# THE REASONER

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## EDITORIAL

### Much ado about nothing

My three year old doesn't believe that Paris really exists. This isn't the result of some sophisticated ontological position, borne out of an inherited and grossly exaggerated taste for desert landscapes (he is only *three*, after all). No, the reason is simpler than that: his only knowledge of Paris is through fiction. The Disney film, *The Aristocats*, to be precise. With his robust sense of reality, he knows full well that this is just a story.

So when I tell him I'm off to Paris for a few days for a conference he looks at me sceptically and says, "Don't be silly, mummy! There's no such place. Cats don't *really* talk, you know." Well, I need to explain my movements somehow, so we sit down and have 'the talk'. I explain that, while it's true that Madame, Duchess, the kittens, and the villainous butler Edgar don't really exist, some of the things we talk about in stories do, and Paris is one of them. And that's where I'm off to. I think I'm getting through to him, but now he looks worried. "But mummy—what if *Edgar* gets you?" I remind him that Edgar doesn't really exist, and that at any rate the last anyone saw of him was when the cats bundled him into a trunk and posted him off to Timbuktu. And so, doubly reassured, he is happy to send me on my way.

I'm in Paris for a conference in honour of Paul Benacerraf, but while I'm there I also have the chance to

catch up with Jody Azzouni, a philosopher who has made a career out of navigating the boundaries of the real. One of Azzouni's early papers starts with the confession: "One of the little tragedies of my early childhood is that I never saw a hobbit." There's a very good explanation for this: hobbits don't exist. Yet we can talk about hobbits, reason about them, even (as his current book reminds us in a colourful example) have vivid hallucinations of them. And (at least modulo a little tutoring—I think my three year old can be excused for now) in general we're pretty good at it: nonexistence doesn't seem to get in the way of our making meaningful and, indeed, true claims in the context of our reasoning about objects such as Edgar that, on the face of it, exist in no sense at all.

My interest in Jody Azzouni's work stems from our shared fascination with the philosophy of mathematics, where we belong to a minority (albeit, I think, a growing minority) of nominalists. Azzouni and I are in agreement that numbers, like the scheming butler Edgar, do not exist. And our agreement is based on very similar considerations—we simply do not see any active role for such objects in our explanations of our reasoning about mathematics, the physical world, or stories. Yet we have one big disagreement: Azzouni thinks that our mathematical theories are, nevertheless, true. That is, we speak truly when we say there are at least three perfect numbers greater than seventeen, *even though there aren't really any numbers at all*. I (my ear for such things ruined, perhaps, by too much time spent reading Quine) find this hard to get my head around, at least in the context of the metaphysics classroom, and this despite my readiness to engage fully in discussions, in other contexts, about the three fictional kittens in the *Aristocats* story, that also do not exist. My preferred solution is a fictionalist construal of talk about numbers and about fictions: when we speak about numbers or about fictional characters we do so against the backdrop of an undischarged (and undischargable) assumption that there are such things, simply for the sake of 'telling a story', without committing ourselves to endorsing that assumption. But admittedly this isn't an easy line to run with, a point that Azzouni has pressed forcefully in his own work. So I'm interested to hear the case for our ability to speak truly about nothing whatsoever, and take the opportunity, while in Paris (which, I must again stress, really is *something*), to talk with Jody

Azzouni about *Talking about Nothing*.

MARY LENG
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## FEATURES

### Interview with Jody Azzouni

Jody Azzouni is professor of Philosophy at Tufts University. His books include: *Metaphysical Myths, Mathematical Practice* (1994); *Knowledge and Reference in Empirical Science* (2000); *Deflating Existential Consequence: A Case for Nominalism* (2004); *Tracking Reason: Proof, Consequence, and Truth* (2006); and *Talking about Nothing: Numbers, Hallucinations, Fictions* (2010).

Mary Leng: Could you start by explaining to our readers, who may be unfamiliar with the philosophical literature in this area, what it is that seems to many philosophers to be so problematic about our apparent ability to talk meaningfully about things that do not exist?

Jody Azzouni: So I guess, basically, there are two things, right? One of them is that, if we're literally talking about nothing, there is no subject matter. So it sounds like what's puzzling about it is that we do seem to say things—and philosophers have mostly focussed on statements like, 'Pegasus does not exist'—but if there's nothing you're talking about it doesn't sound like you're saying something distinctive when you say 'Pegasus does not exist' rather than 'Hercules does not exist'. So that's one kind of issue. And I think it's a little broader, because we also seem to say things that are true and false distinctively, so we'll say for example, 'Hercules is depicted in Greek mythology as a powerful man, whereas Pegasus is depicted as a flying horse'. Those statements are not interchangeable with respect to Pegasus and Hercules, and again if you're not really talking about anything, it's hard to see how that could be the case. So we

might call this the 'aboutness problem'—that is, the problem is that if you're talking about nothing, there isn't a subject matter which makes what you're saying distinctive. That seems to be the root of the issue.

ML: As you say in your book, it is generally assumed that there are just four broad strategies for dealing with apparently true statements, such as 'Santa Claus is often depicted as wearing a red coat with white fur trim', that appear to talk about things that do not exist. These are, roughly, as follows: First, accept that that these are indeed true 'at face value'—i.e., truths *about* Santa Claus and the like, and conclude from this that the objects they talk about do exist after all (e.g., as abstracta).

JA: Abstracta, or as fleeting ephemeral little creatures like Salmon does. There are different views about what they end up being.

ML: Right. And a second option is the Meinongian one, where we accept that these statements are indeed true 'at face value', but hold that they are truths about non-existent objects, whatever that means. Third, we might accept that these statements are true, but reject their face value reading in favour of a reading that dispenses with apparent reference to Santa Claus—replacing names with definite descriptions, for example, or providing a more nuanced reinterpretation. And finally, the fourth option is to reject the truth of these statements, and try to explain away their 'apparent' truth by means of some lesser notion (e.g., fictionality).

Now in your work you argue that there is room for a fifth option beyond these. So could you tell us about that alternative, and how it differs from the ones I have outlined?

