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§1  
EDITORIAL

A year ago I was about to fly to Pittsburgh to spend the Spring Term at the Center for Philosophy of Science. As it is never too late to report on good experiences, I thought that Christmas break was a good occasion to write about my visit and to have John Norton—the director of the Center—speak to our Reasoners.

As regards my visit, there is one aspect that I'd like to mention in particular. This is something I much appreciated at Pitt and that I am also enjoying at Kent now: being part of a group. The great thing about the visiting fellows programme is to find people who are willing to talk to each other about their own work. It strikes me as an old-fashioned way of thinking that philosophers build abstract metaphysical systems while sunk in their armchairs. The kind of philosophy of science done at Pitt is not abstract nor it does come out of 'armchaired' philosophers. There is much going on at the Center and at the Department to entertain even the laziest. What is more, the group of fellows is very active. In fact, we used to meet once a week to discuss work in progress.

The most important learnt lesson was the following: things that may be crystal-clear in your mind may not come across as clear in the paper. The question to ask, as John used to tell us, is that "You know what you wrote, now find out what we read". Confrontation with other scholars serves exactly this role: to make sure our ideas are not only clear and distinct in our minds, but also to others. If disagreement remains, at least we are clear as to what we disagree about! I am engaged in this communal way of doing philosophy at Kent too, where the four 'causality people'—Jon Williamson, Phyllis McKay Illari, Lorenzo Casini, and myself—meet once a week to discuss our work in progress. If you wish to visit us and be part of the group, consider joining the [Reasoning Club](#) programme (for details, email [Phyllis McKay Illari](#)).



One reason why I wanted John to talk to us is that we had interesting discussions about the role of philosophy, and particularly of philosophy of science, for science on the one hand and for the public arena on the other hand. This is a topic I touched on in previous editorials, where I pointed to the difficulty we philosophers oft experience in explaining what we do. Since then, I've tried improving the way I communicate to non-philosophers, and especially non-academics.

Perhaps the next challenge is to definitively get off the armchair and to find effective ways to sneak into the scientists' living rooms and to talk to the public. I am perfectly aware that this sounds naïf and in fact, as you shall see, John has a much less disenchanting view on the issue. But I don't want to anticipate too much, nor to hold you up for too long, and I leave the floor to John.

Federica Russo  
Philosophy, Kent

## §2 FEATURES

### Interview with John Norton

John Norton is Director of the [Center of Philosophy of Science](#) and professor at the [Department of History and Philosophy of Science](#) at the University of Pittsburgh.

Federica Russo: Thanks for agreeing to answer a few questions, John. First of all, could you tell our Reasoners something about your intellectual history and especially how you ended up running the Center so successfully?

John Norton: My first degree was in chemical engineering. Then I moved into history and philosophy of science. My early work was in history of general relativity. Most notably, I gave the first analysis of Einstein's "Zurich Notebook" in which we can reconstruct the steps Einstein took to his greatest discovery, general relativity, and at a level of detail we could scarcely dare to hope for. If you want to look over Einstein's shoulder as he makes his greatest discovery, I've put some choice pages with commentary on my website [here](#).



From there I moved into many further topics in history and philosophy of physics and general science. For me the interest in Einstein's discovery had always been essentially epistemological. Einstein's theories are astonishing. How could Einstein find them and know that they are right? That epistemic orientation has never left me, so I've increasingly been working on inductive inference. One powerful motivation has been to find an approach to inductive inference that is both philosophically sound and applicable to the intricacies of the real case studies in science that have long fascinated me. The failure of the existing literature to provide such an account led me to the "material theory of induction." It urges that there are no universal schema for inductive inference. What warrants an induction are facts. What likely would interest readers of the Reasoner most is this corollary: a Bayesian or probabilistic account of inductive inference, while it may often work very well, cannot succeed universally. I've elaborated on this in papers on my [website](#). They include counter-examples that I believe are unassailable.

For five years, I chaired the Department of History and Philosophy of Science at the University Pittsburgh. Since my tenure did not run the department into the ground, my reward was to be pressed into more administration in the Center for Philosophy of Science. Unexpectedly, directing the Center turned out to be the most fun I have ever had, academically. I am surrounded by the good cheer of visiting philosophers of science. They come expecting to meet lots of interesting people, to hear lots of talks, to engage in discussion of their work and that of others and then to write great papers.

The success of the Center is entirely due to this extraordinary confluence of people with good will and intellectual vitality. My role has simply been to look after everyone as best I can when they are here and keep the doors open to everyone. Indeed that has been the thing at which I've worked hardest. The Center is a resource available to everyone in philosophy of science and I encourage everyone to come and visit. To help

you picture what it is like, the Center's website documents what we do here at a quite personal level. See the "[donuts](#)" pages, for example.

FR: Physics has been the queen of the sciences for a long time. As a leading scholar in the philosophy of relativity and of spacetime, do you think reasoning in physics has something peculiar that makes it different from the other sciences? Or that the other sciences should learn from? Or . . . ?

JN: I don't think that there is anything special about philosophy of physics. What we do in philosophy of physics is what everyone does in philosophy: we try to reason clearly and soberly about philosophical puzzles fully able to explode our heads. However philosophy of physics has proven to be especially fertile since it provides us with a seemingly endless parade of precisely defined, but profoundly intractable problems. That they are precisely definable assures that there is plenty for philosophers to work with; that they are intractable assures that the work will continue indefinitely.

The prominence of philosophy of physics in twentieth century philosophy of science depends in part on an historical accident. The advent of relativity theory in the early part of the century and the resulting challenge to old philosophical wisdoms riveted a generation of philosophers just as they were creating the new field of philosophy of science. That meant that the particular theories of physics and methods amenable to them were located at the foundation of the new field. It happened to be relativity theory specifically in the 1910s and early 1920s that served this role.

Whether this was good or not can be debated. However it could certainly have been worse. It was Einstein and his thought on space, time and relativity that informed the field. Had the founders delayed ten years, it might have been quantum theory and the inchoate thoughts of Niels Bohr that informed us.

There was a time when the ways of philosophy of physics exerted an undue influence on philosophy of science as a whole. Those days are long past. Philosophy of biology and philosophy of cognitive science, to name just two fields, have been thriving to the point of venerable maturity and now speak as loudly in the general arena.

FR: All the past visiting fellows of the Center I met have fantastic memories about their stay. Can you tell us what you consider to be the most important aspect of a visiting fellowship at Pitt?

JN: That you have fantastic memories of the Center is gratifying, but actually tells me a lot about you. There is a real opportunity in the Center to meet people, exchange ideas and find new perspectives. As you know from your visit, it is a place in intellectual ferment. When you visit, what you get back depends entirely on your willingness to participate. The more you put in, the more you get out. Knowing that is perhaps the most important thing.

FR: This probably goes a bit off track, but do you think philosophy of science has or should have any relevance for science itself and for society? In other words, do you think philosophers should get off the armchair? And if so, what to do once we stand in the broader academic livingroom or even in the real world?

JN: People in the broader community are interested in foundational questions in science. Major issues of public policy may depend on them. Prominent examples are the issues of climate change and, in the US, challenges to evolutionary theory. We philosophers of science are professionally best equipped to deal the difficult foundational ques-

tions that arise. Alas, we have a poor track record as public intellectuals. Our work does inform the public, but typically only after it has been filtered through the thought and work of popular writers who are well-meaning but often have lesser philosophical skills.

My sense is that our professionalization is the obstacle. We are rewarded for ever tighter, ever more cramped analyses of issues. And that is appropriate, for none of the problem we address is simple. Alas, simplicity is what the public wants. They are fed a diet of five second sound bites. Anything more is deemed indigestible by a media that seeks out purveyors of glib sound bites and avoids the droning professors who might really understand the issues.

Take one example. In popular arenas, the idea that falsifiability is the gold standard of science flourishes simply because it is an easy point to make and an easy point to understand. Those of us who work on the problem know that it isn't that simple. Aside from beloved toy examples, bad science is almost always not unfalsifiable but actually falsified. And procuring falsifiability can be done cheaply by contriving some arcane prediction that is, in principle, falsifiable, but testing it outstrips present practicalities. What makes a theory good science is a close and thorough grounding in evidence. But how can we convey what that really amounts to in a five second sound bite?

The relationship between science and philosophy of science is more complicated. For me the interesting issue is to know where the philosophy of science ends and the science starts. In philosophy of physics, the work we do has become so technical that it is often hard to know. Clear principles that separate the two are elusive. I know of one clear division. A line is passed when a philosopher of physics starts to propose new physical theories. For the critical scrutiny of the foundations of physics demands that philosophers maintain the highest critical standards. To propose new theories, however, one must allow some slippage in rigor lest promising but ill-formed nascent theories are lost.

