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§1 Editorial

In the Before Time, the Long Long Ago, I rode a skateboard. A lot. I was, I suppose, good enough at it. I practiced just about every waking hour, and I paid attention to the professionals in the business. One professional to whom I paid a great deal of attention was Mike Vallely. When I was young, I wanted to be Mike Vallely. I even shaved my head. Mike was not (and is not) just a skateboarder. He was also an exhilaratingly uncompromising loud mouth. Mike was punk. Rad even. Mike had a lot of interesting, and to me entirely new, things to say about double standards and deceit, as well as similarly interesting things to say about the people who prospered by them. I recall reading an interview with him in *Thrasher* (a skateboarding magazine) where he said (something pretty much like) the following: It was only when he was an outcast amongst the liars, when "they were kicking him face down in the mud", that he came alive. He came alive at that point because he knew it was then that he was close to the truth, and the truth was what he was interested in.

This brings me to this month's issue of The Reasoner, to whose editors I remain indebted for the invitation to write this guest editorial. Hello. My name is Sebastian, and I am your Guest Editor this month. Wonderful! The business of philosophy is to distinguish truth-hood from false-hood. Good. In light of this, it is unsurprising that philosophers have never been particularly popular with people who rely on lies for their power or for their livelihood. If you are planning on doing something God-awful for some insane reason or other, then the last people on Earth you want running around are a bunch of irritating philosopher types encouraging open and energetic debate. That sort of thing is likely to lead to all sorts of awkward questions like "Hang on a minute . . . I thought Bin Laden hated Saddam Hussein to death on account of Saddam being, in Bin Laden's view, a secular heathen?". Anyhow, I suppose that this is why I never bothered reading Heidegger. Instead of fleeing

Nazi Germany like a right-thinking positivist, he started goose-stepping around Freiburg. "Here is a man . . . ", I thought to myself, ". . . who is a little bit dodgy. A man not to be trusted to shoot entirely straight".

In philosophy we need to shoot straight. Shooting straight is how we start out on our way at arriving at the truth. Aiming might not always be a sufficient condition, alas, but it is usually a necessary one (alas twice). Being an articulate, uncompromising, and honest pursuer of the truth is unlikely to make you popular with dishonest pseudo-intellectual posers. But who wants these people as friends anyhow? This was Mike's point, and it is a good one still. Now I am no longer a skateboarder, I am a philosopher. And now I want to be Igor Douven.

Sebastian Sequoiah-Grayson
Formal Epistemology Project, University of Leuven

§2
Features

Interview with Igor Douven

Igor Douven is the Director of the Formal Epistemology Project, and a professor of philosophy at the Centre for Logic and Analytical Philosophy, Institute of Philosophy, University of Leuven.

Sebastian Sequoiah-Grayson: How did you get into philosophy, in the beginning?

Igor Douven: I started quite late. I wanted to be a professional musician. I played piano, but then got an injury in the fifth finger of my right hand. So now I can play the piano, but not professionally any more. Then at 27 I started studying philosophy. But I had been interested in philosophy since I was a teenager. So if I had not started out as a musician, I think that I would have gone straight into philosophy.

SSG: You are obviously still very interested in music...?

ID: Yes!

SSG: Do you ever use music as an inspiration for your philosophy?

ID: No!

SSG: Not at all?

ID: Ha! No no, not at all. It has nothing at all to do with my philosophical work.

[laughs]

SSG: Inspiration aside, do you ever use music as a backing track as you work? Or do you prefer complete silence?

ID : Definitely silence.

SSG: So you have come from art to philosophy.

ID: Yes.

SSG: How do you see the relationship between philosophy and other disciplines, including art and the sciences and so forth?

ID: The kind of philosophy that I liked when I started studying philosophy, and the kind I study still . . . was philosophy related to the sciences. Because there hadn't been a tradition of analytic philosophy [in Holland], the philosophers who published in analytic journals were typically scientists. So my supervisor was a chemist. My teacher for logic was a mathematician, others were physicists . . . and that's quite typical for at least that generation of analytic philosophers, at least in Holland. And it still is.

SSG: Okay . . .

ID: So in relation to the arts, if you want to study philosophy of art then there's a type of philosophy which is, or pretends to be, related to the arts. Continental philosophy is, I mean that's what these people think right!? They have—what they think of as—a literary approach to philosophy. But that's certainly not what I like! I mean, I was not looking in philosophy for what I already knew how to find in art, in music especially. So for me there was no relation between the arts and philosophy. Except at one point I was interested in aesthetics—in analytic aesthetics—for which it is good to know a little bit about art.

[laughs]

SSG: Do you look strictly within philosophy for research ideas and so on?

ID: No no, I don't think so. Especially in the last five years, I've been looking quite a bit at psychology papers, and a little bit at what has been happening in economics.

SSG: That's certainly very topical . . .

ID: Yeah!

[laughs]

That was also a little bit of a coincidence, because in Rotterdam, which is where I was before I came to Leuven, for four years, there I was a member of a group that was basically a philosophy of economics group. That's basically it, I mean I'm also very interested in physics, but I just don't have the right backgroud to do anything related to that! For me it's a no-go area . . .

SSG: Ha! Fair enough. So philosophy of economics aside for a moment, what other issues do you think more philosophers could and should be interested about than we are at present?

ID: Mmmm . . . that's very . . . that's very hard . . . So this sounds much more like general advice, and not the sort of advice that I think I would need to give to anyone who is reading this . . .

[laughs]

. . . but of course in epistemology, and also in philosophy of language . . . I don't know, but certainly in epistemology, there is a growth of formal approaches, that we are now using, and many other people all over the world are now using, and I think that this is very valuable. So if you look at mainstream epistemology, then that's still very often just . . . I don't know what you call it in English . . . intuition mongering!

[laughs]

SSG: That will do!

ID: Yeah, so it's the methodology that I would very much like to propagate, or to popularise. As for topics, I think that that's really one of the hard things in our business. To come up with topics that are worthwhile investigating, and to come up with new ones every one or two years or so. I mean when you want to keep enjoying your research, you have to find new things . . .

SSG: Of course . . .

ID: Some people I think, can work all of their lives, just doing . . . conditionals! Which is fine if you can do that. But I can't.

SSG: When you do hit about a research project then, what is your process of paper writing? Do you just have an initial idea that you then work out as you go, or do you have a proper map worked out beforehand?

ID: It's something in between. I think that I have at least the structure of the paper pretty clearly in my mind's eye, so to speak. But very rarely is that also how the paper is going to look!

[laughs]

SSG: Even the best laid plans, right?

ID: Of course I'm never worried about that. At some point you just know that this is how it works.

SSG: Moving around research projects within disciplines is one thing, but what about moving around disciplines! Do you see yourself doing philosophy forever?

ID: Yeah. I think so, yeah yeah. I mean the obvious other choices, the things that other people in academia sometimes do, where you become the Dean or something like that, or higher up. You don't do any research but you're the administrator . . . I certainly, wouldn't want to do that! What we have been doing a little bit, and what I would certainly like to do more, is this cooperation with Sarah [Sarah Verbrugge—in the psychology department at Leuven], she was on the formal epistemology project, but now has her own project [in] experimental psychology. So if I have more ideas in that direction in the future, then I would be very happy doing that. So if it's interesting and you can continue with it, then if in that case, even if it's not called philosophy, if instead it's called experimental psychology, then there I wouldn't mind.

SSG: So what is next then, on the research agenda?

ID: There are a couple of things of course. There is some new research on conditionals, which I think still looks promising. I was very happy with the work that came out of the collaboration with Sarah, so now there are some people interested, Richard [Richard Dietz], Helen [Helen De Cruz], and our new postdoc who is coming, David Etlin [from MIT]—they are all interested in doing experimental work. That's one thing. Then there is also some work on judgment aggregation, along with simulation approaches.

SSG: That will keep you busy for a while!

[laughs]

ID: Yeah . . .

SSG: Which other academics, philosophers or otherwise, do you find most inspirational or respectable? Be it their methodology or their results or whatever?