JA: So the fifth option is basically that you take the statements to be true, and false, respectively, depending on what they say, but you accept the fact that they are literally about nothing at all. So you take a statement like, 'Mickey Mouse was invented by Walt Disney', or, 'Sherlock Holmes is depicted as smarter than Mickey Mouse', and you say, 'Yes, these statements are true, but there's no metaphysics associated with this. There's no object that we're talking about. No fleeting object that exists; no object that has being but doesn't exist...'. So that is literally a fifth option. And what makes it a fifth option, in a certain sense, is also a burden that it bears, which is that somebody may say, 'Look, I understand how if I'm a Meinongian or I think these things exist in some way, then I can make sense of how the statement, 'Mickey Mouse was invented by Walt Disney' gets to be true—namely there's this thing, that was invented by Walt Disney. And if I'm saying it's

not true and I'm pretending, then I don't have that burden of explaining truth at all, right? And if I'm going to paraphrase it away, I'm going to say we're in some way maybe pragmatically targeting some other statement, which doesn't say this at all—it says something about Mickey Mouse cartoons or something.' But this fifth option says, 'No, we're going to take the burden as it is. The statement isn't about anything. There is no Mickey Mouse, but it's true nevertheless'. So we have to tell a different story about what makes that statement true. That's where the fifth option comes in, and I'm going to tell such a story. And the story will be in terms of the kind of thing we were thinking that you would gesture towards, that is towards a cartoon practice *et cetera, et cetera*. But I'm not going to say that the statement is really about any of that. It's about what it appears to be about, which is nothing at all. But nevertheless, how it gets its truth value is by this practice being in place. So that's, roughly speaking, the fifth option.

ML: Your fifth option in a way has the advantage of fitting well with a lot of our ordinary talk about Mickey Mouse.

JA: That's right. Including the ordinary practice of saying things like, 'Well, *there is no* Mickey Mouse— he doesn't exist'. As I put it in the book at one point, the mother who is engaged in debriefing her child after the child has been deludedly convinced that there is a Mickey Mouse has to say, 'No, there really is no Mickey Mouse', and that's OK, and yet the statements still remain true or false respectively. So that's all as we ordinarily operate.

ML: Given all that, yours is arguably the 'common sense' solution to this problem. Yet many philosophers have been very resistant to it, and even find it hard to understand it as a genuine option distinct from the other four (and here I must confess my own difficulties because in my own written work I've presented you as a kind of Meinongian, which I now realise to be in error). So do you have a diagnosis of why (apart from stupidity on our part!) this may be?

JA: By no means is it stupidity. I mean, the ordinary person—the non-philosopher, let's put it that way— engages in the practices that they engage in, talks the way they talk, and they don't really worry about it very much. What the philosopher starts worrying about, and I think the worry dates back to Parmenides, is the concern about truth conditions. That, I think, is one of the primary motivations for the ordinary philosopher. That is, they'll say, 'As soon as you say you want to take seriously the idea that these statements aren't about

anything at all, I've lost touch with how they're supposed to be true or false.' And I think that when the philosopher puts it that way, the objection—the *prima facie* objection—is very compelling. And the philosopher can get the ordinary person upset very easily, by, you know, if the person says something about Mickey Mouse, and then says, 'Well there is no Mickey Mouse', then the philosopher says, 'Well then, what were we *talking about*?' And the person immediately says something like, 'Oh, you know, *my concept*'. And then they're in trouble, because the philosopher says, 'Well no, I didn't think we were talking about the concept. I'm not having a debate about the *concept* of Mickey Mouse. I may agree with you that the concept was invented by Walt Disney, but that's not what you said when you said, 'Mickey Mouse was invented by Walt Disney', and it's not what you say when you say, 'Sherlock Holmes is smarter than Walt Disney'. You don't mean the *concept* of Sherlock Holmes is smarter than Walt Disney. That's just confused.' So I think all of this motivates moving away from the otherwise natural position, which says, 'There's nothing there'. And that's where, as I said before, I've got a real burden of talking about how these statements are made true and false. And one of the things I also have to do, which many philosophers are uncomfortable with, is when they think of truth conditions—of the semantics of these sentences—they think, 'Well now we're telling a story that connects our sentences to the world'. And I'm going to say, 'No. That doesn't happen in a semantic theory. It *can* happen, but it doesn't have to happen. It does happen when the terms refer to objects in the world, but when they don't refer, then the direction from the semantics to the world is more indirect, more complicated. The world-language relation is one to be studied and one to understand, and there are things to say about it, but it's not part of semantics. So to some extent this is a terminological debate. Somebody might say, 'I want to include it as part of semantics, but the semantics has to be much more complicated.' And I can say, 'Fine, you want to do it that way, that's OK. But certainly I can take on all the standard semantic approaches, and when I do that, it's not capturing language-world relations. And now you're going to have to include something else'.

ML: Your book contains three case studies that you take to involve talk about nothing: numbers, hallucinations, and fictions. Many readers will be happier with the idea that Sherlock Holmes and the apparent objects of our hallucinations do not exist than they will be with the idea that there are no numbers. But of course as a mathematical fictionalist I agree completely with you about the ontological status of numbers. Instead I'd like to focus on hallucinations, because I think that the phenomenology of hallucinations, which you describe very well in your book, means that these present a strong challenge for a fictionalist understanding, particularly one that puts a lot of stock by pretense. So could you start by outlining that challenge?

JA: Yes. I think the challenge to the pretense theorist, or the fictionalist, is one that Evans, quite a while ago, felt very strongly. I think that's why he focussed so much on that kind of case. And the problem is of the phenomenology. Imagine that you are hallucinating, which is maybe something that some people who are reading this have had the experience of. The thing about hallucination is that it is very natural to point out aspects of the hallucination. So if you're hallucinating an elf sitting in a chair, somebody may say to you, 'Which chair?', and you can point at where the elf is sitting, and you can point at the fact that the elf has red shoes or whatever—you can talk about the details of the hallucination. This kind of thing happens in vision science routinely. If you read some of the hallucination literature, you'll find people pointing out aspects of the hallucination. Now, what's very striking about this is, they don't experience any sort of pretense here. In cases where people are aware that they are hallucinating, they know that they are hallucinating, and nevertheless pointing is perfectly cogent to them. They don't think it strange or odd. They're pointing at what they see—and when I use the word, 'see', here, they're seeing something that's not there. And they recognise that. Furthermore, the recipient of the gesture understands what's going on. *They're* not engaged in a pretense either, okay? So if I say to the person who is hallucinating, 'Where exactly is the jumping dwarf?'—you know, I may be a doctor to whom the location of the jumping dwarf—where the person is hallucinating—the location is perfectly relevant to what part of their brain is being activated. It's evidence, of a certain sort. *I* don't experience pretense. They're pointing at something that I can't see—but that's perfectly analogous to cases where if I couldn't see something real that someone else could see, they would point at it, and they'd say, 'Well it's over there'.