My rule of thumb is that philosophers of physics seek to understand the foundations of current physical theories, to which we apply all due rigor. It is the the job we are best equipped to do. The business of finding new theories is the physicists'. It is the job for which they are best equipped.

FR: One last question, and then I set you free. I know you studied engineering before going into philosophy. Does it ever happen to you to miss the more practical and pragmatic way of reasoning of non-philosophers?

JN: What I find energizing about my colleagues in history and philosophy of science is the extraordinary breadth of their interests. Essentially no one has a linear history of undergraduate and graduate work in just one area. We all followed paths that meandered until we found in HPS a garden so rich and beautiful that it was our journey's end. My colleagues are all extraordinarily outward looking. Those who work in induction and confirmation are talking to mathematicians and statisticians. Those who work in philosophy of physics are talking to cosmologists and quantum mechanics. Those who work in philosophy of cognitive science are talking to neuroscientists. Our conversations and talks are full of many sciences, many methods and many ideas.

Perhaps I should add that I was never a good engineer. One of my first jobs was to troubleshoot a "sour water stripper" that, from time to time, would dump foul water

down the drain. I started with the plant’s design drawings and, after some collaboration with the refinery’s lab and several month’s work, provided a complete account of the chemistry of sour water stripping. In an appendix, I noted that whoever was dumping caustic soda into the refinery drainage system had to stop—that is what was messing things up. That remark was all that really mattered in the report. It was a conclusion a better engineer would have found in an afternoon!

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### On the presuppositions of composite propositions

Consider the following example: when one says, “Zhang San’s son has been admitted to Peking University, and Li Si’s son has also been admitted to Peking University.” What does the speaker presuppose and how to get the presupposition? According to Ewa Mioduszewska (“A Solution to The Projection Problem for Presupposition of Compound Sentences within Ulrich Blau’s Three-valued Logic System”) we can employ the definitions of “ $\wedge$ ”, “ $\vee$ ” and “ $\rightarrow$ ” in three-valued logic to describe the corresponding presuppositions of composite propositions, so if we define  $\wedge$  as follows: the presupposition

	$\psi$	1	#	0
$\phi$		1	#	0
1		1	#	0
#		#	#	0
0		0	0	0

of  $\phi \wedge \psi$  expresses the following conditions: (1) the presupposition of each conjunct is true; or (2)  $\phi$ ’s presupposition fails and  $\psi$  is false; or (3)  $\psi$ ’s presupposition fails and  $\phi$  is false. If none of (1), (2) and (3) hold,  $\phi \wedge \psi$  is neither true nor false. Conditions (1)–(3) reflect the following cases respectively: (1’) The values of  $\phi$  and  $\psi$  are 1 or 0; (2’) The value of  $\phi$  is # and of  $\psi$  is 0; (3’) The value of  $\phi$  is 0 and of  $\psi$  is #. Obviously, these are the cases in which  $\phi \wedge \psi$  gets precise truth-values. However, this does not fit our intuitions if we take them to be presuppositions. Consider the following example under this interpretation: when one says, “Zhang San’s son has been admitted to Peking University, and Li Si’s son has also been admitted to Peking University”, he presupposes the following: (a) Zhang San has a son and Li Si also has a son too; or (b) Zhang San has no son and Li Si’s son has not been admitted to Peking University; or (c) Li Si has no son and Zhang San’s son has not been admitted to Peking University. As we know, presuppositions are assumptions that are made in advance, and one of its features is that the speaker takes it for granted. However, in any case the speaker would not take for granted that there are certain conditions that would make the conjunction get truth-values in three-valued logic. The reasons are clear, firstly, it requires that the

speaker understand and accept the definition of  $\phi \wedge \psi$  in three-valued logic. Even if the speaker accepts the meaning of a conjunction, still it requires that the definition of  $\wedge$  apply in every three-valued logic system. Otherwise, it may lead to some absurd result, namely, if you want to know the presupposition of a conjunction, you must first ask the speaker what kind of three-valued logic he has in mind. For those who support Bochvarian three-valued logic, only (1) is left from the above to be a presupposition. (For more details, see: L.T.F. Gamut, 1991: *Logic, Language and Meaning*, University of Chicago Press.)

The presuppositions of composite propositions can be divided into several situations: (a) The presuppositions of component propositions are the same, or (b) one component proposition is the positive or negative of another component proposition's presupposition, or (c) one component proposition implies another, or (d) the presuppositions of component propositions are different.

Among the three main kinds of composite propositions, the presupposition of a conjunction is the easiest to handle. When all conjuncts have the same presupposition, it's also the presupposition of the conjunction. (For example, "Zhang San's son is not only excellent, but also very filial".) When the presuppositions of conjuncts are different, the conjunction of those presuppositions is the presupposition of the whole proposition (such as "Zhang San's son is excellent, and Li Si's son is also excellent"). When the presupposition of one conjunct is simply another conjunct, the presupposition can not become the presupposition of the whole proposition; consider "Zhang San has a son, and Zhang San's son is very excellent". When one conjunct's presupposition implies another conjunct, the presupposition is the presupposition of the whole proposition. (Consider "Zhang San has children, and Zhang San's daughters are very excellent".) But when one conjunct's presupposition is implied by another conjunct, the presupposition is not the presupposition of the whole proposition (for example, "Zhang San has daughters, and his children are all excellent"). Such an interpretation meets the following condition: the whole conjunction has no truth-value if the presupposition fails.

As for a disjunction, when each disjunct has the same presupposition, the presupposition automatically becomes the presupposition of the disjunction (such as "Zhang San's son wounded Li Si's son, or Li Si's son wounded Zhang San's".) When the presuppositions of the disjuncts are different, the disjunction of the disjuncts' presuppositions is the presupposition of whole proposition, such as "Zhang San's son has been beaten, or Li Si's son has been hit". The man who said this does not presuppose both Zhang San and Li Si have sons, but presupposes "Zhang San has sons or Li Si has sons". When one disjunct is formed by denying the presupposition of another disjunct, the presupposition will not become that of whole proposition, such as "Zhang San has no son, or Zhang San's son does not live with him". This interpretation meets the following condition: the whole disjunction has no truth-value if the presupposition fails.

The presupposition of conditionals is rather special and more difficult to deal with. It has something to do with the feature of conditionals itself. Regarding the presupposition, people seem to agree on the following: when the antecedent is just the positive presupposition of its consequent, the presupposition can not become the presupposition of whole proposition. Consider the example, "If there is a king of France, then the King

of France is bald”. We will leave our further investigations on it to some other occasion.

Nianxi Xia  
Philosophy, Capital Normal University, Beijing

## Does Possible Worlds Semantics Make Sense?—A Correction

In *The Reasoner* 3.12 I argued that there are some intuitive problems with possible worlds semantics (PWS) surrounding the debate between world-bound individuals (WI) and trans-world identity (TI). These problems, I suggested, show that (PWS) is not the correct way to understand modality. Here is the main argument I offered. Consider the following two sentences:

- (i) Socrates could have been a carpenter.
  - (ii) Socrates is necessarily human.
1. If (PWS) is an adequate account of modality, then either (WI) or (TI) adequately explains the truth of (i)-(ii).
  2. If (WI), then the truth-makers of modal statements are irrelevant.
  3. If (TI), then the truth-conditions for modal statements are inconsistent.
  4. So, neither (WI) nor (TI).
  5. So, (PWS) is an inadequate account of modality.

While I still believe that the argument and considerations in favor of (2) are good, there is a technical mistake in the argument for (3). The technical mistake is due to my failure to distinguish between time-indexed properties and temporal parts. The argument for (3) that I offered is the following. Consider (i), again.

1. If (TI) is true, then Socrates could have been a carpenter only if in some possible world Socrates is wholly present and a carpenter.
2. However, if in some worlds Socrates is wholly present and a carpenter and in other worlds he is wholly present and not a carpenter, then Socrates both has the property of being a carpenter and not being a carpenter.
3. Since an object cannot have contradictory properties, (TI) is *prima facie* inconsistent.

Based on this initial problem I proposed, following others, that one could defuse the problem by making an analogy with time. Just as an object can be at one time sitting and at another time standing, so can an object in one world be a carpenter and in another be a philosopher without any contradiction. However, I argued against the proposed analogy with time as being enough to render coherent the idea of world-indexed properties, because of a further problem. The further problem is where the technical mistake in the argument for (3) occurred. The confusion is in the difference between:



- (a) Time-indexed properties;
- (b) Temporal parts.

I argued that if an object has time-indexed properties, then it has temporal parts. From which I further argued that if on the temporal parts view of objects, an object is a mereological sum of its temporal parts, then if we held the analogy with time an object would have world parts, which would make the object a mereological sum of its world parts as well. Thus, rendering Socrates a scattered object across worlds, which is inconsistent with the claim in (TI) that he is wholly present in each world.

