief Change, Decision Theory, Interactive Epistemology and Logics of Knowledge and Belief. Each of the sections comes along with an introduction by the editors.

There are two recent journal articles to be mentioned. In their article in the *Journal of Applied Logic*, Giuseppe Primiero and Mariarosaria Taddeo provide a multi-modal type theory that allows to model the role of trust in multiagent communication. In *Logica Universalis*, Katarina Britz, Johannes Heidema and Ivan Varzinczak publish an article developing a framework for non-classic logics that constrain the classical consequence relation, thus modelling the reasoning of limited agents.

LORIWEB is always happy to publish information on topics relevant to the area of Logic and Rational Interaction—including announcements about new publications and

recent or upcoming events. Please submit such news items to Rasmus Rendsvig, our web manager, or to the loriweb address.

DOMINIK KLEIN
TiLPS, Tilburg University

... Uncertain Reasoning

The Uncertainty in Artificial Intelligence (UAI) conference held last July in Barcelona featured a Banquet Talk given by Colin Howson. At some point during the presentation, Howson projected the portrait of Reverend Bayes, an event which prompted an explosion of football-like enthusiasm from the audience—mostly computer scientists. It is of course very hard to pinpoint single contributions to the development of major research areas, but it is fair to say that much of that Barcelona enthusiasm is likely to be connected with the work of Judea Pearl, to whom the Association for Computing Machinery awarded the Alan Turing Award in March 2012. According to the official citation of this prize, which many dub as the Nobel for Computer Science, Pearl made "fundamental contributions to artificial intelligence through the development of a calculus for probabilistic and causal reasoning".

The ACM press release includes the following, as part of the motivation for the award:

> Judea Pearl's work has transformed artificial intelligence (AI) by creating a representational and computational foundation for the processing of information under uncertainty. Pearl's work went beyond both the logic-based theoretical orientation of AI and its rule-based technology for expert systems. He identified uncertainty as a core problem faced by intelligent systems and developed an algorithmic interpretation of probability theory as an effective foundation for the representation and acquisition of knowledge.

Among the many themes of Pearl's work, I'd like to recall the importance of his 1988 monograph *Probabilistic reasoning in intelligent systems: networks of plausible inference* for probability logic. This seminal volume raised a great number of key questions which constituted the focus of logic-based uncertain reasoning the subsequent two decades. The last chapter of the book is evocatively titled "Logic and Probability: The strange connection" and develops, among many others, Adams's idea of interpreting default conditionals as conditionals holding with extreme probability. This application of the "ϵ-semantics" to default logics broke what was largely perceived as a taboo in AI research, as can easily be reconstructed from the reviews of the book. In addition, "the strange connection" had a profound impact on the development of the semantics of nonmonotonic logics and constituted a reference point for the heated "quantitative vs qualitative" debate which pervaded much research during the 1990s-2000s in AI and related fields.

The award gained ample media resonance with high profile press coverage including the Wall Street Journal and the New York Times, and this is certainly great news for the

Uncertain Reasoning community!

HYKEL HOSNI
Scuola Normale Superiore, Pisa
LSE Choice Group, London

EVENTS

MAY

LOGIC-IN-QUESTION: Paris Sorbonne, 2–3 May.

JUSTIFICATION2: From Reasons to Reasoning workshop, Collège de France, Paris, 3 May.

BOBICOLL: 1st Bochum-Bielefeld Colloquium: Philosophical Perspectives on Epistemology, Mind, and Science, Ruhr-Universität Bochum, Germany, 4–5 May.

SOPHA: Société de philosophie analytique, Paris, 4–6 May.

ICDDM: International Conference on Database and Data Mining, Chengdu, China, 5–6 May.

ICFCA: 10th International Conference on Formal Concept Analysis, Leuven, Belgium, 6–10 May.

EXPRESSIVISM AND EPISTEMIC NORMATIVITY: workshop, Paris, 9–10 May.

BELIEF FUNCTIONS: Compiégne, France, 9–11 May.

WPI: 4TH Workshop on the Philosophy of Information, University of Hertfordshire, 10–11 May.

NATURALISM AND NORMATIVITY IN THE SOCIAL SCIENCES: University of Hradec Králové, Czech Republic, 10–12 May.