ML: But in these cases they're pointing at *nothing*, right?

JA: Nevertheless, they can say, *there's nothing there*. So there's a challenge to the philosopher who wants to

say, 'They're pointing at something, and there's nothing there at all', to explain *how can this work*? This has to do with demonstratives, and singular terms generally. We have to explain how these things can be true, given that there's nothing there, and I try to tell a story about how that's going to work. So at the end of the day, the story I want to tell preserves the phenomenology, because the person is not engaged in pretense; it preserves the truth conditions of these statements, because if the person is sincerely saying 'My hallucination is of a red elf', I want it to come out true that they are hallucinating a red elf, that's what they're pointing at; and at the same time, there's nothing there. So I want to respect all of that, and it seems to me I *can* do that. That's what the view tries to do. And the pretense theorist has to give up, and either they have to say that the person *is* really pretending, or they're pretending and they're not aware they are, or pretense is occurring at some stage, whereas I'm flat footedly keeping the truth values of the statements, and very importantly, I think, therefore keeping their value as tools for evidence. We've got true statements about what the person is hallucinating which can then be used as evidence in vision science, for example, for what's going on in the brain. And all of this is exactly as it appears to be, on my view.

ML: That brings us quite nicely to the next question, because with this rich evidential role you're allowing hallucinations to have, there's a danger, isn't there, of their becoming too real? So in your previous work you've presented epistemic criteria for discovering whether something we talk about really exists. We have reason, you think, to believe in the existence of theoretical posits when we have 'thick' epistemic access to such things. But in this book you give an account of hallucinations as potentially public, belief independent, trackable, objects that may lead one to think that these are objects to which we can have thick epistemic access. So are you in danger of bringing hallucinations into the realm of the real?

JA: I don't think I'm in danger of that. What I'm in danger of, of course, is scepticism of the traditional sort. We might all be hallucinating. And I take that kind of scepticism very seriously. I want to understand tracking, and I want to understand 'thick epistemic access', *factively*. I want to understand it so that if we've got thick epistemic access, then there really is something we've got access to. If it turns out it only looks like we've got access to it, then we have to tell a quite different story about what's going on. So I see thick epistemic access as requiring the object. Hallucinations are the

perfect situation where it looks like we're tracking—it looks like it, but we're actually not. And what becomes important is the challenge of being able to establish that there really are objects out there with such and such properties, *et cetera, et cetera*. As I say, it's the challenge of scepticism, which I take seriously and try to meet.

ML: Would you like to say something about how you do try to meet it?

JA: Oh, well I haven't done that in anything I've written yet! But I do *intend* to meet it. . .

ML: Well that ties in nicely to my last question. *Talking about Nothing* appeared with Oxford University Press in 2010, and I understand that since then there is another book in the pipeline. Could you tell me a bit about that book, and how its themes relate to those present in your previous work?

JA: OK, so the next book, the next book is not taking up scepticism—scepticism is maybe two books away, or three books away, or something like that. The next book is provisionally called, *Semantic Perception: How the illusion of a common language arises and persists*. The picture I've got is broadly speaking in continuity with what I've been talking about with hallucinations in the previous book, although hallucination is a bit strong. We have a very powerful, involuntary, experience of speaking a common language. But I (more or less) accept the Chomskian line—it's not just Chomsky—that, in a certain sense, there is no such thing as a public language. There are only, you know, our individual competencies, and our individual competencies at best generate idiolects, in some logical sense of 'generate'. But in point of fact, a lot of our understanding of language involves the involuntary experience of public language entities that have their properties independently of us, and that we experience in common. And our language exchange presupposes that experience. One of the things I do in the book is that I use this to undercut certain aspects of Gricean viewpoints, which involve a kind of mutual recognition of conventions, language conventions, and mutual recognition of communicative intentions and all of that. I'm not denying the existence of communicative intentions—I'm not denying that kind of thing—but I actually think communicative intentions play a very small role in our language transactions. What's playing the biggest role is this involuntary experience that we are exchanging language devices that literally possess language / meaning properties. I'm not saying that anything in the world *has* these properties; I'm just saying that's how we experi-

ence it, and that changes our picture of language transactions a great deal, I think. So that's what the new book is about.

ML: Thank you very much, Jody Azzouni.

## Truth and Success, Again: Reply to Held on Generalist versus Particularist (Anti-)Realism

In a previous paper (Truth and Success: Reply to Held, *The Reasoner*, 5.7, 106–107 (2011)), I took issue with Carsten Held's 'underdetermination argument' (UA) against the ultimate, or 'no-miracle', argument for scientific realism (NMA) (Truth Does Not Explain Predictive Success, *Analysis*, 71, 232–234 (2011)). According to NMA, it would be a miracle if the success of scientific theories were not caused by their being true. Held retorts that, since theories are underdetermined by the relevant evidence, NMA is ungrounded. For, if there is no deductive entailment between a successful theory and the relevant evidence, the realist inference cannot but be of an ampliative nature. But this entails that, for *any* successful theory, it is logically possible that it is completely false. Consequently, Held concludes, the realist stance is not justified.

I objected that realists are not committed to the biconditional success ↔ truth. In particular, *if it is assumed* that a miracle has a probability *P* of occurring where 1 >> *P* > 0, NMA-realists must accept the possibility of successful false theories. But this is only to be expected, given that the argument being offered is explicitly acknowledged to be abductive. Hence, realism does in fact meet the requirement according to which "an explanation of any scientific theory's predictive success must be compatible with the assumption that this theory is false" (Held (2011), 234).

Held (A Particularist Defence of Scientific Realism? Reply to Morganti, *The Reasoner*, 6.2, 22–23 (2012)) interprets this as the admission that realists should be particularists. That is, they should present truth as the best explanation of success in *almost* all cases, making an exception for those in which success goes along with complete falsity. (Particularism is intended here as the denial of generalism, i.e., the view that the success of science has always the same explanation). Held then goes on to suggest that such a particularist form of realism is untenable, as i) it would lack a principled way of telling when success is to be explained in terms of truth and when it cannot, for any theory might at some point

turn out to be false; ii) generalism (be it realist or antirealist) is preferable whenever viable; and iii) antirealist generalism appears indeed viable.

I absolutely agree with i) and ii), but am not sure Held can maintain iii). Suppose one is only committed to the empirical adequacy of theories (i.e., the truth of the claims these theories make about observables). This certainly allows one to 'risk less' than the realist. But in this case too the lack of deductive entailment represents a threat: for, how can this sort of anti-realism deal with the possibility that a specific theory is true and not only empirically adequate?