The problem with the argument is that (b) does not follow from (a). In particular it is possible for an object to have world-indexed properties and be wholly present in a world, just as it is possible for an object to have time-indexed properties and be wholly present at a time. Moreover, only on further assumptions would the doctrine of temporal parts follow from the existence of time-indexed properties.

Furthermore, if all that is required for the coherence of (TI) is that we think of Socrates having distinct properties in distinct worlds on analogy with Socrates having distinct properties at distinct times, then there is no inconsistency as I argued before. Because there is no commitment to Socrates being the mereological sum of his worldly parts, because there is no commitment to Socrates having world parts, only world-indexed properties.

Nevertheless, the technical problem with the argument for (3) does not block all problems with (PWS). In addition, to the problem raised by (2), there is another argument, distinct in kind from the argument above. The argument is aimed simply at the structure of the reduction of necessity to quantification over some kind of entity that is implicit in (PWS), and which is present in many different metaphysical interpretations of (PWS). Following Jubien's *Possibility* (OUP: 2009, pg. 74-75), I will refer to this as the problem of parallel contingency.

Intuitively the problem is the following. If  $\Box P$  is true at the actual world, then on (PWS)  $P$  is true in every possible world. It follows metaphysically from (PWS) that the truth conditions for  $\Box P$ ,  $P$ 's being true in every possible world, *explains* the necessity of  $\Box P$  at the actual world. However, this appears to be the wrong direction of analysis. If there are any possible worlds, then it is because  $\Box P$  is true at the actual world that we should discover that in all the other worlds  $P$  is true. So, (PWS) intuitively analyzes necessity in the wrong direction. The problem is basically that necessity should explain why certain facts obtain in other worlds, and not that the facts in other worlds explain necessity. From the perspective of each world we have contingency. How does parallel contingency across worlds explain necessity?

Anand J. Vaidya  
Philosophy, San Jose State University

## The Logic of Denial, 24–25 October

FLC, The Foundations of Logical Consequence, is an AHRC-funded project run by the Arché Research Centre in the University of St Andrews. The four year project is currently in its second phase, The Structure of Logical Consequence. As part of the regular activity, FLC has just hosted its second workshop, entitled *The Logic of Denial*.

Since Frege, the analysis of denial as assertion of a negation has been the received view in formal logic. However, recent literature has seen a number of attempts at introducing denial into formal systems as a primitive alongside assertion. The workshop invited its speakers to discuss how one best treats denial in a formal framework. In particular, how does denial correspond to different negations, and what is the relationship between logical consequence and rational demands imposed by the norms of assertion and denial?

The workshop's first day started with Dave Ripley (Institut Jean-Nicod, Paris) on 'Embedding Denial'. He discussed the strategy of introducing a primitive denial operator to address problems with expressive power in paracomplete and paraconsistent approaches to semantic paradoxes. Arguing from broader considerations about the nature of denial, he concludes that these theories ought to include a "complete" and "consistent" denial operator. Heinrich Wansing (Dresden) developed a proof-theoretic semantics for bi-intuitionistic logics with a denial-like negation. BHK (Brouwer-Heyting-Kolmogorov) semantics is extended by applying proofs, disproofs and their duals. In a similar vein, Luca Tranchini (Tübingen) offered a dualisation of proof-theoretic semantics in terms of refutation. For this purpose he developed a natural deduction (single-premise, multiple-conclusion) for dual-intuitionistic logic. Finally, Ian Rumfitt (Birkbeck, London) rounded off the first day by revisiting his bilateralist theory (where content is specified by both assertion- and denial-conditions), and offering arguments for another theory of content-determination: Evidentialism.

Peter Schroeder-Heister (Tübingen) started us off on the second day with an extension of his proof-theoretic semantics, using a denial operator in programming clauses, and developing corresponding harmony principles between assertion and denial rules. Next up was Michael De (Arché, St Andrews), with an investigation into how the norms of denial are affected by falsity-preservation consequence. Colin Caret (Arché, St Andrews) returned to the topic of semantic paradoxes discussed by Ripley the day before. He explored how we can get a denial operator that blocks revenge paradoxes while preserving as many intuitions about denial as possible. Greg Restall (Melbourne) had the honour of closing the workshop. He developed his theory that multiple-conclusion derivations can be interpreted as rational constraints on assertion and denial, extending it to discussing issues such as logicity and tonk.

The workshop had about 30 participants. We hope they all share our opinion that the event created significant impetus to future work with the logic of denial, highlighting common ground for researchers from a number of different fields. If there was one single conclusion from the workshop as a whole it was that formal approaches to denial offer

interesting enrichments of expressive power both in theories about semantic paradoxes and in proof-theoretic semantics.

More information about Arché and FLC events can be found [here](#).

Stephen Read, Colin Caret and Ole Thomassen Hjortland

Arché, St Andrews

## Historical Epistemology, 10-12 December

Historical epistemology is now a blooming field of study, bringing history and philosophy together in new ways. Historians of science understand historical epistemology as both a philosophical underpinning of their work and a heuristic tool. Some of them aim at uncovering the historically situated conditions of a field of knowledge or objects of inquiry. Others study fundamental scientific concepts, which organize knowledge in different historical periods, along with the contingent conditions for their permanence or transformation. As Lorraine Daston puts it, historical epistemology is located in between the history of knowledge practices (such as experimenting, mathematical demonstrations or scientific observations) and the history of epistemology, which is a history of philosophical theories. In her view, historical epistemology is about the emergence and articulation of new central epistemological categories out of knowledge practices.

The philosophically most challenging version of historical epistemology is perhaps the one that focuses on our central epistemological concepts. Ian Hacking and others have argued that it is possible to differentiate styles of reasoning, with their distinct points of origin and history. It turns out that rationality, but also objectivity and observation, for instance, are subject to historical determinants. Historical epistemologists question that our intuitions about central epistemological concepts are invariant, universal and stable. History might have crucially shaped not only the meaning of epistemic concepts but also our intuitions about them.

The aim of the conference was to combine history and epistemology in new and interesting ways. After an introduction that clarified the nature and scope of the historical epistemological project (Vermeir), a number of speakers presented examples of historical epistemology in discussing the history of central epistemic concepts (Chemla), of scientific concepts (Van Dyck, Steinle, Boor), and of central distinctions in science (Grosholz). Arabatzis, Cortois, Hyder and Steinle explored philosophically how concepts come into existence, are individuated, become ordered in taxonomies, and migrate to other contexts, and how they retain traces of their original contexts or become sedimented. Others discussed the role of concepts in the related tradition of French epistemology (Chimisso, Hyder). Van Dyck developed a philosophical understanding of his historiographical practice and wondered how these might affect each other.

Of course, the program of historical epistemology was also analyzed critically. Kusch presented a 'genealogy of knowledge' and a 'metrology of knowledge' as possible alternative approaches, while Bloor proposed a sociologically oriented view on historical epistemology. Animated debates were held on the role of 'concepts' and 'norms', on the (un)desirability of normativity for historical epistemology, and on the role of so-

cology in historical epistemology. Finally, Klein and Monaldi argued that not only the epistemology but also the ontology of the sciences has a history, and they discussed examples of new substances and physical states artificially created in the laboratory. As a fitting conclusion, Schickore gave an overview of the recent interactions between history and philosophy of science and presented reflections on how these interactions could be continued in a fruitful way.

Koen Vermeir  
Philosophy, Leuven

## **Emergence and Reduction in the Sciences, 11–13 December**

The second Pitt-Paris conference, co-organized by the Center for Philosophy of Science (Pittsburgh) and the IHPST (Paris), brought together general philosophers of science, philosophers of physics, philosophers of biology and metaphysicians. Below are comments on selected presentations (see [here](#) for a longer report by John Norton).

Cyrille Imbert (AHP, Nancy, France) proposed to refine Mark Bedau’s concept of weak emergence by making precise the concepts of ‘derivability’ and ‘simulation’, and by showing that weak emergence is not merely epistemic. He proposed that a property is emergent if it is produced by an inherently sequential system, and characterized such systems as those whose behavior can only be derived in polynomial time on a parallel architecture. The question arose, both during the Q&A and in subsequent discussions, of how to apply this rigorously defined computational concept of emergence to physical systems.

Sandra Mitchell (Pittsburgh), drawing on examples from biology (a flock of pigeons, a colony of bees), insisted on the importance of the dynamic organization of a system’s parts in the appearance of emergent properties. She also defended the possibility of a downward causal influence from emergent systemic properties onto properties of the system’s parts. Doreen Fraser (Waterloo) presented an argument against Batterman’s analogy between thermodynamics and statistical mechanics on one hand, and quantum field theory (QFT) and effective QFT on the other. She argued that even though in both cases the transition from one theory to the other proceeds using the same method—renormalization groups—there are significant physical differences between the two cases.