MIND NETWORK: workshop, IP London, 11–12 May.

PHILOSOPHY AND COMPUTATION: Lund University, Sweden, 12–13 May.

ABMPHIL: Agent-Based Modeling in Philosophy, Spa, Belgium, 15–19 May.

CASI: 32nd Conference on Applied Statistics Ireland, 16–18 May.

GAMES, GAME THEORY AND GAME SEMANTICS: 8th International Symposium of Cognition, Logic and Communication, Riga, Latvia, 18–20 May.

LMP: 12th Annual Philosophy of Logic, Mathematics, and Physics Conference, University of Western Ontario, 20–21 May.

SLACRR: St. Louis Annual Conference on Reasons and Rationality, 20–22 May.

IPDPS: 26th IEEE International Parallel and Distributed Processing Symposium, Shanghai, China, 21–25 May.

JDS: 44th Journées de Statistique, Brussels, 21–25 May.

PHML: Philosophy, Mathematics, Linguistics: Aspects of Interaction, St. Petersburg, Russia, 22–25 May.

UR: Uncertain Reasoning, Special Track at FLAIRS-25, Marco Island, Florida, USA, 23–25 May.

CONSTRUCTIVITY IN LOGIC: CUNY Graduate Center, New York, 23–25 May.

SSHAP: Mind, Language and Cognition, McMaster University, Canada, 24–26 May.

PHILMILCOG: 10th Annual Graduate Conference on the Philosophy of Mind, Language and Cognitive Science, University of Western Ontario, 24–26 May.

GROUP AGENCY AND COLLECTIVE INTENTIONALITY: Workshop, University of Vienna, 24–26 May.

THE AIMS OF INQUIRY AND COGNITION: Edinburgh Epistemology Research Group, University of Edinburgh, 25–26 May.

EXPERTS AND CONSENSUS IN ECONOMICS AND THE SOCIAL SCIENCES: University of Bayreuth, Germany, 25–26 May.

CSAE: IEEE International Conference on Computer Science and Automation Engineering, Zhangjiajie, China, 25–27 May.

ICKD: 2012 International Conference on Knowledge Discovery, Indonesia, 26–27 May.

AI2012: Canadian Conference on Artificial Intelligence, 28–30 May.

RTA: 23rd International Conference on Rewriting Techniques and Applications, Japan, 28 May–2 June.

FEW: 9th Annual Formal Epistemology Workshop, Munich, 29 May–1 June.

ICCC12: Third International Conference on Computational Creativity, Dublin, 30 May–1 June.

STOCHMOD: 4th meeting of the EURO Working Group on Stochastic Modeling, Ecole Centrale Paris, 30 May–1 June.

HUMAN COMPLEXITY: The University of North Carolina, Charlotte, 30 May–1 June.

CAMBRIDGE PRAGMATISM: a Research Workshop, Cambridge, UK, 31 May–1 June.

TAP: 6th International Conference on Tests & Proofs, Prague, Czech Rep., 31 May–1 June.

RUDOLF CARNAP LECTURES: Ruhr-Universität Bochum, 31 May–2 June.

JUNE

INCOMMENSURABILITY 50: Taipei, Taiwan, 1–3 June.

ICFIE: International Conference on Fuzzy Information and Engineering, Hong Kong, 2 June.

TRENDS IN LOGIC XI: Advances in Philosophical Logic, Ruhr University Bochum, 3–5 June.

LAMAS: 5th Workshop on Logical Aspects of Multi-Agent Systems, Valencia, 4–5 June.

WCSB: 9th International Workshop on Computational Systems Biology, Ulm, Germany, 4–6 June.

FEW: Formal Epistemology Week, Konstanz, 4–6 June.

AAMAS: 11th International Conference on Autonomous Agents and Multiagent Systems, Valencia, Spain, 4–8 June.

LOGIC, SCIENCE, AND METAPHYSICS: Petrus Hispanus Lectures 2012 by Timothy Williamson, University of Lisbon, 5–7 June.

CILC: 9th Italian Convention on Computational Logic, Sapienza University of Rome, 6–7 June.