Setting this aside, even though I am sympathetic to 'local' forms of realism, only committed to the truth of specific theories on the basis of specific reasons, defending particularism was *not* the aim of my reply to Held's original paper. Nor, I submit, has Held shown that the NMA-realist is more or less forced to embrace particularism. In the rest of this third-order reply, I will try to clarify my claims and further elaborate on them in view of Held's useful remarks.

In an admittedly ambiguous passage, I stated: "truth might [...] be taken to explain success in the sense that *in most cases* the success of a theory is explained by that theory's (partial) truth" (Morganti (2011), 107, my italics). It is this that Held took to suggest a particularist response to UA. My point there, however, was exactly the opposite. Namely, that the intuition underlying NMA, despite the fact that it concerns what is *overwhelmingly likely* to be the case and not what is necessary, is inevitably set off *whenever* one is presented with a successful theory—regardless, notice, of the truth-content of the specific theory, which is typically ascertained at a later stage. It is in this sense that the very fact that abductive arguments, so to put it, allow for exceptions by definition makes UA innocuous.

Of course, whether truth really is the best explanation is yet to be established. In my previous reply, I suggested that realism has the advantage of being the 'default' position, and no relevant element in this sense is brought to bear by proponents of UA. I reiterate this point here, but also emphasise that my case does *not* crucially rest on it. For, Held's argument concerns *exclusively* the compatibility of NMA with the possibility of false successful theories, and only if the two were not compatible would it be impossible for NMA to provide the best explanation of anything. But, I argued, no such incompatibility is demonstrated by Held, hence what counts as the best explanation and why is simply irrelevant in the present context.

In connection to this, Held draws attention to the fact that generalist realists have to present a counterargument to UA and, therefore, "cannot very well *presuppose* that [...UA] is false" (Held (2012), 23). But at no point did I assume the falsity of UA: indeed, to repeat, my claim is that UA conveys a merely logical point that falls short of undermining NMA and, because of this, (generalist) NMA-realists can perfectly assume UA to be true.

A rather different option for realists is, of course, to reject an assumption that was agreed on so far, and set $P$ above equal to zero. Leaving Held's assumption that 'predictively successful' and 'false' are logically independent predicates untouched, one particular way of doing so deserves to be pointed out: it consists in arguing that possible worlds where a completely false theory is successful exist but are not *accessible* (in the modal semantics sense of the term) from ours. This would enable one to accept the core idea underlying UA while at the same time making the realist commitment as strong as possible: indeed, the realist could then claim that success *must* be explained in terms of truth, even though the 'must' here does not express logical necessity.

In conclusion, I remain convinced that Held's UA is ineffective and that, once the nature of NMA—and of the debate more generally—is correctly portrayed, scientific realism (intended in generalist terms!) continues to be as strong (or weak) a position as it was before.
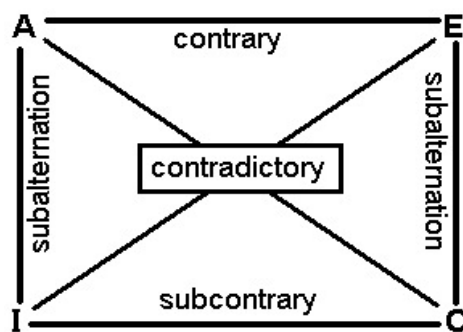
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## The Right Squares

There is a standing problem in recent Deontic Logic: ought it to be the case that $2 + 2 = 4$? This problem is one of many that have arisen because, as in similar analyses for Knowledge and Belief (c.f. Hintikka, J.J. 1962: *Knowledge and Belief: an Introduction to the Logic of the two Notions*, Cornell University Press, Ithaca), the attempt has been made to understand matters in terms of relations to possible worlds. With Knowledge the problem of Omniscience then comes in: if what $a$ knows is what is true in all those possible worlds compatible with what $a$ knows, then $a$ knows all necessary truths. Also $a$ knows the logical consequences of everything that $a$ knows. Likewise, with a similar definition for Obligation, whatever is necessary is also obligatory (so it ought to be the case that $2 + 2 = 4$), and what is entailed by what is obligatory is also automatically obligatory (but does 'You ought to do your homework' entail 'You ought to do your homework, or go to the pictures'?). These follow if what is obligatory is what is true in all those possible worlds compatible with what is obligatory (c.f. Hilpinen, R. 1981: *Deontic Logic: Introductory and Systematic Readings*, Reidel, Dordrecht). Even propositions defined in terms of the possible worlds they are true in generate problems of a similar nature, since they are then equivalent to conjunctions of themselves and necessary truths, making their identity very indistinct. Indeed all necessary truths, on this definition, come out to be identical.

But if propositions are defined in the traditional way, in terms of synonymy and translations (c.f. Haack, S. 1978: *Philosophy of Logics*, C.U.P. Cambridge, Ch. 6), then none of these problems arise. Amongst other things, the traditional definition allows one to distinguish between different necessary truths; but more importantly, in the present connection it enables one to distinguish *what kinds of proposition* are appropriate for different propositional attitudes. What ought to be the case, for instance, is always that someone, or some class of persons, does something or brings something about; so *that* $2 + 2 = 4$ is not even *the sort of thing* that can be obligatory, since it is not something that people can be responsible for. Hence it is *not* obligatory that $2 + 2 = 4$.

The point can be put in terms of what is the right square of opposition for the deontic operators.



The right deontic square is

| | |
|---|---|
| A: It is obligatory that p (Op), | E: It is not permitted that p (¬Pp), |
| I: It is permitted that p (Pp), | O: It is not obligatory that p (¬Op), |

where A and O are contradictories, E and I are contradictories, A entails I, E entails O, A and E are contraries, and I and O are subcontraries, as traditionally defined. But there is another square that is easily confused with this one, namely:

A: It is obligatory that p (Op),
I: It is permitted that p (Pp),

E: It is not permitted that p (¬Pp),
I': It is permitted that not-p (P¬p).

This is imperfect because A and I' are not contradictories, I and I' are not subcontraries, and E does not entail I'. The latter becomes a perfect square only if the 'p's are of the right type, since *only for certain propositions* is it either permitted that p or permitted that not-p, i.e., for them alone 'it is not obligatory that p' is equivalent to 'it is permitted that not-p'. But the O form, which has an external negative in contrast to the I' form, can be used in quite different circumstances: to deny that the expressed proposition is even the kind of proposition that can be said to be obligatory. If we write 'it is a matter of human behaviour whether p' as 'Bp', and then 'It is obligatory that p' is equivalent to 'Bp & ¬P¬p', making 'It is not obligatory that p' equivalent to '¬Bp ∨ P¬p', with 'Bp' being equivalent to 'Pp ∨ P¬p'.