ID: Timothy Williamson, I mean, he's so committed. And of course he has incredible abilities right? Also Bas van Fraassen's work is something that I really admire. And I like the early Putnam a lot!

SSG: What did you want to be as a child?

ID: I wanted to be a musician from very early on! That's typical of most people who want to be a musician, at least if they have studied music. Most people who are serious about that have wanted to be a musician from a very early age. So as far as I can remember, from the age of around seven or eight, I wanted to become a musician.

SSG: Okay, and if you could be a superhero, what would your superpower be?

[laughs]

ID: Um . . . maybe you have something bigger in mind, but let's say, you know, playing the piano really perfectly right!?

[laughs]

SSG: I'm not sure of that's a superpower . . . so much . . . ?

ID: Well, perfection in that profession is really very rare! It has been accomplished by very few people. I can think of two pianists who are really perfect, maybe three. It's really incredibly difficult, even if it doesn't look incredibly difficult!

SSG: So where can we catch you next? Where are your upcoming speaking events?

ID: There is Dusseldorf and St Andrews, although these will have been and gone by the time people read this. There are also many things happening here in Leuven! There is Chris's [Chris Kelp's] epistemology workshop, where I'll be speaking. The conditionals workshop with Richard. There's a workshop on the lottery paradox in Glasgow, and there is a conference on decision theory in Groningen. And there's a conference in Bristol, on conditionals . . .

SSG: On metacognition?

ID: Yes!

SSG: So do you have any parting words of advice and wisdom to the readers of *The Reasoner*?

ID: Yes. If you're doing formal epistemology, then keep doing what you're doing. If your not, then start!

SSG: You can catch Igor at:
The European Epistemology Network Conference, July 4–5, 2009, Formal Epistemology Project, Leuven.
Conditionals and Conditionalisation Sep 4–6, 2009, Formal Epistemology Project, Leuven.
Workshop on Metacognition, Belief Change and Conditionals, 11-12 September 2009, Department of Philosophy, Institute for Advanced Studies, University of Bristol, UK.
Progic 2009, 17–19 September, Groningen.

Bogus singular terms and substitution *salva denotatione*

Take two sentences A and B to be 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. Assume the following two principles:

> **(Sub)** Substitution of co-referential expressions within a sentence doesn't change the reference of the whole sentence.

> **(Dox$_{sen}$)** Doxastically synonymous sentences are co-referential.

Relying on (Sub) and (Dox$_{sen}$), Drai (2002: The Slingshot Argument: an Improved Version, *Ratio* (new series), XV(2)) developed an argument to the effect that any two true sentences refer to the same thing, if sentences refer at all (see also Urbaniak, "Slingshot arguments: two versions", The Reasoner 3(4); "Doxastic synonymy vs. logical equivalence", *The Reasoner* 3(5)).

Drai's doxastic slingshot argument starts with three premises:

(D1) $A \wedge B$

(D2) $A \sim_d$ the truth value of A is True

(D3) $B \sim_d$ the truth value of B is True

An application of (Dox$_{sen}$) to (D2) and (D3) yields ($D(A)$ is the denotation of A; since there is no threat of ambiguity, I don't use quotation marks):

(D4) $D(A) = D$(the truth value of A is True)

(D5) $D(B) = D$(the truth value of B is True)

(D1) entails:

(D6) the truth value of A = the truth value of B

Thanks to (D6), (Sub) allows to substitute 'the truth value of B' for 'the truth value of A' in (D4).

(D7) $D(A) = D$(the truth value of B is True)

The transitivity of identity applied to (D5) and (D7) yields:

(D8) $D(A) = D(B)$

If we are to use (Sub) in order to reach (D7), we have to interpret (D6) as an identity between referring definite descriptions. Drai concedes that much:

> [...] the two expressions 'the truth value of A' and 'the truth value of B' are co-referential not in virtue of any assumption about the references of the embedded sentences A and B. They are co-referential because they are proper names which have the same reference: True or False. [...] the difficult question of whether truth values are objects is not addressed by the slingshot argument, but assumed by it. Given the assumption that truth values are objects, the slingshot argument proves that they are the references of sentences. (2002: 200)

Another thing to observe is that the passage from (D1) to (D6) isn't purely logical. If there are no objects that are truth-values, then (D6) will be false even if (D1) is true.

On Drai's account, we should read (D2) as:

> **(D2′)** (i) It is impossible for a competent speaker to believe that A and not to believe that the truth value of A is True, and (ii) it is impossible for a competent speaker to believe that the truth value of A is True and not to believe that A.

Claim (ii) seems quite compelling. Arguably, to accept (ii) one has to embrace the existence of truth values and in such a case one has to believe that A, if one believes that the truth value of A is True.

Alas, (i) does not seem equally convincing. In order to believe that the value of A is True in the sense required for the argument to work, one has to believe that there is a unique object which is the value of A, there is a unique object which is True, and these objects are identical.

This being the case, it seems that even if we assume that truth values actually exist and behave as expected, (D2′) is still false. (D2′) is a modal claim and to falsify it, it is enough to indicate that no matter whether truth values really exist, there is a *possible* situation where someone believes that A and yet disbelieves the claim that the truth value of A is True. Suppose I am a radical nominalist who believes that A. Yet, I have pretty strong feelings against the claim that there is a unique object which is the truth value of A, or that there is a unique

object that is called 'True'. So I do not believe that the truth value of *A* is True in the sense required by the argument.

Drai defends (D2) as follows:

> Anyone who understands the notions of truth value and True, knows that to say [that the truth value of *A* is True] is no more and no less than to say [that *A*]. (2002: 202)

This sounds misleading: my commitment when I believe that *A* is different from the commitment I make when I believe that the truth value of *A* is True, if the claim is to be understood literally.

It remains to explain why one might in fact initially feel that (D2) and (D3) are true. From the nominalist standpoint, definite descriptions that seem to refer to abstract objects may serve slightly different purpose. For instance, Tadeusz Kotarbiński, a representative of Lvov-Warsaw school (1966: Gnosiology. The Scientific Approach to the Theory of Knowledge, trans. by O. Wojtasiewicz), a radical nominalist, insisted that singular terms that on the face of it name something, but do not name concrete individuals, do not name anything. For him, their role, insofar as their use is meaningful, is to abbreviate or reword some expressions that do not contain such abstract noun phrases.

On this approach, there is a reading of 'the truth value of *A* is True' which allows also a nominalist to believe it. It is the sense in which 'the truth value of *A*' and 'True' are not interpreted objectually as expressions that in fact refer to objects, and the whole sentence is treated just as a fancy and ontologically misleading way of saying that *A* is true. But in this interpretation, the slingshot does not work, because the descriptions that occur in (D6) are just bogus singular terms, and thus (Sub) cannot be applied.

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Towards a Model-Based Model of Cognition

In data mining, people are working (sometimes with almost no theory behind them) with a variety of computer models that are extremely useful in practice, but hardly resemble their target objects. "All models are wrong, but some are useful."—as put by the statistician George E. P. Box (1979: Robustness in the strategy of scientific model building. *Robustness in statistics*, 201–236).

This wide experience with "theory-less, wrong and useful" models is provoking three radical ideas. None of them is completely new, the novelty might be the composition proposed below: let's consider philosophy of all kinds of cognition, and try a completely model-based rewriting of it.

The first idea: *internally*, there is no difference between "true" models and "wrong" models. Mainly, we do not know in advance (sometimes—for centuries), which parts of our models or theories are true, and which are not. Sometimes we know that our model is "wrong" in many respects, but it remains useful, nevertheless. Many people may continue believing in an overthrown model or theory for a long time—and continue acting accordingly. Hence, the somewhat paradoxical term—"wrong" knowledge. This corresponds well to "The Dappled World" picture (Nancy Cartwright), see Paul Teller (2004: How We Dapple the World, *Philosophy of Science*, 71(4): 425–447). Thus, for the philosophy of cognition, "wrong" knowledge should be as prominent a subject as the "true" knowledge.