EXTENDED COGNITION AND EPISTEMOLOGY: Amsterdam, 6–7 June.

MFPS: 28th Conference on the Mathematical Foundations of Programming Semantics, University of Bath, 6–9 June.

MINDS, BODIES, AND PROBLEMS: Bilkent University, Ankara, 7–8 June.

EDINBURGH EPISTEMOLOGY GRADUATE CONFERENCE: University of Edinburgh, 8–9 June.

FOUNDATIONS OF LOGICAL CONSEQUENCE: University St Andrews, 8–10 June.

NMR: 14th International Workshop on Non-Monotonic Reasoning, Rome, Italy, 8–10 June.

RATS: Recent Advances in Time Series Analysis Workshop, Cyprus, 9–12 June.

NORDSTAT: 24th Nordic Conference in Mathematical Statistics, Northern Sweden, 10–14 June.

WORKSHOP ON THE INCOMPUTABLE: Kavli Royal Society International Centre, Chicheley Hall, UK, 12–15 June.

MS5: Conference on Models and Simulations, Helsinki, 14–16 June.

CSAM: Classification Society Annual Meeting, Carnegie Mellon University, Pittsburgh, PA, 14–16 June.

BASIC KNOWLEDGE: Conference on the A Priori, Aberdeen, 16–17 June.

SAT: International Conference on Theory and Applications of Satisfiability Testing, Trento, Italy, 17–20 June.

LOFT: 10th Conference on Logic and the Foundations of Game and Decision Theory, Sevilla, Spain, 18–20 June.

DM: Discrete Mathematics, Dalhousie University, Halifax, Nova Scotia, Canada, 18–21 June.

LOGICA: Hejnice, northern Bohemia, 18–22 June.

CIE: Computability in Europe, Turing Centenary Conference, University of Cambridge, 18–23 June.

RETHINKING SCIENCE AFTER THE PRACTICE TURN: Nancy, France, 19–20 June.

SISSM: Scientific Meeting of the Italian Statistical Society, Rome, Italy, 20–22 June.

FREEDEX: Identity and Freedom of Expression Conference, Paris, 21–22 June.

PHILOSOPHICAL INSIGHTS: Senate House, University of London, 21–23 June.

MBR12: Model-Based Reasoning in Science and Technology, Sestri Levante, Italy, 21–23 June.

SPP: Annual Meeting of the Society for Philosophy and Psychology, University of Colorado at Boulder, 21–24 June.

HOPOS: Halifax, Nova Scotia, Canada, 21–24 June.

CCA: 9th International Conference on Computability and Complexity in Analysis, Cambridge, UK, 24–27 June.

COLT: 25th Annual Conference on Learning Theory, Edinburgh, 25–27 June.

MPC: 11th International Conference on Mathematics of Program Construction, Madrid, Spain, 25–27 June.

ARTIFICIAL INTELLIGENCE AND SOFT COMPUTING: Naples, Italy, 25–27 June.

VANIM: Values and Norms in Modeling, Eindhoven, The Netherlands, 25–27 June.

LICS: 27th ACM/IEEE Symposium on Logic In Computer Science, Dubrovnik, Croatia, 25–28 June.

SQUARE OF OPPOSITION: American University of Beirut, 26–29 June.

ICML: 29th International Conference on Machine Learning, University of Edinburgh, 26 June–1 July.

IJCAR: 6th International Joint Conference on Automated Reasoning, Manchester, UK, 26 June–1 July.

SEMANTICS AND PRAGMATICS OF CETERIS PARIBUS CONDITIONS: University of Düsseldorf, 28–29 June.

DGL12: Sixth Workshop in Decisions, Games & Logic, LMU Munich, 28–30 June.

EEN: European Epistemology Network Meeting, Universities of Bologna and Modena, Italy, 28–30 June.

&HPSUK: 7th Integrated History and Philosophy of Science Workshop, University College London, 28–29 June.

SEMANTICS AND PRAGMATICS OF CETERIS PARIBUS CONDITIONS: University of Duesseldorf, Germany, 28–29 June.

AAL: Conference of the Australasian Association of Logic, Sydney, Australia, 29–30 June.