We see the same pattern again in temporal logic (c.f. Ohrstrom, P. and Hasle, Per F.V. 1995: *Temporal Logic: From Ancient Ideas to Artificial Intelligence*, Kluwer, Dordrecht.), since what distinguishes 'it is not always the case that p' from 'it is sometimes the case that not-p', for example, is the possibility that the 'p' in question might not express an event type, i.e., something that might occur repeatedly in time. Temporally definite propositions are not of this sort, since the fact that the battle of Waterloo took place in 1815, for example, while it is about an event, is not itself something that took place at a certain time. Necessary truths such as that $2 + 2 = 4$ are also not of the required sort, and so again provide an illustration: it is *not always the case* that $2 + 2 = 4$, although that is not to say that it is sometimes the case that $2 + 2 \neq 4$. Clearly though, for the type of proposition that is required it will either sometimes be the case that p or sometimes be the case that not-p, i.e., 'it is not always the case that p' will, for them, be equivalent to 'it is sometimes the case that not-p'. But we must formalize the fully general relations using an operator for the category of proposition in question, say 'It is a temporal matter whether p', i.e. 'Ep'. Then 'It is always the case that p' is equivalent to 'Ep and it is not at any time the case that not-p', making 'It is not always the case that p' equivalent to 'Not-Ep or it is sometimes the case that not-p'. 'Ep', of course, is then equivalent to 'either it is sometimes the case that p or sometimes the case that not-p', making 'not-Ep' equivalent to 'it is not at any time the case that p and not at any time the case that not-p'.

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# NEWS

## Sellars at 100: "No Intellectual Holds Barred" on Kant, Science, and Sensibility

A hundred years after his birth in 1912 in Ann Arbor, Michigan (d. 1989), Wilfrid Sellars's philosophy once again occupies center stage in current philosophical disputes about mind, meaning, and science. Sellars's philosophy has been remarkable for the way in which it has deeply influenced some of the most famous philosophers today who have nonetheless held widely diverging philosophical views: from the scientific naturalisms of Paul Churchland and Ruth Millikan to the Hegelian and later Wittgensteinian views of Robert Brandom and John McDowell (all of whom and more are among the speakers at the 'Sellars Centenary Conference' in Dublin, Ireland to be held on June 4–8, registration free). What is the character of Sellars's philosophy such that it continues to have this deep but divergent influence?

It is well known that Sellars took himself to be defending something akin to Kant's *transcendental idealism*, with its distinction between the 'appearances' in space and time and the 'things in themselves' (noumena) that Kant conceived as their unknowable ground (cf. Sellars 1992 [1967], *Science and Metaphysics: Variations on Kantian Themes*, Atascadero, CA: Ridgeview, passim). Roughly speaking, corresponding to Kant's perceptible or phenomenal realm was what Sellars called the *manifest image* of "man-in-the-world", while Kant's unknowable 'things in themselves', on Sellars's view, should be reconceived in terms of the sorts of knowable but "imperceptible" micro-processes in physics and evolutionary explanations in biology that have enabled theoretical science to provide continuously improving underlying explanations of the phenomena.

Less well known is that Sellars regarded Kant's own primary arguments for transcendental idealism to be unsound. Kant was right that "perceptible physical objects," as we conceive them within the manifest image, "are transcendentally ideal," but "he was right for the wrong reasons" (1992 [1967], ch. 2, §VIII). For Sellars it is primarily in terms of considerations concerning theoretical science and the nature of sense perception that "a sound case can be made for the idea that the colours" of physical objects that "we conceptually represent in perception are transcendentally ideal, i.e., exist only as conceptually represented," so "that the world of perceived objects is, after all, in the Kantian sense, 'appearance'" (*ibid*, §IX). Again, very roughly—for the same goes for *perceived shape*, too!—this is because Sellars argued in the tradition of Galileo that the sensuous colours and other sensible qualities that we naturally represent as characterizing external physical objects (for example, the sensed redness of the apple) are ultimately, in reality, "in some sense states of the perceiver" (*ibid*) rather than being constituent characteristics of those external objects.

This contention was one primary source of Sellars's controversial view that, if we take the projected scientific image of the world adequately into account, then we should recognize that *strictly speaking* "there are no such things as the coloured physical objects of the common sense world"; there is thus "a sense in which the scientific picture of the world *replaces* the common sense picture" (1991 [1963], ch. 5, 'Empiricism and the Philosophy of Mind' (1956), §41). But it is when we ask what happens to *persons* on this Sellarsian picture of "the primacy of the scientific image" (1991 [1963], ch. 1, §VI) that we come to the issues that have most energized but also divided the Sellarsians. What room is there for norm-governed conceptual thinking and rational agency on this ideal "scientific image of man" as "a complex physical system" from top to bottom (ibid., §IV)? It was once again Kant who provided the inspiration for some of Sellars's most important moves in his attempt to *reconcile* or "fuse" the ostensibly conflicting manifest and scientific images of the human being.

For Sellars agreed with Kant, against both the classical empiricists and rationalists, that any instance of knowledge or cognition whatsoever—even of the most 'immediate' or 'direct' objects of sensation, inner awareness, or rational intuition—is possible only within the context of a wider, holistic system of concepts and rule-governed norms of inference. For Kant the latter were of course the *a priori categories and principles of*

*understanding*, but Sellars's famous twin conceptions of the normatively irreducible *logical space of reasons* and of the *myth of the given* (i.e., his rejection of allegedly immediate or 'given' knowledge) constitute an understanding of our conceptual cognition that is thoroughly Kantian in crucial respects. As Sellars put it in his Autobiographical Reflections, Kant showed "that a skeptic who grants knowledge of even the simplest fact about an event occurring in Time is, in effect, granting knowledge of the existence of nature as a whole. I was sure he was right. But his own question haunted me. How is it *possible* that knowledge has this structure?"