And, if we wish to answer non-trivial questions like as "Is it true that quarks really exist?", then our *philosophy of cognition shouldn't introduce the notion of "truth" too early*, as something primary, and therefore, mystical. Truth is emerging later, on top of cognition, it doesn't reside at the bottom of it. We can derive ontologies and truths only by analyzing *invariants* of a successful model evolution—as I tried to propose in "Is Scientific Modeling an Indirect Methodology?" (*The Reasoner*, 3(1)).

In terms of theories, a similar idea was proposed as the "Deepening Maxim" by Paul Thagard (2007: Coherence, truth, and the development of scientific knowledge, *Philosophy of Science*, 74, 28-47):

> If a theory not only maximizes explanatory coherence, but also broadens its evidence base over time and is deepened by explanations of why the theory's proposed mechanism works, then we can reasonably conclude that the theory is at least approximately true. (41).

And by Jeffrey Alan Barrett (2008: Approximate Truth and Descriptive Nesting. *Erkenntnis*, 68(2): 213–224)—as "a notion of local probable approximate truth in terms of descriptive nesting relations between current and subsequent theories" (213).

The second idea: models are the *ultimate results* of all (scientific, non-scientific, and anti-scientific) kinds of cognition. Therefore, philosophy of cognition should start with the following fundamental distinction: *there are models, and there are means of model-building*. Laws of nature and theories are useful only as a means of model-building—"The Toolbox of Science"—as put by Mauricio Suárez and Nancy Cartwright (2008: Theories: Tools versus Models. *Studies in History and Philosophy of Modern Physics*, 39: 62-81).

The third idea: to cover all kinds of cognition, the notion of model should be defined as broadly as possible: *a model is anything that is (or could be) used, for some purpose, in place of something else*. To put it somewhat paradoxically: models are tiny fragments of the Universe possibly usable (for some purpose) in place of other fragments (or, even in place of the entire Universe). Mathematical models, fictional worlds, mental structures and processes are included here, of course.

Among philosophers, this broadest possible notion of model was stated by Paul Teller (2001: Twilight of the Perfect Model Model. *Erkenntnis*, 55: 393–415). But, among computer scientists, it can be traced back to Marvin Minsky (1965: Matter, Mind and Models. *Proceedings of IFIP Congress* 65, 1: 45-49).

Minsky applies the notion of model in a way, that is very natural from computer scientist's point of view, but seems not very popular among philosophers. I would put this "robotic ontology" as follows:

In my head, I have a model of the world (an incomplete one, incoherent, inconsistent, in part fictional, containing all my knowledge, beliefs, dreams etc.). And I'm acting according to this model. In this model, other persons are believed to have their own models of the world (in some respects—different from my model). And they are acting according to their models. I may know these models more or less, and in this way I can predict—to some extent—people's behavior. Thus, my model of the world may contain "models of models"—for example, a simplified model of your model of the world.

And, to complete the picture: how about model-building in philosophy? Perhaps, many will agree with Peter Godfrey Smith (2006: Theories and Models in Metaphysics. *The Harvard Review of Philosophy*, XIV: 4-19):

> ... much metaphysical work, especially of the contemporary systematic kind, might best be understood as model-building, ... (4).

However,

> It would be foolish to suppose that such a hypothesis could be applied to all metaphysical discussion, but it might be true of an important part of the field. (5).

But how about trying this "foolish" step?

If none of the above theses is completely new, then—what is missing? My general impression: despite many brilliant insights, generated by philosophers for many years, the field (philosophy of cognition) remains unordered for too long a time. For example, according to the account given by Roman Frigg and Stephan Hartmann (2006: Models in Science, *Stanford Encyclopedia of Philosophy*), there is still no generally acknowledged unified notion of model. Or, according to the account given by Eric Schwitzgebel (2006: Belief, *Stanford Encyclopedia of Philosophy*), there are several competing approaches to explaining "what is it to believe". Couldn't these complications be caused by the idea of "propositional attitude"—the idea that separate propositions are believed in, and not entire models, theories, or fragments of them?

If it's true that models are the ultimate results of cognition, then shouldn't we try reordering the field, starting with the notion of model? In this way, couldn't we obtain a unified and more productive picture—a model-based model of cognition?

Karlis Podnieks
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§3
News

How Should Research be Organised?

Donald Gillies (2009): How Should Research be Organised? College Publications.

This book is divided into three parts. Part 1 presents a criticism of the Research Assessment Exercise (or RAE) which has been used to organise research in the UK from 1986 to 2008. The RAE is based on peer review, and the criticism consists in pointing out a surprising flaw in peer review. Many works which in retrospect are seen as constituting major advances were judged by contemporaries of the researcher, his peers, to be valueless. An example of this is provided by Frege whose *Begriffsschrift* was judged in 6 contemporary reviews to have made no advance in the subject. Nowadays it is seen as having introduced mathematical logic in its modern form. Another example, from a completely different field, is provided by Semmelweis, a doctor who carried out research into childbed fever. Semmelweis's explanation of the cause of the disease was broadly correct from a modern point of view, and he recommended antiseptic precautions (doctors washing their hands in chlorinated lime before examining patients) which greatly reduced the death rate from the disease, as he showed statistically. Yet Semmelweis's ideas were not accepted by his contemporaries, and the antiseptic precautions he recommended were only generally adopted in hospitals more than twenty years after his research.

A Kuhnian explanation is given of these historical failures of peer review. Researchers always work within a paradigm, and hence any new development which contradicts the paradigm is likely to be regarded as mistaken, even though, with hindsight, it constituted a ma-

jor advance.

Researchers like Frege and Semmelweis who make major advances which are not at first appreciated by their contemporaries are referred to as pink diamonds, since such diamonds are about a thousand times more valuable than ordinary clear diamonds, but might be mistaken for valueless flawed diamonds by a careless sorter. The mistake of the RAE then is that it is likely to throw away pink diamonds.

Part 2 of the book criticises the new system (the Research Excellence Framework, or REF) which has been introduced in the UK to replace the RAE. Where this does not continue to use peer review, it uses metrics such as citation indices. A citation index judges the merit of a research paper by the number of times it is cited by other researchers. However, the papers of pink diamonds like Frege and Semmelweis whose work is not appreciated by their contemporaries will not be cited by their contemporaries. So they will do badly on metrics such as citation indices as well as on peer review. So the new system has exactly the same fault as the one it replaces. It is likely to result in pink diamonds being thrown away, and hence in progress in research being held up.

Part 3 outlines an alternative system of research organisation designed to avoid the faults of the RAE and REF. The main idea is that research can be improved by the indirect strategy of rewarding teaching.

Donald Gillies
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Journal of Argument & Computation

In recent years, a substantial and well-established technical literature has emerged at the intersection between Argumentation Theory and Computer Science. On the one hand, formal models of argumentation are making significant and increasing contributions to Computer Science in general, and Artificial Intelligence in particular, from defining semantics of logic programs, to implementing persuasive medical diagnostic systems, to specifying negotiation protocols in multi-agent systems. On the other hand, Computer Science has also made an impact on Argumentation Theory and Practice, for example by providing formal tools for argument annotation, analysis, evaluation, and visualisation.

A testimony to the emergence of this new field is the appearance of various journal special issues in recent years (e.g., in the AI Journal and IEEE Intelligent Systems), the commencement of a new biannual conference on the Computational Modelling of Argument, and a number of successful workshop series (namely CMNA and ArgMAS).

Publisher Taylor & Francis has recently launched the Journal of Argument & Computation, which aims to promote the interaction and cross-fertilisation between the fields of argumentation theory and computer science. It will be of interest to researchers in the fields of artificial intelligence, multi-agent systems, computer science, logic, philosophy, argumentation theory, psychology, cognitive science, game theory and economics. Topics of interest span a wide spectrum of topics, ranging from argumentation-based techniques to nonmonotonic reasoning and game-based semantics of programs, to computer-assisted deliberation and argument-based coordination in multi-agent systems.

Argument & Computation will publish three issues per year to start with. The journal is accepting submissions now, and the first issue is due to appear in early 2010. The journal will accept full articles, describing novel theoretical or applied research in any of the areas of interest; reviews, condensing and critiquing an appropriate subfield of research; system descriptions, focusing on implementations (typically offering online access or downloadable code) and letters, providing pithy polemic on burning issues.