EVOLUTION AND FUNCTION OF CONSCIOUSNESS: Summer School in Cognitive Science 2012, Montreal, Canada, 30 June–9 July.

JULY

MARKETS, MECHANISMS, AND MULTI-AGENT MODELS: ICML Workshop on the Interaction of Machine Learning and Economics, Edinburgh, 1 July.

STAMLINS: ICML Workshop on Statistics, Machine Learning and Neuroscience, Edinburgh, 1 July.

AAP2012: Conference of the Australasian Association of Philosophy, University of Wollongong, 1–6 July.

UNCERTAINTY IN COMPUTER MODELS: Sheffield, UK, 2–4 July.

AISB/IACAP: Birmingham, UK, 2–6 July.

HAI: Hypercomputation and AI Symposium, Birmingham, UK, 2–6 July.

LASR: 31st Leeds Annual Statistical Research Workshop, University of Leeds, 3–5 July.

BOUNDED RATIONALITY: Summer Institute on Bounded Rationality, Berlin, Germany, 3–10 July.

FOUNDATIONS FOR AN INTERDISCIPLINARY DECISION THEORY: Max Planck Institute for Human Development, Berlin, Germany, 3–10 July.

ICT: 7th International Conference on Thinking, London, 4–6 July.

IIBM: 5th International Workshop on Intelligent Informatics in Biology and Medicine, Palermo, Italy, 4–6 July.

HISTORY AND PHILOSOPHY OF PROGRAMMING: Ghent University, 5–6 July.

BSPS: Annual Conference of the British Society for the Philosophy of Science, University of Stirling, 5–6 July.

CAV: 24th International Conference on Computer Aided Verification, Berkeley, 7–13 July.

ISSCSS: International Summer School in Cognitive Sciences and Semantics, Latvia, 8–18 July.

ASC: 21st Australian Statistical Conference, Adelaide, 9–12 July.

IPMU: 14th International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems, Catania, Italy, 9–13 July.

ICALP: 39th International Colloquium on Automata, Languages and Programming, University of Warwick, 9–13 July.

Foundations of Mathematics: University of Cambridge, 10–12 July.

TVіTC: Theoretical Virtues in Theory-Choice, University of Konstanz, 12–14 July.

ICNCI: International Conference on Network and Computational Intelligence, Haikou, China, 14–15 July.

DEON: 11th International Conference on Deontic Logic in Computer Science, University of Bergen, Norway, 16–18 July.

WorldComp: The 2012 World Congress in Computer Science, Computer Engineering, and Applied Computing, Nevada, USA, 16–19 July.

DMIN: 8th International Conference on Data Mining, Nevada, USA, 16–19 July.

SIPTAss: Society for Imprecise Probability: Theories and Applications Summer School, Pescara, Italy, 16–20 July.

HUJI: Graduate Conference in Philosophy, Hebrew University of Jerusalem, 18–19 July.

Interfaces of the Mind: workshop at Ruhr-Universität Bochum, Germany, 19–21 July.

ISA: IADIS International Conference Intelligent Systems and Agents, Lisbon, Portugal, 21–23 July.

Paradox and Logical Revision: LMU, Munich, 23–25 July.

WoMO: 6th International Workshop on Modular Ontologies, Graz, Austria, 24 July.

FOIS: 7th International Conference on Formal Ontologies in Information Systems, Graz, Austria, 24–27 July.

August

NAFIPS: 31th North American Fuzzy Information Processing Society Annual Conference, Berkeley, 6–8 August.

CLAM: Logic and Computability Session, Latin American Congress of Mathematicians, Argentina, 6–10 August.

PMUV: Philosophy and Mathematics of Uncertainty and Vagueness, Brazil, 6–15 August.

ESSLLI: 24th European Summer School in Logic, Language and Information, Poland, 6–17 August.

KDD: 18th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, Beijing, China, 12–16 August.

StaRAI: 2nd Statistical Relational AI workshop, Cataline Island, USA, 13 August.

ITP: 3rd Conference on Interactive Theorem Proving, Princeton, NJ, 13–16 August.

Logic and Cognition: Logic and Cognition Workshop, Opole, Poland, 13–17 August.

Historical Counterfactuals: Workshop, Bristol, 14 August.