Philippe Huneman (IHPST) presented the example of the neutral theory of ecology, which, despite ignoring interactions between individuals, fits observed patterns of species abundance better than more realistic models do. From this example, he suggested that properties or patterns are emergent when they are robustly produced by models that abstract away from the details of the interactions between the system’s parts. During the Q&A, John Norton pointed out the similarities between this case and that of the relationship between thermodynamics and statistical mechanics.

Carl Gillett (NIU) defended the coherence of the idea of a constraint exerted by a strongly emergent systemic property upon a system’s parts. He characterized this type of constraint, which he calls ‘machresis’, as neither compositional nor causal.

Peter Machamer (Pittsburgh) focused on concepts including causation, composition and level, which, while in the background of most of the other presentations, were seldom directly discussed. He emphasized the local and contextual character of levels, and criticized the use of concepts such as that of composition to account for the relationships between psychological phenomena (e.g. remembering) and physical entities (e.g. the hippocampus).

The general sentiment among participants was that the conference was a great success. It offered some very original contributions to the current debate on reduction and emergence, creating connections between computational, physical, biological, and metaphysical approaches to the topic of emergence.

Alexandre Marcellesi

Department of Philosophy, University of California San Diego

## **Subjective Bayes, 14–16 December**

This workshop brought together researchers in subjective Bayesian theory and methods and sought to expose young researchers, many of whom produced excellent posters, to this important and exciting field. Established participants were drawn from statistics but also from a variety of other related disciplines, including philosophy, psychology and management science. There was considerable interaction between the young participants and the established researchers in this field.

Several presentations concerned the foundations of the discipline. De Finetti's formulation of imprecise probabilities can be seen as eliciting fair buying and selling prices of options. Teddy Seidenfeld reformulated this construction in terms of scoring rules introducing ideas of lower and upper probability forecasts. Glen Shafer then presented a new foundational justification of subjective probability models which expressed the model as a three player game whose pay-off structure was based round an ingenious score function. He demonstrated how standard theorems of probability could be proved and how certain ideas central to subjective probability elicitation—such as calibration—were a transparent and immediate consequence of good decision making within his new formulation. Fernando Bonassi showed that the gambler's fallacy could be rational if events were believed to be finitely but not infinitely exchangeable.

In a methodological talk Bob Winkler reviewed the elicitation of probability forecasts using score functions discussing the interesting families of power and pseudo-spherical proper scoring rules. He argued that in many cases it was most appropriate to use non-uniform baselines giving some recent results in this area. Simon French reported some alarming gaps in methodological developments in the combination of expert judgments, especially for the text book problem which was becoming more widely applicable with the age of e-democracy. Multiplicity is not a problem in a subjective Bayesian framework but Jim Berger demonstrated that the empirical Bayes methods could produce inferences which were seriously flawed. Michail Papathomas discussed a new model for refining elicited judgments on binary data using expensive but better judgments and hypotheses of dependence. Jesus Rios described how a subjective game

theoretic model with finite regress might be used to build decision support for counterrrorism.

There were several applied talks. Roger Cooke illustrated a number of important principles including traceability, neutrality, fairness and empirical control for elicitation of expert probability and Paul Garthwaite discussed some new elicitation techniques for subjective modeling within a generalized linear model. Jonty Rougier explained how environmentalists thought about risk and presented a number of simple techniques both to ease elicitation. Leanna House demonstrated how a reified model could be justified and Nick Chater spoke about which probabilistic tasks the untrained senses could perform well. He argued that many biases could be better explained in terms of the way the brain is designed to process rather than as mistakes within a Bayesian paradigm. Larry Phillips concluded the workshop demonstrating the nature and centrality of a subjectivity in group decision making and the efficacy of using deliberation to shape and reshape preferences.

Jim Smith

Department of Statistics, University of Warwick

## **Model-Based Reasoning in Science and Technology, 17–19 December**

From Thursday 17 to Saturday 19 December 2009 the International Conference “Model-Based Reasoning in Science and Technology” (MBR09-BRAZIL) was held at the State University of Campinas - UNICAMP in the town of Campinas, Brazil. Chairs were Lorenzo Magnani (University of Pavia, Italy) and Walter Carnielli (University of Campinas, UNICAMP, Brazil).

The conference derived from a research cooperation between the State University of Campinas - UNICAMP, the Department of Philosophy of the University of Pavia (Italy) and the department of Philosophy and Social Sciences of the University of Siena (Italy) and continued the themes both of the Conferences “Model-Based Reasoning in Scientific Discovery” MBR98, “Model-Based Reasoning: Scientific Discovery, Technological Innovation, and Values” MBR01, “Model-Based Reasoning in Science and Engineering: Abduction, Visualization, and Simulation” MBR04, and “Model-Based Reasoning in Science and Medicine” MBR06.

The conference considered the logical, epistemological, and cognitive aspects of modeling practices employed in science and cognitive science, including logical and computational models of such practices. A particular attention has been devoted to examining the impact of Model-Based Reasoning research in the enhancement of various kinds of human cognitive skills, mental, hybrid, manipulative, etc. Presentations were solicited that examine the role of abduction, visualization, simulation, etc. in model-based reasoning from philosophical, historical, sociological, psychological, or computational perspectives.

The papers presented at MBR09-BRAZIL covered a number of topics pertaining: abduction; logical analyses related to model-based reasoning; visual, spatial, imagistic modeling and reasoning; simulative modeling; the role of diagrammatic representa-

tions; computational models of visual and simulative reasoning; causal and counterfactual reasoning in model construction; manipulative reasoning; distributed model-based reasoning; embodiment in model-based reasoning; model-based reasoning and ethics; model-based reasoning and semiotics; model-based reasoning in scientific explanation; model-based medical diagnosis; model-based reasoning in engineering and robotics; model-based reasoning and technological artifacts. The proceedings will be published by Springer (Series “Computational Intelligence”) and in a special issue of the *Journal of Algorithms in Cognition, Informatics and Logic* (Oxford University Press).

The invited speakers that attended the conference were Walter Carnielli (State University of Campinas, Brazil), B. Chandrasekaran (Ohio State University, US), Simon Colton (Imperial College, London, UK), Jairo Jose Da Silva (Unesp-Rio Claro, Brazil), Alex Kirlik, University of Illinois at Urbana-Champaign, US), Lorenzo Magnani (University of Pavia, Italy), Mamede Lima-Marques (Universidade de Brasília, Brazil), Claudio Pizzi (University of Siena, Italy), Paul Thagard (University of Waterloo, Canada), John Woods (University of British Columbia, Canada). Jaakko Hintikka from Boston University (US) was invited as Honorary Speaker.

Lorenzo Magnani

Department of Philosophy, University of Pavia

## Calls for Papers

**TRANSHUMANISM, COGNITIVE ENHANCEMENT AND AI:** special issue of *Minds and Machines*, deadline 15 January.

**TRENDS IN THE PHILOSOPHY OF MATHEMATICS:** special issue of *Studia Logica*, deadline 15 January.

**EMPIRICAL EVALUATIONS IN REINFORCEMENT LEARNING:** special issue of *Machine Learning*, deadline 26 February.

**EVOLUTIONARY NEURAL NETWORKS: THEORY AND PRACTICE:** special issue of *Journal of Intelligent & Fuzzy Systems*, deadline 28 February.

**THE METHODS OF APPLIED PHILOSOPHY:** special issue of the *Journal of Applied Philosophy*, deadline 1 April.

**THE EXTENDED MIND:** special issue of *Teorema*, deadline 1 October.

**PHILOSOPHICAL HISTORY OF SCIENCE:** special issue of *The Monist*, deadline 31 October.

**EXPERIMENTAL PHILOSOPHY:** special issue of *The Monist*, deadline 30 April 2011.

**FORMAL AND INTENTIONAL SEMANTICS:** special issue of *The Monist*, deadline 30 April 2012.

## §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](mailto:features@thereasoner.org) with a sample first column.

### ... Formal Epistemology and Religion

In 2009 both 16th-century theologian and church reformer John Calvin (1509-1564) and 19th-century biologist Charles Darwin (1809-1882) received extraordinary media-attention. For some of their many followers, the fortuitous fact that they are both honored in the same year, appeared a sufficient reason to contrast their works, proclaiming them champions of two entirely opposite worldviews and invoking many vigorous debates on (the tension between) science and faith.