It is in large part the differing attitudes toward this last 'haunting' question that has led to the widely diverging philosophical outlooks that we find among contemporary Sellarsian philosophers. For Sellars immediately followed up this question with the elusive comment that it "wasn't until much later that I came to see that the solution of the puzzle lay in correctly locating the conceptual order in the causal order and correctly interpreting the causality involved" (*ibid*, pp. 285–6). For scientific naturalist Sellarsian philosophers such as Millikan and Churchland, this last comment would suggest that Sellars's ultimate solution to the place of mind, meaning, and personhood within nature was to encourage us to take a further, bold step beyond Kant toward possible evolutionary and neuroscientific explanations ("in the causal order") of how such holistic, normatively structured, cognitive systems such as we proudly possess were *themselves* actually generated within the world as described by the natural sciences. Whereas the more Kantian contemporary Sellarsians such as McDowell and Brandom argue that, to the extent that Sellars might have envisaged or hoped for an ideal natural scientific explanation of our constitutively normative, rational capacities in this way, to that extent he was in danger of letting broadly 'scientistic' false hopes get in the way of his own striking insights into how to understand the place of our rational capacities within nature and culture. It will, to put it mildly, be interesting to see how these and other Sellarsians engage with these questions in Dublin in June.

JAMES R. O'SHEA
Philosophy, Dublin

## Midwest Workshop in the Philosophy of Science, Technology, Engineering, and Mathematics, 13–14 April

The third "Midwest Workshop in the Philosophy of Science, Technology, Engineering, and Mathematics" (PhiloSTEM-3) took place in Fort Wayne, Indiana, USA, April 13–14, 2012. The workshop is sponsored by the Department of Philosophy at Indiana University-Purdue University Fort Wayne (IPFW) and organized by Bernd Buldt, Ioan Muntean, and Charles McCarty (Indiana University, Bloomington). Its goals are to build a bit of a community among philosophers, scientists, and historians in the Midwest (and beyond!) and to provide an opportunity for an informal exchange of ideas and for friendly criticism of work in progress. Our meetings consist in invited lectures and contributed presentations, most of them followed by comments.

At PhiloSTEM-3, we invited two colleagues to talk about recent work: Anjan Chakravartty (Notre Dame) and Timothy Lyons (a previous participant in PhiloSTEM, from Indiana-Purdue, Indianapolis). Anjan ("How Realists Can Make Worlds") proposed a new research program based on the idea of "synchronic world-making" and a taxonomic pluralism based on properties rather than entities in which he reconciles the idea of scientific realism with world-making, traditionally an antirealist position. Tim ("Using Underdetermination to Articulate a Realist Axiology") presented an argument based on underdetermination for his own realist axiology, based on the hypothesis that science seeks to increase a particular sub-class of true claims.

Three of the five contributed papers we had selected dealt with, broadly speaking, the life sciences. Nina Atanasova (Cincinnati) showed that animal models can serve as counterexamples to the 3M account (Kaplan and Craver, 2011) of explanatory force. Susan Smith (SUNY, Buffalo) started with a problem in Kitcher's pluralistic realism and proposed replacing his account of species *simpliciter* with a proxy language of "DNA connectedness," using a concept of consilience. Charles Pence (Notre Dame) criticized both causalists and statisticalists for not offering a framework in which natural selection and genetic drift can be adequately understood. Mark Jordan, an evolutionary biologist from IPFW, chimed in and shared his perspective as a working biologist. In the only talk in philosophy of physics, Pablo Ruiz de Olano (Notre Dame) argued that the group theoretical considerations of ontic structural realism need to be supplemented with dynamical consider-

ations and suggested fiber bundle formalism as a candidate. Timothy Fuller (Ohio State U) compared and contrasted two types of non-individualistic scientific inference: the "extended mind" and the "population-level" theories and argued why the latter is more plausible. Finally, turning to Turing, Ioan Muntean (IPFW) discussed some epistemological implications of using evolutionary programming in the process of scientific discovery based on results by Schmidt and Lipson (2009).

At PhiloSTEM-3, the commentators were guests or members of the IPFW community: Bernd Buldt, Tim Fuller, Mark Jordan (IPFW, Dept. of Biology), Ken Long (IPFW), Ioan Muntean, and Charles Pence.

PhiloSTEM-4 is scheduled for October, 19–20. Confirmed speakers include Gordon Belot (Michigan), Stuart Glennan (Butler), Bryan Hall (Indiana, South-East), Nick Huggett (Illinois, Chicago), Chris Pincock (Missouri); a call for contributed papers will follow soon. See here for updates and details.

BERND BULDT
IOAN MUNTEAN
Indiana University-Purdue University Fort Wayne

## The Progress of Science, 25–27 April

When Lorenzo Casini, News Editor of this gazette, asked me to write a report about the "Progress of Science" conference which I co-organized, I agreed without thinking too much about it. Only when I started writing I noticed that I would have to refrain from either praise or blame: either I would not be credible or I would be impolite towards the speakers. Thus, instead of pointing out the "highlights" of the conference, I prefer to tell you a bit about the conference series and its history.

In 2007, two new research centers in the philosophy of science were established: the Sydney Centre for the Foundations of Science, directed by Mark Colyvan, and the Tilburg Center for Logic and Philosophy of Science (TiLPS), directed by Stephan Hartmann. While both centers naturally aim at producing excellent work in their field, they also have a vivid interest in the relation between science and society, and in the role that philosophy of science can and should play in the public discourse. Encouraged by Huw Price (then at Sydney), Mark and Stephan felt that it would be a good idea to join forces and to increase the visibility of both centers. So they decided to establish closer institutional links. In the course of this, Mark and Stephan became Visit-

ing Professors at Tilburg and Sydney, respectively, and the Sydney-Tilburg conference series was born. Since then, one conference a year was organized, alternately in Sydney and in Tilburg. The Tilburg conferences are typically devoted to bringing together different approaches to grand topics in the philosophy of science. The Sydney conferences, on the other hand, stress the importance of science for public policy and society in general.

I was present at each single conference (though not always as an organizer) and always enjoyed it very much. This year was no exception. The only critical moment came when Heather Douglas, one of our invited speakers, had to cancel her flight due to sudden illness. But she recovered enough to make it to her office on the day she was scheduled to speak and to give a very well-received talk via skype! Special thanks to her, to the other three invited speakers (Paul Hoyningen-Huene, Theo Kuipers, and Michael Weisberg) and to all the other attendants. It was an unusually diverse and colorful conference, where talks ranged from the good old verisimilitude program to agent-based models, from the exegesis of "Structure" to the role of the applied sciences in the current policy debate. Moreover, the evening enjoyment lasted into the early hours of the morning, and the decision not to start the official program before 10 a.m. was much appreciated by the participants.