UAI: Conference on Uncertainty in Artificial Intelligence, Catalina Island, USA, 15–17 August.

SLS: 8th Scandinavian Logic Symposium, Roskilde University, Denmark, 20–21 August.

ALFAn: Latin American Analytic Philosophy Conference, Buenos Aires, Argentina, 21–24 August.

CTF: Concept Types and Frames in Language, Cognition, and Science, Düsseldorf, 22–24 August.

AIML: Advances in Modal Logic, Copenhagen, 22–25 August.

FMIP: Munich / Groningen Summer School: Formal Methods in Philosophy, Groningen, 23–28 August.

EASLLC: International Conference and the Second East-Asian School on Logic, Language and Computation, Chongqing, China, 25–31 August.

FLINS: 10th International FLINS Conference on Uncertainty Modeling in Knowledge Engineering and Decision Making, 26–29 August.

CLIMA: 13th International Workshop on Computational Logic in Multi-Agent Systems, Montpellier, France, 27–28 August.

ARCOE: 4th International Workshop on Acquisition, Representation and Reasoning with Contextualized Knowledge, Montpellier, France, 27–28 August.

ECAI: 20th European Conference on Artificial Intelligence, Montpellier, France, 27–31 August.

COMPSTAT: 20th International Conference on Computational Statistics, Cyprus, 27–31 August.

COLLECTIVE INTENTIONALITY: University of Manchester, 28–31 August.

CNL: Workshop on Controlled Natural Language, Zurich, 29–31 August.

FoR&D: Conference on Frontiers of Rationality and Decision, University of Groningen, 29–31 August.

SEPTEMBER

CSL: 21st EACSL Annual Conference on Computer Science Logic, Fontainebleau, France, 3–6 September.

WoLLIC: Workshop on Logic, Language, Information and Computation, Argentina, 3–6 September.

ABS: Applied Bayesian Statistics School, Italy, 3–7 September.

ICLP: 28th International Conference on Logic Programming, Budapest, 4–8 September.

ıKNOW12: 12th International Conference on Knowledge Management and Knowledge Technologies, Graz, Austria, 5–7 September.

ECıтS

Evidence and Causality in the Sciences,
University of Kent, 5–7 September

INTUITIONS, EXPERIMENTS AND PHILOSOPHY: University of Nottingham, 8–9 September.

LOGIC AND RELATIVITY: 1st International Conference on Logic and Relativity, Budapest, 8–12 September.

WEO-DIA: 1st Workshop on Well-founded Everyday Ontologies–Design, Implementations & Applications, Wroclaw, Poland, 9 September.

COMMA 2012: 4th International Conference on Computational Models of Argument, Vienna, Austria, 10–12 September.

LATD: Logic, Algebra and Truth Degrees, Japan, 10–14 September.

WPMSIIP: 5th Workshop on Principles and Methods of Statistical Inference with Interval Probability, Munich, Germany, 10–15 September.

Datalog 2.0: 2nd Workshop on the Resurgence of Datalog in Academia and Industry, Vienna, Austria, 11–14 September.

WUPES: Workshop on Uncertainty Processing, Czech Rep., 12–15 September.

ENFA: 5th Meeting of the Portuguese Society for Analytic Philosophy, University of Minho, Braga, 13–15 September.

SIFA: 10th National Conference of the Italian Society for Analytic Philosophy, Alghero, 13–15 September.

SUM: 6th International Conference on Scalable Uncertainty Management, Marburg, Germany, 17–19 September.

ILP: 22nd International Conference on Inductive Logic Programming, Dubrovnik, 17–19 September.

GAP8: 8th Conference of the Society for Analytic Philosophy, Germany, 17–20 September.

SemDial: 16th Workshop on the Semantics and Pragmatics of Dialogue, Université Paris-Diderot, 19–21 September.

PGM: 6th European Workshop on Probabilistic Graphical Models, Granada, Spain, 19–21 September.

CaLintSS: Causation and Laws in the Special Science—Metaphysical Foundations, Konstanz, 21–22 September.

Philosophical Issues in Belief Revision, Conditional Logic and Possible World Semantics: Konstanz, Germany, 21–22 September.