Remarkably though, the 900th anniversary of the death of the scholastic philosopher Anselm of Canterbury (1033-1109) received far less media-attention. Yet he was one of the founders and key representatives of scholastic philosophy, that eminently targeted the relationship between faith and reason. But to many, Anselm still owes his fame to his illustrious work *Proslogion*, being the first to develop an ontological argument for the existence of God. From the very start this argument encountered much theological resistance, but it has intrigued logicians and philosophers for centuries. Today, textbooks in modal logic usually get students acquainted with the well-known 20th century modal ontological proof of Charles Hartshorne, but nearly all rightly pay tribute to Anselm, who developed his purely conceptual, logical argument 800 years earlier with only Aristotelian / Boethian logic at his disposal. His reasoning roughly goes as follows. Anyone, believer or disbeliever, has a concept of God as “something than which nothing greater can be conceived”. This means that God at least exists in the mind. Suppose that God exists only in the mind and not in reality. Then, there is something bigger conceivable, a God that exists in the mind and in reality. For existence in reality is greater than existence in the mind. This provides a contradiction. Therefore, God must exist.

In all its deceptive simplicity, Anselm’s argument started an impressive career throughout the course of the history of ideas. Descartes and Leibniz elaborated it, Hume scorned it, whereas Immanuel Kant—after careful analysis—tried to refute it once and for all. Then, Hegel launched the idea again, albeit from his own rather eccentric conception of logic. But, more importantly, and despite Kant’s rigorous attempts, the argument was revitalized after the emergence of mathematical logic in the late 19th and early 20th century. Such divergent scholars as Kurt Gödel, Alvin Plantinga, the aforementioned Charles Hartshorne, Norman Malcolm and only recently Graham Oppy developed new versions or analyses that invoke a burgeoning literature. The prevailing opinion on the argument is perhaps best expressed by Bertrand Russell, stating that although many people will have the unpleasant feeling that there is something wrong with the argument, it is much harder to identify what exactly.

Many of Anselm’s contemporaries felt that this line of argument could open a Pandora-box with all kinds of unwanted derived entities or alleged facts, which might well be inconsistent with the Bible. Its apologetical influence was rather modest, due to the fact that in scholastic philosophy, so-called natural theology was dominant, aimed at



providing evidence for God's existence and other theological truths by referring to the structure of the cosmos and the complexity, beauty or functionality in nature. Leading scholastic philosopher and theologian Thomas Aquinas championed this tradition and used cosmological and teleological arguments, rather than giving credit to Anselm's ontological proof. But, Anselm's radical attempt to bridge the gap between existence in the mind and existence in reality, by deriving abstract and even transcendental entities, also caused estrangement and intellectual contortions in later generations; 17th century mathematician and philosopher Blaise Pascal developed an entirely different view on rational belief, taking an utilitarian and probabilistic stance, arguing that it is rational to believe in God, as the revenues will most likely surpass the costs.

The persistence of the ontological argument in modern times—where apologetic implications look less relevant and advanced formal methods are available—seems remarkable. Interestingly so, it is no exception. In fact, many of the traditional issues and problems of natural theology and philosophical debates concerning rational belief, have been rethought, re-analyzed, improved, defended and attacked by systematic application of formal methods. These issues and problems include traditional cosmological and teleological arguments, the probability of miracles, the credibility of religious experiences and testimonies, the problems of evil, theism versus agnosticism, the problem of religious pluralism, foundations of morality, evolution versus intelligent design, and many more. They are now addressed by systematically applying such divergent techniques as modal (epistemic, deontic) logics, probabilistic methods, decision-theory and Bayesian confirmation theory: all applied or further developed in formal epistemology or in foundational research in artificial intelligence (knowledge representation and belief revision). Among others, Richard Swinburne famously used Bayesian confirmation theory to defend theism and related doctrines, Alvin Plantinga developed much discussed modal ontological theses, whereas John Earman refuted Hume's classical argument on miracles, using probabilistic methods. Others, like Herman Philipse use the same formal techniques to attack the claims of theism.

As a result, there seems some mutual understanding now between formal epistemology and the philosophy of religion. Many philosophical disciplines experienced subsequently a logical, a probabilistic, and finally a computational turn. No doubt, the philosophy of religion took the first two steps graciously and experienced the emergence of a subfield, that could well be labeled the formal epistemology of rational belief. Conversely, formal epistemology has found a very fertile playground for the application and perhaps even further development of formal methods and theories. It may well supplement the realistic large-scale empirical domains provided by the sciences today, and the much-used isolated puzzles / "toy examples", that were persistent in logic and philosophy of science for a long time.

Although one could hardly expect Anselm's achievements to make their way into public debate, as Darwin's and Calvin's did, a small tribute in 2009 wouldn't have been inappropriate. His approach to philosophy, the cosmological and teleological arguments pursued by some natural theologians and Pascal's probabilistic strategy, did prelude and

inspire much of current work in formal epistemology of religion and rational belief.

Richard Starmans  
Information and Computing Science, Utrecht University

### ... Logic and Rational Interaction

Just like last month, we published three extended reports on [Logic and Rational Interaction](#). Jens Ulrik Hansen wrote very enjoyable piece on the *Methods for Modalities* workshop, held in Copenhagen last November. Reminding us of the warm days of August, Andrzej Murawski reported on his ESSLLI course on *Game Semantics and Its Applications*. Finally, Sebastian Sequoiah-Grayson summarized the discussions during the first half of the fall semester at the *Formal Philosophy Seminars* in Leuven.

Two new publications were announced: a working paper by Johan van Benthem and F.R. Velazquez-Quesada on *Inference, Promotion, and the Dynamics of Awareness*, and *a new collection of essays in honor of Goran Sundholm*, edited by Giuseppe Primiero and Shahid Rahman announced, at College Publications.

You can stay in touch with [loriweb.org](http://loriweb.org) by either registering for the [newsletter](#), or for our [RSS feed](#). Please visit the website for more details. As always, I end by reminding you that we welcome any contributions relevant to our theme, and that we are also constantly looking for new collaborators. If you would like to join the team, or 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

### ... Formal Epistemology

What's hot (and what's not) in formal epistemology. Handy tips and helpful advice from the Formal Philosophy Seminar series at the Formal Epistemology Project, University of Leuven.

Sonja Smets—Groningen (joint work with Alexandru Baltag from the Oxford Comlab)—talked to us about “Merging beliefs by talking your way into agreement”. The issue concerns modeling the the phenomenon of doxastic agreement amongst groups of agents. The actual process brining about such agreements is, of course, the exchange of information. Taking the goal of such informational exchange to be total agreement amongst the agents in the group, various rules for the “exchange game”, such as public communication, sincerity, and persuasiveness were laid down. The hard (and fun!) work turned on the properties required by the various dynamic belief-merging operations. Some of these operations operate on particular beliefs, and others on entire doxastic structures! Question time went overtime, and this was one of my favourite FPS talks so far.

Photos of our fun may be found [here](#).

The full FPS program is available [here](#). Next time: Toby Meadows on modal logic and Brian Hill on counterfactuals! In the meantime, a very happy holiday season to all the Reasoner readers from Team FEP.

Sebastian Sequoiah-Grayson

Formal Epistemology Project, University of Leuven

## §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 have feedback concerning any of the items printed here, please email [features@thereasoner.org](mailto:features@thereasoner.org) with your comments.

#### **Alonzo Church**

In 1936, Alonzo Church, Emil Post, and Alan Turing each proposed independent explications of the informal notion of an effectively computable function, or algorithm. The three formal notions were later shown to select the same class of mathematical functions. Further equivalent formulations have been produced by Gödel and others. The resulting thesis, that the computable functions are the recursive functions, has become known as Church's Thesis, or the Church-Turing thesis. (The notion of a recursive function traces to Gödel; Church considered a related class of functions called  $\lambda$ -definable.)

Church's Thesis is important because we want to know whether some problems have algorithmic solutions. For example, Church initially formulated the thesis in an attempt to answer the question of whether first-order logic was decidable. A theory is decidable if there is a procedure for determining whether any given formula is a theorem. Since recursion is formally definable, Church's Thesis provides a method for determining whether a particular problem has an effective solution. It provides a formal characterization of an intuitive concept.

Church's Thesis is also important because of its relation to Turing's formulation. Turing selected the recursive functions by considering the abilities of logical computing machines, or Turing Machines. Some writers who have compared Turing machines to human minds have used Church's Thesis with excessive enthusiasm, making broader claims about its implications than are supported by the thesis properly construed. In fact, Church's Thesis is entirely silent about the nature and limitations of both the human mind and computing machines.

Church's Thesis is widely accepted. It appears that every recursive function is effectively computable, and it also appears that every effectively computable function is recursive. Still, there is some debate over whether Church's Thesis is provable. This

debate has focused on whether any identification of an informal concept with a formal notion can be proven. Some philosophers consider Church's Thesis to be a working hypothesis. Others take it to be merely another mathematical refinement of a commonsense notion like set, function, limit, or logical consequence.