Iyad Rahwan
Institute of Informatics, British University in Dubai &
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Konstanz-Leuven Series in Formal Epistemology, 6 April

The Bi-Annual Konstanz-Leuven Series in Formal Epistemology takes place once in spring in Konstanz and once in fall in Leuven. It is jointly organized by Igor Douven (Leuven) and Franz Huber (Konstanz). At the first meeting at the University of Konstanz, Igor Douven and Richard Dietz from Leuven were invited as speakers.

In the first talk "Lotteries, Assertion, and the Pragmatics of Belief" Igor Douven confronted the audience with the fact that the "standard" formulation of our epistemic goal, saying that we should aim at believing only what is true and at believing all that is true, implies that in the standard lottery case we should believe all but one lottery proposition. This is not only counterintuitive, but generates a problem for the rational credibility account of assertion, because lottery propositions are generally held to be unassertable. Douven explained the unassertability of lottery propositions with reference to Gricean conversation rules. Furthermore, he argued that something like Gricean conversation rules do not only apply to assertion, but also to believing. This led him to give the following reformulation of our epistemic goal: We should aim at believing only what is right and at believing all that is right, where a sentence S is "right" iff it is true and has only true conventional implicatures.

As lottery propositions have false implicatures, it follows that we should not believe them. Thus, in contrast to the standard epistemic goal, the reformulated epistemic goal has no counterintuitive consequences when applied to the lottery case.

The second talk "Ramsey's Test, Adams' Thesis, and Conditional Evidence" by Richard Dietz was about updating on conditional information. There is a whole range of plausible accounts of updating ones beliefs if new evidence in form of a factive sentence is being received. However, new information need not always come in form of a factive sentence, it might as well come in form of a conditional. In his talk Richard Dietz was discussing three requirements (the Judy Benjamin requirements) which an update procedure for conditional sentences is supposed to meet according to van Fraassen (1981: A problem for relative information minimizers in probability kinematics, in *British Journal for the Philosophy of Science*, 32: 375-379).

Dietz first showed that a generalization of Adams' Thesis to left nested conditionals is a valid alternative to Adams' conditioning—previously established in Richard Bradley (2005: Radical probabilism and Bayesian conditioning, in *Philosophy of Science*, 72: 342-364)—because it fulfills the Judy Benjamin requirements. But secondly Dietz presented examples of updating on conditional evidence in which two of the Judy Benjamin requirements are violated and thus showed that the Judy Benjamin requirements are materially inadequate.

The next meeting of the Konstanz-Leuven series takes place in Leuven on November 26. Everybody is cordially invited to attend!

Benjamin Hoffmann and Alexandra Zinke
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Games, Argumentation and Logic Programming, 23–24 April

The GALP symposium held by the Individual and Collective Reasoning Group (ICS) of the University of Luxembourg on 23th-24th April 2009 brought together, for two days, a number of distinguished researchers who are contributing and have contributed to interdisciplinary research at the interface of the disciplines of games, argumentation and logic (with particular focus on logic programming). The aim of the symposium was to foster the interaction between the aforementioned research areas along the lines already present in the seminal contribution of Dung ("On the Acceptability of Arguments and Its Fundamental Role in Non-Monotonic Reasoning, Logic Programming, and N-Persons Games", Artificial Intelligence 1995). While this contribution laid the foundations of argumentation theory as a mathematical discipline, sparkling a rich and lively research area within Artificial Intelligence, its interaction with Game Theory and Logic Programming has been relatively neglected. The symposium filled this gap by highlighting a number of recent scientific developments as well as stimulating future research directions.

The talks presented can be grouped according to four focus points: talks concerning argumentation theory in general; and talks focusing on the three overlapping areas of games and logic (programming), games and argumentation, argumentation and logic.

Argumentation. Dr. Martin Caminada (University of Luxembourg) provided a thorough introduction to argumentation theory, presenting novel results concerning, in particular, algorithmic aspects of argumentation theory and dialogue games. The implementation of the algorithms introduced by Dr. Caminada were then presented in a comprehensive demo by Patrizio Barbini (Universities of Turin and Luxembourg) and Yining Wu (University of Luxembourg). Finally, Prof. Gerhard Brewka (University of Leipzig) proposed a multi-agent framework for argumentation generalizing Dung's setting to cover the interaction of different argumentative contexts.

Games and Logic. The contribution of Prof. Juergen Dix (Technical University of Clausthal) concerned the use of logic as a formal language for talking about games. It illustrated a number of systematic extensions of ATL—focusing in particular on their complexity—able to capture several game-theoretic concepts, from the typical "power-view" of games based on effectivity functions, to the full-fledged characterization of equilibrium concepts such as the Nash equilibrium. Along a similar line, Dr. Marina de Vos (University of Bath) showed how Answer Set Programming can be successively used to encode games and, consequently, compute their Nash equilibria. Then, somehow closing the circle, she showed how the solutions of answer set programs can be seen as the product of playing winning strategies in appropriately designed logic games.

Argumentation and Games. This was definitely the richest section in the symposium. Its talks focused on two main aspects: 1) the game-theoretic proof theory of argumentation based on the so-called dialogue or discussion games; 2) the application of argumentation theory to strategic situations in rational interaction, such as dispute resolution. In the first group, Dr. Sanjay Modgil (King's College London) introduced dialogue games for an extension of argumentation frameworks incorporating, besides the standard attack relation between arguments, an attack relation from arguments to attack relations. Prof. Henry Prakken (Universities of Utrecht and Groningen) emphasized the procedural and goal-driven aspects of dialogue games, besides their logical

and argumentation-theoretic nature, which still await a full-fledged formal analysis.

As to the second group, Serena Villata proposed an argumentation-theoretic approach to study the dynamics of coalition-formation in multi-agent systems. Finally, professor P. M. Dung (Asian Institute of Technology) introduced a novel argumentation-theoretic perspective to dispute resolution based on a form of mechanism design for dialogue games. According to this perspective, dialogue games are viewed as procedures for dispute resolution where all arguments defensible via the procedure are also admissible (soundness) and, vice versa, all admissible arguments are defensible via the procedure (completeness).

Argumentation and Logic. The symposium hosted two talks which bridged argumentation theory with modal logic. The first one, by Prof. Dov Gabbay (King's College London) applied Provability Logic to characterize the content of an argumentation framework as a modal formula whose models naturally correspond to the possible complete extensions of the framework. The second one, by Dr. Davide Grossi (University of Amsterdam) systematically investigated the simple idea of viewing Dung's argumentation frameworks as Kripke models. The talk showed how such perspective opens up the possibility of importing techniques (e.g., calculi, evaluation games) and results (e.g., complexity of model-checking) from modal logic to argumentation theory.

All in all, the symposium has beautifully shown how rich the overlaps are between game theory, argumentation theory and logic, and how promising future research lines can be in further investigating such overlaps. For the abstract of the talks, as well as the slides, see the website of the event.

Davide Grossi
Institute of Logic, Language and Computation,
University of Amsterdam

Philosophical Methodology, 25–27 April

The AHRC 'Philosophical Methodology' Project at the Arché Research Centre at The University of St Andrews held a major conference on philosophical methodology on 25–27 April 2009. The aim of the conference was to explore any questions concerning *philosophical methodology*. Consequently, the papers presented covered a wide range of issues but there were numerous connections between them.

A number of papers offered hypotheses about the psychological origins of important intuitions in philosophy. Eugen Fischer (East Anglia) argued that intuitions that have been used to support dualism about the mind are based on an erroneous form of analogical reasoning. Jennifer Nagel (Toronto) and Ángel Pinillos (ASU) both appealed to the distinction between 'System 1' and 'System 2' processing to shed light on certain intuitions. Nagel used dual-process accounts of cognition to explain patterns in our intuitions that conflict with closure principles for knowledge. Pinillos presented experimental results in support of the conclusion that people are less likely to have 'Knobe Effect' intuitions when placed in better epistemic conditions, and he suggested that these results might be due to System 2 processing being used in the better conditions and System 1 in the worse conditions.