ENPOSS: 1st European Network for the Philosophy of the Social Sciences Conference, University of Copenhagen, 21–23 September.

MLSP: IEEE Workshop on Machine Learning for Signal Processing, special session on Causal Discovery, Spain, 23–26 September.

Structure and Uncertainty: workshop on Modelling, Inference and Computation in Complex Stochastic Systems, Bristol, 24–27 September.

ECML-PKDD: European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, Bristol, UK, 24–28 September.

JELIA: 12th European Conference on Logics in Artificial Intelligence, Toulouse, 26–28 September.

Consciousness and Volition: 1st International Krakow Conference in Cognitive Science, Krakow, Poland, 27–29 September.

LNK: 5th Conference on Non-Classical Logic. Theory and Applications, Poland, 27–29 September.

LSFA: 7th Workshop on Logical and Semantic Frameworks with Applications, Rio de Janeiro, 29–30 September.

October

SMPS: 6th International Conference on Soft Methods in Probability and Statistics, Konstanz, 4–6 October.

FPMW: 4th French PhilMath Workshop, Collège de France, Paris, 4–6 October.

PHILOSOPHY OF SCIENTIFIC EXPERIMENTATION: University of Colorado, Boulder, 5–6 October.

TiC2: Turing in Context II: Historical and Contemporary Research in Logic, Computing Machinery and AI, Brussels, 10–12 October.

ATAI: Advanced Topics in Artificial Intelligence, Bali, Indonesia, 22–23 October.

ECREA: 4th European Communication Conference, Istanbul, Turkey, 24–27 October.

IDA: 11th International Symposium on Intelligent Data Analysis, Helsinki, Finland, 25–27 October.

COURSES AND PROGRAMMES

Courses

ESSLLI: 24th European Summer School in Logic, Language and Information, Opole, Poland, 6–17 August.

FMIP: Munich / Groningen Summer School: Formal Methods in Philosophy, Groningen, 23–28 August.

Programmes

APHIL: MA/PhD in Analytic Philosophy, University of Barcelona.

DOCTORAL PROGRAMME IN PHILOSOPHY: Language, Mind and Practice, Department of Philosophy, University of Zurich, Switzerland.

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

MASTER PROGRAMME: in Statistics, University College Dublin.

LoPhiSC: Master in Logic, Philosophy of Science & Epistemology, Pantheon-Sorbonne University (Paris 1) and Paris-Sorbonne University (Paris 4).

MASTER PROGRAMME: in Artificial Intelligence, Radboud University Nijmegen, the Netherlands.

MASTER PROGRAMME: Philosophy and Economics, Institute of Philosophy, University of Bayreuth.

MASTER PROGRAMME: Philosophy of Science, Technology and Society, Enschede, the Netherlands.

MA IN COGNITIVE SCIENCE: School of Politics, International Studies and Philosophy, Queen's University Belfast.

MA IN LOGIC AND THE PHILOSOPHY OF MATHEMATICS: Department of Philosophy, University of Bristol.

MA IN LOGIC AND THEORY OF SCIENCE: Department of Logic of the Eotvos Lorand University, Budapest, Hungary.

MA IN METAPHYSICS, LANGUAGE, AND MIND: Department of Philosophy, University of Liverpool.

MA IN MIND, BRAIN AND LEARNING: Westminster Institute of Education, Oxford Brookes University.

MA IN PHILOSOPHY: by research, Tilburg University.

MA IN PHILOSOPHY OF BIOLOGICAL AND COGNITIVE SCIENCES: Department of Philosophy, University of Bristol.

MA IN RHETORIC: School of Journalism, Media and Communication, University of Central Lancashire.

MA PROGRAMMES: in Philosophy of Language and Linguistics, and Philosophy of Mind and Psychology, University of Birmingham.

MRES IN COGNITIVE SCIENCE AND HUMANITIES: LANGUAGE, COMMUNICATION AND ORGANIZATION: Institute for Logic, Cognition, Language, and Information, University of the Basque Country, Donostia, San Sebastian.

MRES IN METHODS AND PRACTICES OF PHILOSOPHICAL RESEARCH: Northern Institute of Philosophy, University of Aberdeen.