Church's Thesis is independent of the purely technical result called Church's Theorem. Church's Theorem shows that first-order logic is recursively undecidable, as long as it contains non-monic predicates. (A monic predicate, like 'is blue' takes only one argument, in contrast to relational predicates, like 'is bigger than' or 'is between'.) Appending Church's Thesis to Church's Theorem, as Church did, we can show that there is no effective decision procedure for first-order logic, no sure method for deciding whether a formula of first-order logic is valid. However, there is a decision procedure for monic predicate logic.

Russell Marcus  
Hamilton College

## Port-Royal Logic

The Port-Royal Logic is the popular name for Antoine Arnauld and Pierre Nicole's *La Logique ou l'Art de Penser*, the most influential logic text between the seventeenth and nineteenth centuries. The nickname is derived from the convent of Port-Royal, near Paris, with which both men were associated. According to the authors, the Logic was originally composed by Arnauld to make good on a boast that he could teach a teenage nobleman, Charles-Honoré d'Albert, subsequently Duke of Chevreuse, all that was worth knowing about logic in no more than five days. After this work had begun to circulate in manuscript, Arnauld collaborated with Nicole to prepare a version for publication. During the authors' lifetimes, the work was published in five editions, between 1662 and 1683. It was first translated into English in 1674, and most recently and faithfully by Jill Vance Buroker (1996: Cambridge).

The Logic is divided into four parts, covering ideas, propositions, reasoning and method, respectively. The second and third parts comprise a conventional, if engagingly written, summary of the scholastic logic of categorical propositions and syllogisms. Throughout, the authors emphasize the practical application of logic in the evaluation and composition of reasoning, and disarmingly dismiss much of the theory they summarize as of use only for exercising the mind. However, unlike some seventeenth-century critics of scholasticism, they demonstrate a sophisticated grasp of its key tenets. The other two parts are more original, and display the influence of Ren Descartes and Arnauld and Nicole's fellow Jansenist Blaise Pascal.

Part One recapitulates Descartes's argument that intellectual intuition can be a source of "clear and distinct ideas," which are thereby self-evident. This is understood as providing justification for absolute truths in both science and religion. Part Four also echoes Descartes, with an account of scientific method which stresses the mathematical over the empirical and downplays the long-standing distinction between synthesis, or working forward from the premisses to the conclusion, and analysis, or working back-

ward from the conclusion to the premisses. Arnauld and Nicole's impatience with empiricism, rhetoric, and especially Michel de Montaigne's scepticism with respect to the efficacy of reason are also characteristically Cartesian. The influence of Pascal is evident in the account of definition, which clarifies the ultimately Aristotelean distinction between nominal and real definitions as specifying respectively how the word is used, and how the idea for which it stands is related to other ideas. Arnauld and Nicole also helped to fix the now standard distinction between extension and intension, or comprehension in their usage, as distinguishing the individuals to which a term refers from the ideas which it represents.

The Port-Royal Logic was the principal conduit by which the Cartesian approach to logic was transmitted. This influence was perhaps greatest in the context of theological epistemology: the Logic found favour with Protestant as well as Catholic colleges, and influenced later religious-minded logicians, such as Isaac Watts. Latterly, the humanistic emphasis of the work has been praised as anticipating argumentation theory, see Maurice Finnochiario (1997: The Port-Royal Logic's theory of argument, *Argumentation*, 11, 393–410).

Andrew Aberdein  
Florida Institute of Technology

## §6 EVENTS

### JANUARY

**ISAIM:** 11th International Symposium on Artificial Intelligence and Mathematics, Fort Lauderdale, Florida, 6–8 January.

**USE OF STATISTICAL SCIENCE IN DECISION MAKING:** Applied Statistics Association of Sri Lanka, 8–10 January.

**MIAMI GRADUATE EPISTEMOLOGY CONFERENCE:** University of Miami, 14–16 January.

**GRADUATE CONFERENCE ON THE PHILOSOPHY OF LOGIC AND MATHEMATICS:** University of Cambridge, 16–17 January.

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

**FORMAL MODELS OF NORM CHANGE:** University of Amsterdam, 18-19 January.

**EPISTEMOLOGY AND PHILOSOPHY OF MIND AT THE CROSSROADS:** Conference of the Dutch-Flemish Association for Analytic Philosophy, Catholic University of Leuven, 20–22 January.

**VAGUENESS AND METAPHYSICS:** Barcelona, 21–22 January.

**ICAART:** International Conference on Agents and Artificial Intelligence, Valencia, Spain, 22–24 January.

**ICCMS:** 2nd International Conference on Computer Modeling and Simulation, Sanya, China, 22–24 January.

**SOFSEM**: 36th International Conference on Current Trends in Theory and Practice of Computer Science, Špindleruv Mlýn, Czech Republic, 23–29 January.

**BAYESIAN BIOSTATISTICS**: The University of Texas M. D. Anderson Cancer Center, 27–29 January.

**ICMSS**: International Conference on Mathematical and Statistical Sciences, Cape Town, South Africa, 27–29 January.

## FEBRUARY

**STATISTICAL MODELLING AND INFERENCE**: Conference to celebrate Murray Aitkin's 70th birthday, Brisbane, Queensland, Australia, 1–4 February.

**DUBLIN INTENTIONALITY WORKSHOP**: Royal Irish Academy, 4–5 February.

**UTTERANCE INTERPRETATION AND COGNITIVE MODELS**: Brussels, 5–7 February.

**IUI**: ACM International Conference on Intelligent User Interfaces, Hong Kong, China, 7–10 February.

**LATTICE-VALUED LOGIC AND ITS APPLICATIONS**: 31st Linz Seminar on Fuzzy Set Theory, Linz, Austria, 9–13 February.

**IWCogSc**: ILCLI International Workshop on Cognitive Science, Donostia-San Sebastian, 10–12 February.

**ICMLC**: 2nd International Conference on Machine Learning and Computing, Bangalore, India, 12–13 February.

**MIND IN NATURE**: Humboldt-University of Berlin, 15–17 February.

**LOGICAL APPROACHES TO BARRIERS IN COMPUTING AND COMPLEXITY**: Alfred Krupp Wissenschaftskolleg, Greifswald, Germany, 17–20 February.

**PHD'S IN LOGIC**: Tilburg University, The Netherlands, 18–19 February.

**AILACT**: Association for Informal Logic and Critical Thinking, Central APA Meeting in Chicago, Illinois, 19 February.

**ICMSSC**: International Conference on Mathematics, Statistics and Scientific Computing, Penang, Malaysia, 24 February.

**ONTOLOGY OF ORDINARY OBJECTS**: 2nd Annual Auburn Philosophy Conference, Auburn, Alabama, 26–27 February.

**BCPS**: International Conference on Behavioral, Cognitive and Psychological Sciences, Singapore, 26–28 February.

## MARCH

**STACS**: 27th International Symposium on Theoretical Aspects of Computer Science, Nancy, France, 4–6 March.

**RELATIONAL VERSUS CONSTITUENT ONTOLOGIES**: University of Notre Dame, South Bend, Indiana, 5–6 March.

**AGI**: 3rd Conference on Artificial General Intelligence, Lugano, Switzerland, 5–8 March.

**METHODS IN PHILOSOPHY**: Dublin Graduate Conference in Philosophy, Trinity College Dublin (TCD) and University College Dublin (UCD), 6–7 March.

**CONSCIOUSNESS, OTHER MINDS AND NATURALIZING THE MIND:** Ruhr-University Bochum, Germany, 9 March.

**PGSA:** Philosophy Graduate Student Association, University of Waterloo, Canada, 11–12 March.

**PHILOSOPHICAL IMPLICATIONS OF SECOND-ORDER MODAL LOGIC:** International Graduate Workshop at the Centre for Logic and Language, Institute of Philosophy, University of London, 11–13 March.

**THOUGHT EXPERIMENTS AND COMPUTER SIMULATIONS: SAME END, DIFFERENT MEANS?:** IH-PST, Paris, France, 11–13 March.

**ICKD:** 2nd International Conference on Knowledge Discovery, Bali Island, Indonesia, 19–21 March.

**SEP:** 38th annual meeting of the Society for Exact Philosophy, Kansas City, Missouri, 19–21 March.

**PROPOSITIONS, CONTEXT, AND CONSEQUENCE:** Arché Research Centre, University of St Andrews, 20–21 March.

**CICLING:** 11th International Conference on Intelligent Text Processing and Computational Linguistics, Iasi, Romania, 21–27 March.