A last note: Some of you may have heard that Stephan received an Alexander-von-Humboldt Professorship at the LMU München. As a consequence, LMU Munich will join the Sydney-Tilburg consortium and the next conference in the series will in fact take place in Munich next spring. Regarding the future of TiLPS, there are already many events planned for the next academic year (including the third René Descartes Lectures with Cristina Bicchieri in November). Moreover, we are running a number of externally funded projects with several young and enthusiastic researchers who are keen on continuing the success story of TiLPS. So please stay tuned: we will not disappear from the map!

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JAN SPRENGER<br>
TiLPS, Tilburg University
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## Expressivism and Epistemic Normativity, 9–10 May

On May 9–10, 2012 a conference on *Expressivism and Epistemic Normativity* was held in Paris, organized by Joëlle Proust and Anne Coubray (Institut Jean-Nicod) as part of the ERC advanced grant "Dividnorm" project, which aims to provide a naturalistic account of epistemic norms, and of the associated norm awareness in human children and adults from different cultures.

Expressivism is the view according to which normative judgments do not describe reality, but are rather the expression of practical attitudes. Such an analysis offers a promising way of naturalizing normative judgments, and could account for the nature of metacognitive evaluations, aimed at expressing the confidence of a thinker in her cognitive dispositions, which might be based on conative states such as epistemic feelings. The purpose of the conference was to explore the semantic, epistemological and psychological issues raised by expressivism about epistemic norms.

In his "Full Truth for Expressivists: Deflationary Truth and Acceptability", Allan Gibbard (Michigan) argued that, although normative claims, indicative conditionals, and epistemic modals can all be explained expressivistically, normative claims, such as claims of probability in the light of evidence, can be true or false in the full deflationary sense, while indicative conditionals with false antecedents, epistemic modals and "perhaps" statements can only be acceptable or unacceptable.

Kristoffer Ahlstrom-Vij (Copenhagen) discussed "The Costs of Epistemic Realism", arguing that the realist faces a dilemma: either she accepts a far-reaching skepticism, or she has to reject the idea that truth is a central epistemic norm, and hold that diversity in theorizing about epistemic normativity is a sign of irrationality.

In his "Knowledge without Truth", Seth Yalcin (Berkeley) asked whether every case of knowing is a case of knowing a fact. He made the case for credal expressivism as a pragmatic thesis: knowing that something is likely is not a matter of knowing a truth, but probability talk serves to update the common ground of a conversation.

Simon Blackburn's "Expression and Explanation in the Theory of Meaning" raised the problem of attributions of meaning: on a pragmatist expressivist account, they are relative to an "intentional stance", while on a realist account, they are true or false depending on some semantic, social, or psychological facts. Relying on Jonathan Bennett's *Linguistic Behaviour*, he argued that we need not choose between these two options: although attributions of meaning cannot be reduced to a set of observations, we still need an empirical theory to

account for them.

Matthew Chrisman's "Epistemic Discourse as Rational but not Descriptive" defended as an alternative to expressivism the idea of epistemic pragmatism, which retains the motivations for expressivism while avoiding the main objections raised against it: knowledge attributions are not descriptive, but commit us to the idea that the subject believes the embedded proposition, to the truth of this belief, and to the idea that the subject's belief is one that she epistemically ought to have.

Finally, Igor Douven's "Inference to the Best Explanation, Dutch Books and Inaccuracy Minimization" discussed whether inference to the best explanation, when it is at variance with Bayes' rules, should be rejected as leading to irrational beliefs updates. Computer simulations, he showed, indicate that Bayes' rules are not the most accurate rules for all our cognitive goals.

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ANNE COUBRAY
Institut Jean-Nicod

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## Calls for Papers

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.

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WHAT'S HOT IN . . .

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## . . . Logic and Rational Interaction

As you all know, the Stanford Encyclopedia is a widely-used database presenting philosophical topics to a broader public—both within and outside the philosophy community. The last months have seen a number of new entries representing some fields of interest to our readers.

Sergej Artemov and Mel Fitting give a well-written survey of justification logic. The classic account in epistemology analyzes knowledge as *justified true belief*, whereas epistemic logic only deals with two of these three, namely truth and belief. The idea of justification logic is to close this gap by giving a modal logic for justifications. To do so, the the set of epistemic formulae is enriched with a second set of potential justifications that act as modal operators.

Eric Pacuit deals with a quite different topic in rational interaction: voting theory. His well-written introduction focuses on philosophical questions connected to voting theory, starting with the most elementary: 'who should be elected'. The answer to this normative question boils down to the acceptance of certain axioms. The article does not omit the various paradoxes resulting from demanding too many of these axioms. A second philosophical topic mentioned is the epistemic value of voting procedures. That is the question of whether voting could help a group of individuals to combine their efforts in finding the truth about a certain statement. The article presents some topics in contemporary voting theory.

And to mention a more exotic topic: Brendon Gillon analyzes the role of logic in classical indian philosophy.

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.

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DOMINIK KLEIN
TiLPS, Tilburg University

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## . . . Uncertain Reasoning

On Saturday 23 June, logicians, computer scientists, mathematical biologists, and enthusiasts of many other fields will celebrate the centenary of Alan Mathison

Turing. A number of events are planned worldwide for the day, bringing the Alan Turing Year to its climax.

One thing for which Turing is well known in popular culture is his WWII code-breaking activity which, as it turns out, makes Turing a contributor also to the field of uncertain reasoning. Partly owing to the fact that much of the work carried out at Bletchley park was classified until fairly recently (with some content still being restricted today) Turing's contributions to this area are comparatively less widely known.

Turing's interest in uncertain reasoning was in fact two-fold. As illustrated in very fine detail by Sandy Zabell (1995: "Alan Turing and the central limit theorem", *The American Mathematical Monthly* 102(6): 483–494) Turing entered the field as a mathematical statistician. As a third year undergraduate at King's College Cambridge, in late 1933 he attended a series of lectures that astrophysicist Eddington gave on the Methodology of Science. Apparently dissatisfied with the presentation given by the lecturer on how measurement errors often approximate the normal distribution, Turing gave his own rigorous statement and proof of a central limit theorem in 1934. He then discovered that essentially the same result had been proved by Lindeberg in 1922. Nonetheless Turing was persuaded to submit an amended version of the paper as a Fellowship Dissertation which resulted in him being elected Fellow of King's College in March 1935. Turing's interest in the subject didn't last very long though and he moved quickly to tackling the *Entscheidungsproblem*.