MSc IN APPLIED STATISTICS: Department of Economics, Mathematics and Statistics, Birkbeck, University of London.

MSc IN APPLIED STATISTICS AND DATAMINING: School of Mathematics and Statistics, University of St Andrews.

MSc IN ARTIFICIAL INTELLIGENCE: Faculty of Engineering, University of Leeds.

MA IN REASONING

A programme at the University of Kent, Canterbury, UK. Gain the philosophical background required for a PhD in this area. Optional modules available from Psychology, Computing, Statistics, Social Policy, Law, Biosciences and History.

MSc IN COGNITIVE & DECISION SCIENCES: Psychology, University College London.

MSc IN COGNITIVE SCIENCE: University of Osnabrück, Germany.

MSc IN COGNITIVE PSYCHOLOGY/NEUROPSYCHOLOGY: School of Psychology, University of Kent.

MSc IN LOGIC: Institute for Logic, Language and Computation, University of Amsterdam.

MSc IN MATHEMATICAL LOGIC AND THE THEORY OF COMPUTATION: Mathematics, University of Manchester.

MSc IN MIND, LANGUAGE & EMBODIED COGNITION: School of Philosophy, Psychology and Language Sciences, University of Edinburgh.

MSc IN PHILOSOPHY OF SCIENCE, TECHNOLOGY AND SOCIETY: University of Twente, The Netherlands.

MRES IN COGNITIVE SCIENCE AND HUMANITIES: LANGUAGE, COMMUNICATION AND ORGANIZATION: Institute for Logic, Cognition, Language, and Information, University of the Basque Country (Donostia San Sebastian).

OPEN MIND: International School of Advanced Studies in Cognitive Sciences, University of Bucharest.

PhD SCHOOL: in Statistics, Padua University.

Jobs and Studentships

Jobs

Post-doc position: in Probabilistic Reasoning, Vienna University of Technology, Austria, until filled.

Post-doc positions: in all areas of speech and language processing at the Human Language Technology Center of Excellence at Johns Hopkins University, until filled.

Post-doc position: on the project "Explanatory Reasoning: Normative and Empirical Considerations," Tilburg Center for Logic and Philosophy of Science, until filled.

Post-doc position: in cognitive psychology and/or computational modelling at the Center of Experimental Psychology and Cognitive Science, Justus Liebig University Giessen, until filled.

Post-doc position: in Semantics of Computer Systems, University of Cambridge, deadline 4 May.

Chair: in Logic and Rhetoric, University of Glasgow, 6 May.

Fellowship: in Statistics, Department of Mathematical Sciences, University of Bath, deadline 21 May.

Post-doc position: Advanced Bayesian Computation for Cross-Disciplinary Research, University of Warwick, deadline 22 May.

Professor: of Computer Science, University of Reading, deadline 22 May.

Fellowships: at the Center for Mind, Brain and Cognitive Evolution, Ruhr-University Bochum, deadline 1 June.

Post-doc positions: in Artifical Intelligence, Agents, Planning, Game Theory, or Autonomous Systems, Czech Technical University in Prague, deadline 18 June.

Studentships

Three Doctoral Training Grants: School of Computing, Faculty of Engineering, University of Leeds, until filled.

PhD position: in Bayesian Decision Theory, School of Computer Science and Statistics, Trinity College Dublin, until filled.

Two PhD positions: in the project "Designing and Understanding Forensic Bayesian Networks with Arguments and Scenarios", Utrecht University / University of Groningen, to be filled asap.

PhD positions: in the Statistics & Probability group, Durham University, until filled.

PhD positions: in Statistical Methodology and its Application, University College London, until filled.

PhD position: in Logic and Theoretical Philosophy at the Institute for Logic, Language and Computation at the University of Amsterdam, until filled.

PhD position: in Philosophy, Metametaphysics, Humboldt University of Berlin, deadline 3 May.

PhD position: at the Institute for Logic, Language and Computation, University of Amsterdam, deadline 20 May.

PHD POSITION: in Statistics, Department of Mathematics, University of Bergen, deadline 2 June.

PHD POSITION: on the project "Knowledge Representation and Inference Based on Type-2 Fuzzy Sets and Systems," School of Computer Science, University of Nottingham, deadline 30 December.