David Chalmers (ANU) and Carrie Jenkins (Nottingham) offered contrasting views on what makes a dispute a 'merely verbal' dispute. Benjamin Jarvis (Brown), Jonathan Schaffer (ANU, Arché) and Anand Vaidya (SJSU) all engaged Timothy Williamson's influential work on methodology. Jarvis defended the a priori versus a posteriori distinction against Williamson's critique of it. Schaffer argued, against Williamson, that Gettier's famous arguments should be viewed as targeting a claim of conceptual necessity. Vaidya offered an alternative to Williamson's account of modal epistemology, based partly on Jonathan Kvanvig's distinction between understanding and knowledge. Helen Beebee (Birmingham) and Ephraim Glick (MIT) both explored in principle limitations of specific philosophical arguments. Beebee argued that appeals to the phenomenology of free action can establish little in debates about free will, and Glick examined the limitations of arguments in debates about the nature of knowledge-how.

Other talks addressed more general methodological issues. Daniel Nolan (Nottingham) argued that our 'armchair' knowledge is often a posteriori. Ernest Sosa (Rutgers) developed a competence-based account of rational intuition. Thomas Kelly (Princeton) argued that the fact that one believes that p gives one a reason to increase one's confidence that p is true, a conclusion that was claimed to support the Moorean idea that philosophy is unlikely to ever dislodge our commonsense beliefs. Jonathan Weinberg (Indiana) outlined a neopragmatist account of epistemic norms, and he used this account to make certain prescriptions about the use of intuitions in philosophy. Schaffer also argued that there is no distinctively philosophical form of inquiry; there are just general methods for answering questions. Tamar Szabó Gendler (Yale) compared philosophy that aims to address theoretical questions with philosophy that aims to contribute to human flourishing.

The conference was a great success. The talks were all excellent and the discussion sessions (formal and informal) were extremely productive and conducted in a great spirit. Arché's methodology project has a very active blog where you can find more discussion of the conference and other topics in philosophical methodol-

ogy.

Yuri Cath
Arché, University of St Andrews

Scientific Realism Revisited, 28–29 April

This conference invited key contributors to the scientific realism debate to revisit their views and those of others. Damien Fennell (LSE) opened the conference by specifying its aim. The comments of Bradley Monton (University of Colorado at Boulder) who spoke last seemed to sum up the result: views seem settled in the middle of the range of previously expressed ones.

John Worrall (LSE) emphasized that the intuition captured by the no-miracles argument "won't go away". He argued against entity and ontic structural realism, as well as inference to the best explanation, and supported his view. The demand made by "Realisms for Sale: entity, experimental, structural (epistemic and ontic), partial, 'full-on' .... But will the real realism stand up please?" picked out epistemic structural realism.

Mauricio Suárez (Complutense University) didn't reconsider experimental realism, but instead presented a stimulating talk on "Fictions, Inference, and Realism". Suárez argued that the only fictionalist view that could be incompatible with scientific realism, what he termed 'wide fictionalism', does not speak against (or for) the realist claim that science aims at truth.

Nancy Cartwright (LSE and UCSD, "Phenomenological Realism: how bold should we be?") rejected entity realism for the same reasons as Worrall. She clarified she would support 'phenomenological' and not 'high theory' realism, because the only scientific laws we can confirm inductively (and can legitimately be realists about) are complicated phenomenological ones. To accord with the conference theme, Cartwright considered other entity realist views: those of Ian Hacking's and Bas Van Fraassen's who—surprising some—she described as an observable entity realist.

Sherrilyn Roush (UC Berkeley) argued for "Optimism about the Pessimistic Induction". She specified a 'second-order' property about the 'first-order' content of our theories that old and current scientific theories share (contemporary belief in these theories) thus giving a basis for an inductive (pessimistic) inference about current theories to go through. She countered that asymmetries between old and current scientific methodologies should block a pessimistic induction to the failure of current science.

Steven French (Leeds, "One Trope or Two: How much metaphysics should the realist take with her tea?") focused on the relationship between metaphysics and science. French called his view complementary to Worrall's; complementing epistemology with the metaphysical question: What are we realists about? French argued that ontic structural realism with respect to objects and causal structuralism with respect to properties commits to what metaphysics ground structural realism, and one should make such metaphysical commitments to minimize 'metaphysical humility' and effectively reduce the domain of facts we cannot have knowledge of.

Bradley Monton's (University of Colorado at Boulder) discussion of 'What Constructive Empiricism Gets Wrong, and What it Might get Right' revisited Van Fraassen's view that scientific theories aim to empirical adequacy. Monton presented arguments for constructive empiricism (the pessimistic induction, the argument from underdetermination of theory by data) and against it (science is interested in the unobservable, truth and empirical adequacy are not the only possible aims of science). Monton also interestingly located what he called an 'empiricist structuralist' view in Van Fraassen's work.

Sophia Efstathiou
CPNSS, LSE &
Philosophy, UCSD

Putting Causation in Context: Causes and Effects in Law and Philosophy, 1 May

The workshop brought together philosophers and legal scholars to discuss issues of causation as they arise in Law and Philosophy. The workshop consisted of five sessions of over an hour, each started with a short presentation of a paper followed by a thorough discussion.

Jonathan Schaffer (Philosophy, ANU/Arché) opened the workshop with a paper he wrote for the workshop entitled 'Contrastive Causation in the Law', in which he defends his contrastive view of causation and explores its applications in the law. The paper raises four arguments to defend the contrastive treatment of causation and argues that it can serve as the theoretical basis for the *sine qua non* test, which is commonly used in the Law.

Amit Pundik (Law, Cambridge) presented his paper 'Can One Deny both Causation by Omission and Causal Pluralism? The Case of Legal Causation'. The paper argues that it is inconsistent to hold that (1) omissions cannot be genuine causes and (2) that causation is a single concept which is shared by various disciplines. The paper also identifies a type of omission which was neglected by philosophers of causation (the failure to do *enough*) and shows why it creates additional difficulties for those who wish to deny that omissions can be genuine causes.

Alex Broadbent (Philosophy, Cambridge) discussed his paper 'Facts and Law in the Causal Inquiry'. The paper defends the importance of the distinction between

law and facts in the causal inquiry, but argues that separating factual and legal causation as different elements of liability is not the best way to implement it. Instead, the paper proposes a contrastive view of causation which more clearly distinguishes matters of fact from matters of law within the cause-in-fact inquiry.

Jane Stapleton (Law, Texas/ANU/Oxford) presented her paper 'Choosing what we mean by "Causation" in the Law'. The paper proposed a new account of "causation" in the law by separating three forms of causal "involvement": necessity, duplicate necessity, and contribution (though contribution subsumes the others). This account is aimed to improve clarity, identify the normative issues involved, and transparently distribute issues between causation and other analytical elements within the legal analysis.

Roderick Bagshaw (Law, Oxford) closed the workshop with his paper 'Intervening Events'. The paper challenged Jane Stapleton's account on various grounds and argues that tort law rules about the scope of liability may require causal interrogations other than the question as to 'involvement'. The paper also raises an important question about the *degrees* of causal contribution, namely whether causation is a binary status (either something is a cause or it is not) or whether it is a continuum (one cause can contribute more than another cause in bringing about the effect).

The workshop was hosted by the Hughes Hall Centre for Biomedical Sciences in Society and was generously supported by Hughes Hall and the PHG Foundation.

Amit Pundik
Faculty of Law, University of Cambridge

ACL2 Theorem Prover and Its Applications, 11–12 May

The ACL2 workshops provide the key technical forum for researchers to present and discuss improvements to the theorem prover, comparisons of ACL2 with other systems, and applications of ACL2 in formal verification. ACL2, co-authored by Matt Kaufmann and J. Moore, is a state-of-the-art automated reasoning system that has been used in academia, government, and industry. ACL2 2009 was held in Boston, MA, USA, on May 11–12, 2009.

The presentations in ACL2 2009 involved (1) implementations and utilities to extend the reach of ACL2, (2) application of ACL2 to different domains, and (3) pedagogical applications and user interfaces. In addition to regular papers, ACL2 2009 included an invited keynote, a panel discussion, and "rump sessions" discussing on-going research.