In 1939 Turing was forced back into uncertain reasoning, this time with an applied twist. For the most part while at Bletchley Park, Turing worked on cracking *Enigma*, the machine used by Germans to code military transmissions. As pointed out by Irving J. Good—Turing's chief statistical assistant at Bletchley Park—whilst tackling this problem Turing made an important contribution to uncertain reasoning by inventing sequential data analysis with weights of evidence (Irving J. Good 1979: "A.M. Turing's Statistical Work in World War II", *Biometrika* 66(2): 393–396).

Possibly under the influence of Frank Ramsey and Harold Jeffreys, Turing adopted a betting interpretation and worked with odds rather than with probability functions. Let $p \in [0, 1]$ be the probability of an event of interest $H$. This can be given a betting interpretation by saying that it determines odds of $p/1 - p$ for $H$ (Irving J. Good 1985: "Weight of Evidence: A Brief Survey", in J.M. Bernardo, M.H. de Groot, D.V. Lindely and A.F.M. Smith (Eds), *Bayesian Statistics 2*, Elsevier). Under this interpretation, odds of 1 ("evens") correspond to probability 1/2, odds of 2 correspond to probability 2/3, etc. If we denote by $p(H \mid E)$ the probability of hypothesis $H$ given evidence $E$, then

$$\frac{o(H \mid E)}{o(H)} = \frac{p(H \mid E)}{p(H \mid E^c)}$$

where $E^c$ is as usual the complement of $E$.

Commenting on the left hand side of the equation, Good (1985) notes:

> It is [...] natural to call it the factor in favour of $H$ provided by $E$ and this was the name given to it by A.M. Turing in a vital cryptanalytic application in WWII in 1941.

Good subsequently changed Turing's terminology into "Bayes factor in favour of $H$ provided by $E$" and defined the notion of a weight of evidence as the logarithm of the Bayes factor:

$$W(H : E) = \log \frac{o(H \mid E)}{o(H)}.$$

> The original cryptanalytic application was an early example of sequential analysis. It was called Banburismus because it made use of stationery printed in the town of Banbury; so Turing proposed the name "ban" for the unit of weight of evidence when the base of the logarithm is 10. [...] Turing called one tenth of this a deciban by analogy with a decibel in acoustics, and we used the abbreviation db. (Good 1985)

As recalled above, Turing began his mathematical work under the influence of Ramsey's attack to Keynes's logical interpretation of probability and he was probably familiar with the odds version of Bayes's theorem developed by Harold Jeffreys. Both Ramsey and Jeffreys's work thus may have played a direct role in the development of Turing's conception of uncertain reasoning. But was Turing a Bayesian? Good (1985) puts it like this:

He did not mention Bayes's theorem, with which [the factor in favour of *H* provided by *E*] is of course closely related, because he always liked to work out everything for himself. When I said to him that the concept was essentially an application of Bayes's theorem he said "I suppose so".

Donald Gillies (1990: "The Turing-Good Weight of Evidence Function and Popper's Measure of the Severity of a Test", *British Journal of Philosophy of Science* 143–146) however suggests that the Turing-Good weight of evidence is rather more Popperian than Bayesian by showing that under certain conditions it is in fact essentially Popper's *principle of severe testing*.

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# EVENTS

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.

KR: 13th International Conference on Principles of Knowledge Representation and Reasoning, Rome, Italy, 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.

ACE: Turing's 100th Birthday Party at King's College, Cambridge, 15–16 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.

NASSLLI: North American Summer School in Logic, Language and Information, University of Texas at Austin, 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.

INFERNING: Interactions between Inference and Learning workshop, Edinburgh, 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.

MLG: 10th workshop on Mining and Learning with Graphs, 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.

SCIENCE AND METAPHYSICS: University of Kent, 2–3 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.

JOINT SESSION: The Aristotelian Society and the Mind Association, University of Stirling, 6–8 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.

RSC: 35th Annual Research Students' Conference in Probability and Statistics, University of Southampton, 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.

WORLDCONG: 8th World Congress in Probability and Statistics, Istanbul, 9–14 July.

FOUNDATIONS OF MATHEMATICS: University of Cambridge, 10–12 July.

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

LOGIC COLLOQUIUM: University of Manchester, 12–18 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.

ASLP: Annual Conference of Australian Society of Legal Philosophy, Macquarie University in Sydney, 20–22 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.

Einstein's Philosophy of Science: Summer School, University of Tübingen, 30 July–3 August.

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.

BMAw: 9th Bayesian Modeling Applications workshop, Catalina Island, 18 August.

UiNI: Uncertainty in Natural Intelligence workshop, Catalina Island, 18 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.

STeDy: Spatio-Temporal Dynamics workshop, Montpellier, France, 27–28 August.

WL4AI: Weighted Logics for AI workshop, Montpellier, France, 27–28 August.

AIGM: Algorithmic Issues for Inference in Graphical Models, 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.

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.

FORMAL ETHICS: Munich, 11–13 October.

NUMBERS & TRUTH: The Philosophy and Mathematics of Arithmetic and Truth, University of Gothenburg, Sweden, 19–21 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

NASSLLI: North American Summer School in Logic, Language and Information, University of Texas at Austin, 18–22 June.

EINSTEIN'S PHILOSOPHY OF SCIENCE: Summer School, University of Tübingen, 30 July–3 August.

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.

TISS: Tübingen International Summer School—How do we make decisions?, 24–27 September.

## 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.

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### 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.

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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 Logic and / or Philosophy of Mathematics, Université du Québec à Montréal, until filled.

Lecturer: in Statistics, University of Manchester, until filled.

Associate Professor of Professor: in Logic and the Philosophy of Science, University of Calgary, until filled.

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

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

Post-doc position: in Logics for Quantum Interaction, Institute for Logic, Language and Computation at the University of Amsterdam, deadline 6 June.

Post-doc position: in Statistics, CRiSM, University of Warwick, deadline 6 June.

Assistant Professor: in Philosophy and Philosophy of Science AOS: Logic and Epistemology, University of Konstanz, deadline 10 June.

Post-doc positions: in Philosophy of (Social) Science, Academy of Finland Centre of Excellence in the Philosophy of the Social Sciences / TINT, deadline 11 June.

Professor: in Philosophical Logic, University of Amsterdam, deadline 15 June.

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

Lecturer: in Philosophy, Northern Institute of Philosophy, University of Aberdeen, deadline 22 June.

Post-doc position: in Philosophy of Science, University of Johannesburg, deadline 30 June.

## Studentships

Two 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.

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 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.

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