**SW:** Operational Research Society 5th Simulation Workshop, Worcestershire, England, 23–24 March.

**MIDiSoVA:** Modelling Interaction, Dialog, Social Choice, and Vagueness, ILLC, Amsterdam, 26–28 March.

**INFOS:** 7th International Conference on Informatics and Systems, Cairo University, Egypt, 28–30 March.

**AISB:** Annual Convention of the Society for the Study of Artificial Intelligence and Simulation of Behaviour, De Montfort University, Leicester, 29 March - 1 April.

**SBP:** International Conference on Social Computing, Behavioral Modeling, & Prediction, Bethesda, MD, 29 March - 1 April.

**MATCHING AND MEANING:** Automated Development, Evolution and Interpretation of Ontologies, Leicester, UK, 31 March - 1 April.

## APRIL

**THEORY OF BELIEF FUNCTIONS:** Brest, France, 1–2 April.

**THE SNOWBIRD WORKSHOP:** The Learning Workshop, Cliff Lodge, Snowbird, Utah, 6–9 April.

**JAIST:** International Symposium on Integrated Uncertainty Management and Applications, Ishikawa, Japan, 9–11 April.

**NEWTON AND EMPIRICISM:** Center for Philosophy of Science, University of Pittsburgh, 10–11 April.

**ADS:** Agent-Directed Simulation Symposium, Orlando, Florida, USA, 12–15 April.

**SCIENTIFIC PHILOSOPHY: PAST AND FUTURE:** Tilburg University, The Netherlands, 13 April.

**PROGRESS IN MEDICINE:** University of Bristol, 13–15 April.

**VISIONS OF COMPUTER SCIENCE:** Edinburgh University, 13–16 April.

**THE FUTURE OF PHILOSOPHY OF SCIENCE:** Tilburg Center for Logic and Philosophy of Science, 14–16 April.

**SYNTHESE CONFERENCE:** Columbia University, New York, 15–16 April.  
**SSPP:** Southern Society for Philosophy and Psychology annual meeting, Atlanta, GA, 15–17 April.  
**NORTHWESTERN/NOTRE DAME EPISTEMOLOGY CONFERENCE:** Northwestern University, 16 April.  
**UNILOG:** 3rd World Congress and School on Universal Logic, Lisbon, Portugal, 18–25 April.  
**FLOPS:** 10th International Symposium on Functional and Logic Programming, Sendai, Japan, 19–21 April.  
**NON-CLASSICAL MATHEMATICS:** a special session at World Congress on Universal Logic 2010, Lisbon, Portugal, 22–25 April.  
**FORMAL SEMANTICS AND PRAGMATICS:** 6th International Symposium of Cognition, Logic and Communication, University of Latvia, Riga, 23–25 April.  
**INSTRUMENTS: MENTAL AND MATERIAL:** 6th Annual HAPSAT Conference, Institute for the History and Philosophy of Science and Technology, University of Toronto, 25 April.  
**ICCMNC:** International Conference on Computer Mathematics and Natural Computing, Rome, Italy, 28–30 April.  
**RIAO:** Adaptivity, Personalization and Fusion of Heterogeneous Information, Paris, France, 28–30 April.  
**SDM:** SIAM Conference on Data Mining, Columbus, Ohio, 29 April–1 May.  
**IGCC:** 2nd annual Interdisciplinary Graduate Conference on Consciousness, Boston University, 30 April–1 May.  
**REFERENCE AND REFERRING:** Inland Northwest Philosophy Conference, Moscow, ID & Pullman, WA, 30 April–2 May.

## MAY

**MODELS AND SIMULATIONS:** University of Toronto, 7–9 May.  
**REASON TODAY. FROM DIFFERENTIATION TO UNITY:** Babes-Bolyai University, Cluj-Napoca, Romania, 7–9 May.  
**KR:** 12th International Conference on the Principles of Knowledge Representation and Reasoning, Toronto, Canada, 9–13 May.  
**AAMAS:** 9th International Conference on Agents and Multi Agent Systems, Toronto, Canada, 10–14 May.  
**FORMAL EPISTEMOLOGY FESTIVAL:** Learning From Experience & Defeasible Reasoning, University of Toronto, 11–13 May.  
**AISTATS:** 13th International Conference on Artificial Intelligence and Statistics, Chia Laguna, Sardinia, Italy, 13–15 May.  
**NMR:** Workshop on Commonsense and Non-Monotonic Reasoning for Ontologies, Sutton Place, Toronto, Canada, 14–16 May.  
**MEANING, MODALITY AND APRIORITY:** University of Cologne, Germany, 17–20 May.  
**INFINITY:** Infinite and Infinitesimal in Mathematics, Computing, and Natural Sciences, Cetraro, Italy, 17–21 May.  
**FLAIRS:** 23rd Florida Artificial Intelligence Research Society Conference, Daytona Beach, Florida, 19–21 May.



**IDA:** 9th International Symposium on Intelligent Data Analysis, Tucson, Arizona, 19–21 May.

**POBAM:** Philosophy of Biology @ Madison Workshop, University of Wisconsin-Madison, 21–23 May.

**PM@100: LOGIC FROM 1910 TO 1927:** Bertrand Russell Research Centre, McMaster University, Hamilton, Ontario, Canada, 21–24 May.

**SLACRR:** 1st St. Louis Annual Conference on Reasons and Rationality, University of Missouri-St. Louis, 23–25 May.

**ALGORITHMIC RANDOMNESS:** Department of Mathematics, University of Notre Dame, 24–28 May.

**LATA:** 4th International Conference on Language and Automata Theory and Applications, Trier, Germany, 24–28 May.

**ISMVL:** 40th International Symposium on Multiple-Valued Logic, Barcelona, Spain, 26–28 May.

**MODEL UNCERTAINTY:** Centre for Research in Statistical Methodology (CRiSM), Warwick, 30 May - 1 June.

**BSAP:** First meeting of the Brazilian Society for Analytic Philosophy, Unisinos University, Brazil, 31 May–2 June.

## JUNE

**PHILOSOPHY AND MODEL THEORY:** History and Contemporary Developments, Philosophical Issues and Applications, Paris, 2–5 June.

**BLAST:** Boolean Algebras, Lattices, Algebra, Set Theory, and Topology, Boulder, Colorado, 2–6 June.

**COGNITIVE ECOLOGY: THE ROLE OF THE CONCEPT OF KNOWLEDGE IN OUR SOCIAL COGNITIVE ECOLOGY:** Episteme Conference, University of Edinburgh, 3–4 June.

**VALENCIA INTERNATIONAL MEETINGS ON BAYESIAN STATISTICS:** Benidorm, Spain, 3–8 June.

**ICIC:** 3rd International Conference on Information and Computing Science, Jiangnan University, Wuxi, China, 4–6 June.

**ICMS:** 3rd International Conference on Modelling and Simulation, Jiangnan University, Wuxi, China, 4–6 June.

**SOCIETY FOR PHILOSOPHY AND PSYCHOLOGY:** 36th Annual Meeting, Lewis & Clark College, Portland, Oregon, 9–12 June.

**ICSS:** IEEE International Conference on Computational and Statistical Science, Manila, Philippines, 11–13 June.

**ICDDM:** IEEE International Conference on Database and Data Mining, Manila, Philippines, 11–13 June.

**THE FOUNDATIONS OF LOGICAL CONSEQUENCE:** St Andrews, Scotland, 12–14 June.

**ICAISC:** 10th International Conference on Artificial Intelligence and Soft Computing, Zakopane, Poland, 13–17 June.

**DM:** SIAM Conference on Discrete Mathematics, Hyatt Regency Austin, Austin, Texas, 14–17 June.

**OBJECTIVITY IN SCIENCE:** University of British Columbia, 17–20 June.

**SQUARE OF OPPOSITION:** Corte, Corsica, 17–20 June.

**FROM PRACTICE TO RESULTS IN LOGIC AND MATHEMATICS:** Nancy, France, 21–23 June.  
**LCM:** 4th International Conference on Language, Culture and Mind, Turku, Finland, 21–23 June.  
**MPC:** 10th International Conference on Mathematics of Program Construction, Québec City, Canada, 21–23 June.  
**ICML:** 27th International Conference on Machine Learning, Haifa, Israel, 21–25 June.  
**HUMAN-ROBOT PERSONAL RELATIONSHIPS:** Leiden University, The Netherlands, 23–24 June.  
**HOPOS:** International Society for the History of Philosophy of Science, Central European University, Budapest, Hungary, 24–27 June.  
**VALENCIA MEETINGS:** Valencia / ISBA Ninth World Meeting on Bayesian Statistics, Spain, June 2010.  
**ILP:** 20th International Conference on Inductive Logic Programming, Firenze, Italy, 27–30 June.  
**IPMU:** 13th International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems, Dortmund, Germany, 28 June - 2 July.  
**CiE:** Computability in Europe: Programs, Proofs, Processes, Ponta Delgada (Azores), Portugal, 30 June - 4 July.