Sumners presented a user-controllable term simplifier, and discussed the role of user control and extensibility in its design; Moore presented a hint mechanism for automatic functional instantiation through an adaptation of Huet-Lang's pattern matching algorithm; Kaufmann presented a new facility for printing large terms in the theorem prover and provided glimpses of what goes on in the design of a new feature; Hunt discussed a new symbolic simulation technique and its application; Liu discussed a specific approach, based on a syntactic term-manipulation capability, to automatically discharge a certain type of linear inequality proofs; Greve discussed two utilities, (1) for automating proofs of formulas involving first-order quantification, and (2) for introducing arbitrary recursive definitional axioms in ACL2 with an added hypothesis that the recursion terminates where the added hypothesis permits the introduction of a (conditional) definitional axiom and associated induction scheme while not requiring a possibly difficult proof of termination.

Schmaltz and his students presented progress on verification of communication models for network-on-chips; Ralston discussed a proof of AVL tree implementation; Gamboa and Cowles gave two talks, *i.e.*, (1) a formalization of inverse functions in ACL2(R) (the extension of ACL2 supporting real numbers) , and (2) a formal proof of a number-theoretic result that determines which triangular numbers are perfect squares; Kaufmann, Kornerup, and Reitblatt discussed the use of ACL2 in National Instruments to verify LabVIEW programs; Hardin discussed verification of security-critical data structures; Pierre and her students discussed the use of ACL2 in the verification of fault-tolerance properties of systems; Rager presented a formal proof of security protocol JFKr.

Page discussed his experience introducing computational logic in the undergraduate curriculum; Eastlund discussed *doublecheck*, a framework for testing ACL2 conjectures; Eastlund and Felleisen presented an approach to verify graphical user interfaces; Lozano and his colleagues presented a tool based on XML to render ACL2 output in more accessible format.

The keynote lecture by Barrett outlined recent progresses in SMT solving and discussed how theorem proving and SMT might benefit from each other.

The panel topic was "What is the Future of Theorem Proving?". Panelists argued that while interactive theorem proving is here to stay, for the technology to be pervasive it is critical to integrate it into the design flow as a debugging aid rather than as an activity performed post-facto.

Sandip Ray
Department of Computer Sciences, University of Texas at Austin

Philosophy of Language and Linguistics, 14–16 May

The Chair of English and General Linguistics (University of Lodz, Poland) organized in May 2009 the first International Conference on Philosophy of Language and Linguistics: PhiLang2009. During the conference 6 invited guest speakers presented 5 plenary lectures, and 62 participants from 18 countries delivered 60 papers in 3 parallel sections.

The principal aim of the conference was to bring together philosophers and linguists, and also logicians with interests in formal analyses of natural language. The title of the conference was deliberately ambiguous: the organizers wished to investigate the relation between philosophy of language and linguistics, and to focus on philosophy of language as opposed to philosophy of linguistics. An additional question was connected with the myths and dogmas current in contemporary philosophy of language.

The five plenary lectures concentrated on the myth of semantic structure (Jaroslav Peregrin), the myth of the sign (Michael Morris), events as a phenomenon lying at the intersection of linguistics, cognitive psychology and philosophy (Barbara Lewandowska-Tomaszczyk), time in language and thought (Katarzyna Jaszczolt), and on two dogmas of contemporary philosophical linguistics (Eros Corazza and Kepa Korta).

Peregrin claimed, not uncontroversially, that autonomous semantic structure is only a convenient working conjecture, a myth stemming from uncritical acceptance of received wisdoms. Morris offered two reasons for questioning the traditional assumption that languages are systems of signs, the first was connected with giving account of poetic language, the second with rebutting the unattractive idealism about the nature of the world. Lewandowska-Tomaszczyk elaborated on asymmetric events and negative events in the framework of cognitive linguistics. Jaszczolt corroborated the hypothesis that the human concept of time is supervenient on the concept of epistemic possibility. Corazza and Korta discussed the dogmas of monopropositionalism and sententialism, and proposed a pluri-propositional framework.

Other topics which attracted considerable attention where approaches to proper names (Filip Kawczynski, Piotr Wilkin), formal semantic theories (Brendan Gillon, Mieszko Talasiewicz, Christian Bassac, Chris Fox), context and context-dependence (Lucian Zagan, Joanna Odrowaz-Sypniewska, Tadeusz Ciecierski), and different approaches to metaphor (Aleksander Szwedek, Jakub Macha). Several papers discussed historiographical issues, such as the influence of science and scientism upon modern linguistics and philosophy of language (Yrsa Neuman, Pius ten Hacken), the unfading influence of Frege (Piotr Stalmaszczyk), and the importance of Ludwik Flecks methodological insight for cognitive linguistics (Henryk Kardela).

The name most often referred to during the conference was undoubtedly that of the German logician, Gottlob Frege. His legacy has proved to be of unquestionable importance for contemporary philosophers of language and linguists alike. Also the continuing influence of Bertrand Russell, Ludwig Wittgenstein, Willard Van Orman Quine, Donald Davidson, Noam Chomsky and Saul Kripke was clearly visible in numerous presentations and discussions.

The idea of bringing together researchers working within different disciplines and traditions and interested in natural language proved highly successful, and therefore the next PhiLang conference is planned for May 2011.

Piotr Stalmaszczyk
Chair of English and General Linguistics, University of Lodz

Calls for Papers

Animal Minds: Special issue of *Teorema*, deadline 15 June.

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

Causality in the Sciences

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

David Hume's Epistemology and Metaphysics: Special issue of *Logical Analysis and History of Philosophy*, deadline 31 July.

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

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

Psychology and Psychologies: which Epistemology?: Special issue of *Humana.Mente*, deadline 5 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.

Hannes Lietgeb (in his joint work with R. Pettigrew) took us on a Baysian exploration of how it is that we might go about justifying our beliefs. The key was a mathematical precisification of the norm: Try to minimize the inaccuracy of your beliefs. Getting all of this up and running properly required replacing Jeffrey conditionalisation with their own, custom-shop conditionalisation. Neat!

Wiebe van der Hoek (in his joint work with Thomas Agotness and Michael Wooldridge) made the case for Pauly's Coalitional Logic actually being more about Cooperative Games than Coalitional Games. A succinct variation of Pauly's Coalitional Logic was used to define further epistemic logics. Several formalisations for epistemic logics for explicitly Coalitional Games were then developed.

Richard Bradley gave us an altered model of Baysian conditioning that dropped the assumption of maximally opinionated agents. I was interested in this from an epistemic logic point of view. It's canonical in epistemic logic circles that knowledge and belief are duals. But, obviously on cursory reflection, this only holds if the agent is maximally opinionated. I'm wondering what sorts of relations between knowledge and belief (as operators) fall out if you start restricting the agent's opinion across the domain in various ways. To make my job easier, I just set this as a question for my masters students in my formal epistemology class. If any of them choose to answer it, and if any of them say something especially insightful, then readers of *The Reasoner* will be the first to know!

Next month: Luc Bovens and Tomoji Shogenji!

Pics of the FPS seminars are available here. The full FPS program is available here.

Sebastian Sequoiah-Grayson
Formal Epistemology Project, Leuven

Logic and Rational Interaction

The last month on loriweb.org has belonged to Melvin Fitting and Justification Logic. Fitting gave an interview to LORI, where he situates justification logic with respect to epistemic logic and formal epistemology, and points out to new and exiting research concerning the place of evidence in social contexts. Fitting's talk at HYLOCORE'09, a workshop on hybrid logic held at Roskilde University, has been also reported by Rasmus Rendsvig. Rasmus's report also covers the presentation of Jens Ulrik Hansen on hybrid epistemic logic. Back to justification logic, LORI announced three recent publications by people related to the topic: S. Artemov's "Intelligent Players," which gives surprising results in interactive epistemology, M. Fitting's "Justification Logics, Logics of Knowledge, and Conservativity", putting together the whole family of Justification Logics, and Bryan Renne's "Propositional Games with Explicit Strategies", which provides a game semantics for Artemov's Logic of Proofs.

LORI was also proud to publish Minghui Ma's report on an intensive Dynamic Logic Seminar in Beijing, connecting work by locals with PhD students from the ILLC in Amsterdam. Still on the announcement side, two very good pieces of news from Groningen University went out through LORI: first Rineke Verbrugge's new appointment as full professor at ALICE (Artificial Intelligence and Cognitive Engineering) in the Faculty of Mathematics and Natural Sciences and her new research project on logical and computational models of higher-order social cognition, and second Sujata Ghosh's new project on the logic of strategies.

I take the occasion to remind you that you can stay in touch with loriweb.org by registering to the newsletter, or to our recently improved RSS feed. You can find all details about these on loriweb.org.

As usual, I'll close by mentioning that 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.

Begriffsschrift

Begriffsschrift is the book that inaugurated modern logic. Written by the German mathematician Gottlob Frege and published in 1879, it gave the first exposition of predicate logic, introducing a notation for quantification, and also offered an axiomatization of propositional logic. The book is divided into three parts. The first part explains Frege's logical symbolism, which he called 'Begriffsschrift' (literally, 'concept-script'), the second shows how to represent and derive certain propositions, and the third uses the symbolism to provide a logical analysis of mathematical induction.

Frege's crucial innovation lay in extending the use of function-argument analysis from mathematics to logic. In traditional (Aristotelian) logic, simple propositions such as 'Gottlob is cool' had been seen as having subject-predicate form, represented by 'S is P', with 'S' symbolizing the subject and 'P' the predicate, joined together by the copula 'is'. In Fregean logic, they are seen as having function-argument form, represented by 'Fa', with 'a' symbolizing the argument (in this case Gottlob) and 'x is F' the function (in this case, the concept is cool), the 'x' here indicating where the argument term goes to yield the proposition. With a notation for quantification, more complex propositions such as 'All logicians are cool' (involving the quantifier 'All') can then be formalized. Traditional logic had also seen these as having subject-predicate form, 'All logicians' in this case being the subject. In Fregean logic, however, this is seen as having a quite different and more complex (quantificational) form: in modern notation, symbolized as '$(\forall x)(Lx \rightarrow Cx)$, i.e. 'For all x, if x is a logician, then x is cool'. The advantages of Fregean logic come out, especially, when we consider statements of multiple generality (involving more than one quantifier), such as 'Every philosopher loves some logician', which traditional logic had had great difficulty in analysing.

Michael Beaney
Philosophy, York

Semantics

Logics may be defined syntactically by deductive calculi that include a formal language: Proof theory investigates a logic from the point of view of deducibility and provability. However, logics are often motivated by an intended interpretation of their symbols, and it is desirable to specify an interpretation formally. The interpretation of the logical symbols is the same in all interpretations, whereas the interpretation of the nonlogical symbols may vary to some extent. An interpretation of a logic is called a model for the logic. Semantics and model theory comprise the models of a logic and the investigation of their properties. For example, Boole gave two different interpretations of his algebra of logic.

The first rigorous definition of a semantics for classical first-order logic was given in the mid 1930s. Assuming that the language contains $\neg$ ("not"), $\vee$ ("or") and $\forall$ ("for all") as logical constants, denumerably many variables $x_0, x_1, x_2, \ldots$, and predicate symbols $P^{n_1}_1, P^{n_2}_2, \ldots$ as nonlogical symbols, the interpretation may be outlined as follows. Let D be a nonempty set of arbitrary objects (the domain), I an interpretation function and v a valuation function.

(1) $I(\neg\varphi)_v = T$ iff $I(\varphi)_v = F$,

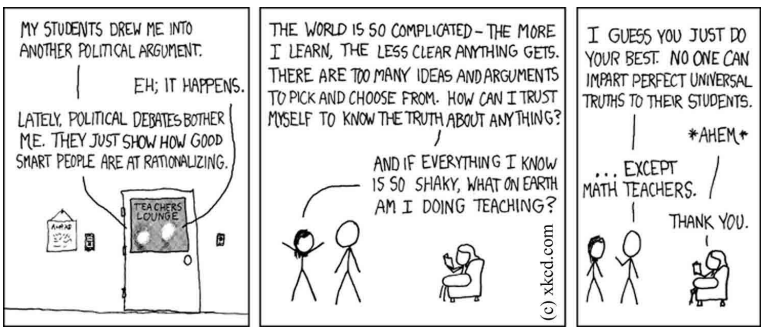
(2) $I(\varphi_i \vee \varphi_j)_v = T$ iff $I(\varphi_i)_v = T$ or $I(\varphi_j)_v = T$,

(3) $I(P^{n_i}_i(x_1, \ldots, x_{n_i}))_v = T$ iff $\langle v(x_1), \ldots, v(x_{n_i})\rangle \in I(P^{n_i}_i)$,

(4) $I(\forall x.\, \varphi)_v = T$ iff for any valuation $v_{[x\mapsto d]}$, $I(\varphi)_{v_{[x\mapsto d]}} = T$,

where $v_{[x\mapsto d]}$ is a one-point modification of the valuation function setting x's value to d (where $d \in D$).

The relationship between a logic and its semantics is expressed by the soundness and the completeness theorems. An axiomatization of first-order classical logic is sound if φ's provability from Γ implies that every interpretation mapping all elements of Γ into T, interpret φ into T. Completeness states the converse, that is, if φ is a semantic consequence of the set of formulas Γ, then φ is derivable from Γ.



Nonclassical logics require more intricate interpretations than classical logic does. A semantics may include 3, 4, finitely many or infinitely many values. A logic may have algebraic semantics, where the logical constants are mapped into operations and constants of the algebra. A semantics—often used in completeness proofs—may be built from expressions (or equivalence classes of expressions) of the logic, some of which are called "term semantics."

The preferred type of semantics for nonclassical logics is the relational semantics. Kripke introduced such semantics for normal modal logics, and they are nowadays usually called "possible worlds semantics." In relational semantics, sentences are interpreted as propositions, which are sets of possible worlds or situations. Connectives (that do not occur in classical logic) are defined from a compatibility (or accessibility) relation on situations. Relational semantics for relevance logics utilizing a ternary accessibility relation were introduced by Routley and Meyer. A uniform framework—called generalized Galois logics—encompassing relational semantics for nonclassical logics was introduced by Dunn. A precise characterization of classes of relational structures for a logic can be obtained by adding a topology to the structures. This leads straightforwardly to dualities between the categories of algebras of logics and of relational structures for logics.

Katalin Bimbó
Philosophy, Alberta

§6 Events

June

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

Questioning Scholastic Reason: Maison Française d'Oxford, UK, 1 June.

Theory and Practice: 4th Joint Workshop on Integrated History and Philosophy of Science, Durham University, 1 June.

Commonsense: 9th International Symposium on Logical Formalizations of Commonsense Reasoning, Toronto, Canada, 1–3 June.

Memory and Self-Understanding: Hanse-Wissenschaftskolleg (HWK), Delmenhorst, Germany, 3–5 June.

Argument Cultures: Ontario Society for the Study of Argumentation, Windsor, Canada, 3–6 June.

The Phenomenal Qualities: University of Hertfordshire, Hatfield, UK, 5 June.

O-Bayes: International Workshop on Objective Bayes Methodology, Wharton School of the University of Pennsylvania, Philadelphia, PA, 5–9 June.

Skepticism Graduate Philosophy Conference: University of Southampton, 6 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.

Erasmus Workshop: with Max Kölbel on Relativism and Context Dependence, Department of Philosophy, Universitá degli studi di Genova, Italy, 9–11 June.

Philosophy of Darwin: Department of Philosophy, University of Birmingham, 10 June.

Formal methods in the Epistemology of Religion: KULeuven, Leuven, Belgium, 10–12 June.

The Aim of Belief: Centre for the Study of Mind in Nature, University of Oslo, 11–13 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: 35th Annual Meeting, Indiana University, Bloomington, 12–14 June.

Scepticism: University of St Andrews, 13–14 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: 26th International Conference On Machine Learning, Montreal, Canada, 14–18 June.