## JULY

**METHODS OF APPLIED PHILOSOPHY:** St Anne's College, Oxford, 2–4 July.  
**LOFT:** 9th Conference on Logic and the Foundations of Game and Decision Theory, University of Toulouse, France, 5–7 July.  
**IWAP:** 5th International Workshop on Applied Probability, Universidad Carlos III de Madrid, Colmenarejo, Madrid, Spain, 5–8 July.  
**IWSM:** 25th International Workshop on Statistical Modelling, Department of Statistics, University of Glasgow, 5–9 July.  
**INC2010:** 8th International Network Conference, Heidelberg, Germany, 6–8 July 2010.  
**WoLLIC:** 17th Workshop on Logic, Language, Information and Computation, Brasília, Brazil, 6–9 July.  
**DEON:** 10th International Conference on Deontic Logic in Computer Science, Florence, 7–9 July.  
**BSPS:** British Society for the Philosophy of Science Annual Conference, University College, Dublin, 8–9 July.  
**UAI:** 26th Conference on Uncertainty in Artificial Intelligence, Catalina Island, California, 8–11 July.  
**ICCSIT:** 3rd IEEE International Conference on Computer Science and Information Technology, Chengdu, China, 9–11 July.  
**FLoC:** 5th Federated Logic Conference, University of Edinburgh, 9–21 July.  
**LICS:** Logic in Computer Science, Edinburgh, Scotland, UK, 11–14 July.  
**TMFCS:** International Conference on Theoretical and Mathematical Foundations of Computer Science, Orlando, FL, USA, 12–14 July.  
**UNCERTAINTY IN COMPUTER MODELS:** Sheffield, UK, 12–14 July.

**WORLDCOMP**: World Congress in Computer Science, Computer Engineering, and Applied Computing, Las Vegas, Nevada, 12–15 July.

**CBR-MD**: International Workshop Case-Based Reasoning on Multimedia Data, Berlin, Germany, 14 July.

**BICS**: Brain-Inspired Cognitive Systems Conference, Madrid, Spain, 14–16 July.

**ICCBR**: 18th International Conference on Case-Based Reasoning, Alessandria, Italy, 19–22 July.

**WCCM/APCOM**: 9th World Congress on Computational Mechanics and 4th Asian Pacific Congress on Computational Mechanics, Sydney, Australia, 19–23 July.

**NACAP**: Simulations and Their Philosophical Implications, Carnegie Mellon University, 24–26 July.

**KDD**: 16th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, Washington, DC, 25–28 July.

## AUGUST

**FLINS**: 9th International FLINS Conference on Foundations and Applications of Computational Intelligence, Chengdu (Emei), China, 2–4 August.

**THOUGHT IN SCIENCE AND FICTION**: 12th International Conference of the International Society for the Study of European Ideas, Ankara, 2–6 August.

**ICNC-FSKD**: the 6th International Conference on Natural Computation and the 7th International Conference on Fuzzy Systems and Knowledge Discovery, Yantai, China, 10–12 August.

**ICCP**: 10th International Conference on Philosophical Practice, Leusden, Netherlands, 11–14 August.

**MAKING DECISIONS**: Singapore Multidisciplinary Decision Science Symposium, Nanyang Technological University, Singapore, 12–13 August.

**ECAI**: 19th European Conference on Artificial Intelligence, Lisbon, Portugal, 16–20 August.

**EUROPEAN MEETING OF STATISTICIANS**: Department of Statistics and Insurance Science, University of Piraeus, Greece, 17–22 August.

**TRUTH MATTERS**: Toronto, 18–20 August.

**ARTIFICIAL LIFE**: 12th International Conference on the Synthesis and Simulation of Living Systems, Odense, Denmark, 19–23 August.

**COMPSTAT**: 19th International Conference on Computational Statistics, Paris, France, 22–27 August.

**CIPP**: Collective Intentionality VII, Perspectives on Social Ontology, University of Basel, Switzerland, 23–26 August.

**CONCEPT TYPES AND FRAMES**: in Language, Cognition, and Science, Düsseldorf, Germany, 24–26 August.

**AI ML**: 8th International Conference on Advances in Modal Logic, Moscow, 25–29 August.

**ASAI**: 11th Argentine Symposium on Artificial Intelligence, Ciudad Autónoma de Buenos Aires, 30 August - 3 September.

## COURSES AND PROGRAMMES

**Courses**

**ISLA:** 3rd Indian School on Logic and its Applications, University of Hyderabad, Gachibowli, India, 18–29 January.

**MODERN BAYESIAN METHODS:** Queensland University of Technology, Brisbane, 1 February.

**ADVANCED SMALL AREA ESTIMATION:** Southampton Statistical Sciences Research Institute, 15–16 February.

**COST-ADT:** Doctoral School on Computational Social Choice, Estoril, Portugal, 9–14 April.

**NASSLLI:** 4th North American Summer School in Logic, Language and Information, Bloomington, Indiana, 21–25 June.

**ANALYTIC PRAGMATISM, SEMANTIC INFERENCE, AND LOGICAL EXPRESSIVISM:** 2nd Graduate International Summer School in Cognitive Sciences and Semantics, University of Latvia, Riga, 19–29 July.

**MEANING, CONTEXT, INTENTION:** Central European University (CEU), Budapest, Hungary, 19–30 July.

**ESSLLI:** European Summer School in Logic, Language and Information, University of Copenhagen, Denmark, 9–20 August.

**Programmes**

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

**MA IN PHILOSOPHY:** by research, Tilburg University.

**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.

**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, Law, Biosciences and History.

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

**MSC IN COGNITIVE SCIENCE:** University of Osnabrück, Germany.

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

**MASTER OF SCIENCE:** Logic, Amsterdam.

## §8

### JOBS AND STUDENTSHIPS

#### Jobs

**VISITING FELLOWSHIPS:** Centre for the Philosophy of Science, University of Pittsburgh, until filled, review starts on 15 December.

**POSITIONS AVAILABLE:** in the field of speech and natural language processing, COE, Johns Hopkins University, Baltimore, Maryland, deadline 4 January.

**POSTDOCTORAL RESEARCH FELLOW:** in Theoretical Philosophy, Department of Philosophy, Stockholm University, deadline 4 January.

**ASSISTANT PROFESSOR:** Philosophy of Biology and Environmental Sciences at UQAM, Montreal, Canada, deadline 5 January.

**IBM HERMAN GOLDSTINE MEMORIAL POSTDOCTORAL FELLOWSHIP:** for research in mathematical and computer sciences, Business Analytics and Mathematical Sciences Department of the IBM Thomas J. Watson Research Center, deadline 6 January.

**LECTURESHIP:** in Philosophy, AOS: metaphysics or philosophy of language, UCL Philosophy Department, University College London, deadline 8 January.

**THREE-YEAR FELLOWSHIP:** in Philosophy, Department of Philosophy, Logic and Scientific Method and Forum for European Philosophy, LSE, deadline 8 January.

**POSTDOC POSITIONS:** in philosophy, in the research project “Relativism and pluralism regarding truth and knowledge, norms and values”, University of Tartu, deadline 15 January.

**JUNIOR FELLOWSHIP:** in the Neural Computation and Adaptive Perception (NCAP) program, University of British Columbia, deadline 15 January.

#### Studentships

**PHD STUDENTSHIP:** “Multilevel Search Methodologies for Problem Solving”, School of Computer Science, University of Nottingham, until filled.

**PHD STUDENTSHIPS:** at the Gatsby Computational Neuroscience Unit, UCL, deadline 6 January.

**PHD STUDENTSHIPS:** in Computer Science, University of Nottingham, deadline 8 January.  
**PHD SCHOLARSHIPS:** Berlin School of Mind and Brain, Humboldt-Universität zu Berlin, deadline 15 January.

**PHD POSITION:** in early modern philosophy/science, Department of Philosophy and Moral Sciences and the Centre for History of Science, Ghent University, deadline 15 January.

**PHD STUDENTSHIP:** Philosophy of Medicine, Centre for the Humanities and Health, King's College London, deadline 1 February.

**PHD STUDENTSHIP:** Philosophy and Psychiatry, Centre for the Humanities and Health, King's College London, deadline 1 February.

**GRADUATE TEACHING ASSISTANTSHIP:** Ontology, School of Computing, Science & Engineering, University of Salford, deadline 5 February.

**PHD POSITIONS:** "Probabilistic Graphical Models and Image Analysis", University of Heidelberg, Germany, deadline 26 February.

**PHD STUDENTSHIPS:** Experimental Psychology, University of Bristol, deadline 1 March.

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