MSRL: Multidisciplinary Symposium on Reinforcement Learning, Montreal, Quebec, Canada, 18–19 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.

COLT: 22nd Annual Conference on Learning Theory, Montreal, Canada, 18–21 June.

UAI: 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.

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.

Petri Nets: International Workshop on Petri Nets and Software Engineering, Paris, 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

Logics and Strategies: University of Groningen, The Netherlands, 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.

Practical Reasoning: University of Edinburgh, 28–29 June.

BRICKS: Workshop on Game Theory and Multiagent Systems, Amsterdam, 30 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.

The European Epistemology Network Conference: Formal Epistemology Project, Brussels, 4–5 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.

TACL: Topology, Algebra and Categories in Logic, Institute for Logic, Language and Computation University of Amsterdam, 7–11 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.

MJCAI: 1st Malaysian Joint Conference on Artificial Intelligence, Kuala Lumpur, Malaysia, 14–16 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: 3rd Workshop in Decisions, Games & Logic, HEC Lausanne, Switzerland, 15–17 June.

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, UK, 5–7 August.

The Skeptic's Toolbox: The Scientific Method: Annual Conference of the Committee for Skeptical Inquiry, University of Oregon, 6–9 August.

Meaning, Understanding and Knowledge: 5th International Symposium of Cognition, Logic and Communication, Riga, Latvia, 7–9 August.

LCC: 10th International Workshop on Logic and Computational Complexity, Los Angeles, 10 August.

LICS: Logic in Computer Science, Los Angeles, 11–14 August.

Probability and Stochastic Processes: Isfahan University of Technology, Iran, 14–15 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.

ESSA: 6th European Social Simulation Association Conference, University of Surrey, Guildford, 14–18 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.

Artificial by Nature: 4th International Plessner Conference, Erasmus University, Rotterdam, 16–18 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

History of Statistics and Probability: Santiago de Compostela, Galicia, Spain, 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.

Applied Statistics: Ribno (Bled), Slovenia, 20–23 September.

The Social Self: Summer School in Neuroscience and Philosophy of Mind, Alghero, Sardinia, Italy, 20–27 September.

International Darwin Conference: Norcroft Centre, University of Bradford, 24–26 September.

Humanities and Technology Annual Conference: Special Topic: Technology, Democracy, and Citizenship, University of Virginia, 24–26 September.

LACSI: The Logic and Cognitive Science Initiative Conference on Ontology, North Carolina State University, 25–26 September.

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

Amsterdam Graduate Philosophy Conference: Universiteit van Amsterdam, 1–3 October.

Joint Attention: Developments in Developmental and Comparative Psychology, Philosophy of Mind, and Social Neuroscience, Bentley University, Greater Boston, 1–4 October.

Buffalo All X-Phi Weekend: University at Buffalo, 2–3 October.

IC3K: International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management, Madeira, Portugal, 6–8 October.

Hugh MacColl Centenary: 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.

P-NPMW: Paris-Nancy PhilMath Workshop, Nancy, 21–22 October.

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

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

Darwin Conference: Chicago, Illinois, 29–31 October.

Language, Epistemology and History: 2nd SIFA Graduate Conference, Bologna, Italy.29–31 October

November

Darwin in the 21st Century: Nature, Humanity, and God: University of Notre Dame, Indiana, USA, 1–3 November.

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

Logic, Epistemology, and Philosophy of Science: Universidad de los Andes, Bogotá, Colombia, 4–6 November.

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

AICI: Artificial Intelligence and Computational Intelligence, Shanghai, China, 7–8 November.

CSMN/Arché Graduate Conference: University of St Andrews, 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.

ICITE: International Conference on Information Theory and Engineering, Kota Kinabalu, Malaysia, 13–15 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.

Knowledge, Value, Evolution: An international conference on cross-pollination between life sciences and philosophy, Prague, 23–25 Novermber.

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.

Emergence and Reduction in the Sciences: 2nd Pittsburgh-Paris Workshop, Center for Philosophy of Science, University of Pittsburgh, 11–12 December.

FIT: International Conference on Frontiers of Information Technology, Abbottabad, Pakistan, 16–18 December.

Seventeenth Amsterdam Colloquium: University of Amsterdam, 16–18 December.

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

January 2010

SODA: ACM-SIAM Symposium on Discrete Algorithms, Hyatt Regency Austin, Austin, Texas, 17–19 January.

February

IWCogSc-10: ILCLI International Workshop on Cognitive Science, Donostia-San Sebastian, 10–12 February.
Logical Approaches to Barriers in Computing and Complexity: Alfried Krupp Wissenschaftskolleg, Greifswald, Germany, 17–20 February.

§7 Jobs

Post-doc position: 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, deadline 1 June.

Centre for Reasoning Research Fellowships

Two 2-year research fellowships at the Centre for Reasoning, University of Kent, Canterbury, UK. Choose a project and apply for job HUM0078 here. Deadline 5th June.

Research Fellowship: School of Psychology, Queen's University, Belfast, deadline 5 June.
Research Associate: in Cognitive Robotics, Intelligent Systems Research Centre (ISRC), Faculty of Computing and Engineering, University of Ulster, deadline 5 June.
Research Associate: in the EU-funded project "Intrinsically Motivated Cumulative Learning Versatile Robots" (ImClever), Intelligent Systems Research Centre (ISRC), Faculty of Computing and Engineering, University of Ulster, deadline 5 June.
Research Fellowship: 3-year funded position on "Topos Theory and Quantum Foundations", School of Computer Science, University of Birmingham, deadline 10 June.
Full Professorship: in Theoretical Philosophy at the University of Vienna, deadline 12 June.
Post-doc position: in the research project "The Dynamics of Argumentation" (DYNAR), University of Luxembourg, deadline 15 June.
Professorship/Readership: in Computational Neuroscience, Intelligent Systems Research Centre (ISRC), Faculty of Computing and Engineering, University of Ulster, deadline 19 June.
Visiting Fellowships: Joseph L. Rotman Institute of Science and Values, University of Western Ontario, deadline 1 July.
Visiting International Fellowship: Department of Sociology, University of Surrey, Guildford, deadline 30 September.
Post-doc positions: Instituto de Investigaciones Filosóficas, UNAM, Mexico, deadline 10 October.

§8 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.
MSc in Artificial Intelligence: Faculty of Engineering, University of Leeds.

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.
MSc in Cognitive Science: University of Osnabrück, Germany.
Master of Science: Logic, Amsterdam.
APTS: Academy for PhD Training in Statistics, University of Warwick.
Summer School in Logic and Formal Epistemology: Carnegie Mellon University, 8–26 June.
Arché Summer School: University of St Andrews, 29 June–1 July.
NN: Summer School in Neural Networks in Classification, Regression and Data Mining, Porto, Portugal, 6–10 July.
ISSCSS: 1st Graduate International Summer School in Cognitive Sciences and Semantics, University of Latvia, Riga, 16-26 July.
Philosophy and Medicine: Summer School & Workshop, University of Rostock, Germany, 27 July–1 August.
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 Studentship: 3-year AHRC studentship in the Foundations of Logical Consequence project, University of St Andrews, until filled.

Two PhD Scholarships: in Philosophy of Mind and Cognitive Sciences, Center for Integrative Neuroscience (CIN), University of Tübingen (Germany), deadline 7 June.

Two D.Phil Studentships: in AI/Computational Logic, associated with the EPSRC project "Constraint Satisfaction for Configuration: Logical Fundamentals, Algorithms, and Complexity", Computing Laboratory, University of Oxford, deadline 10 June.

Two PhD Studentships: in Computing Science, Department of Computing Science and Mathematics, University of Stirling, deadline 10 June.

PhD position: Vrije Universiteit Brussel, Center for Logic and Philosophy of Science, deadline 15 June.

PhD position: 3-year funded PhD position on "Programming and Reasoning with Infinite Structures", Functional Programming Laboratory, University of Nottingham, deadline 20 June.

PhD position: in OR and Statistics, Centre for OR and Applied Statistics, University of Salford, deadline 26 June.

PhD position: Cork Constraint Computation Centre (4C), University College Cork, deadline 1 July.