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Editorial

What sort of discipline is philosophy of science? Most professionals would agree that the discipline deals with all sorts of rigorous investigations concerning foundations, methods, and development of science (and probably a couple of things more). More disagreement might be prompted by asking about the proper method of philosophy of science. In the good old days, for example, the logical empiricists identified philosophy of science mainly with analytical, mathematical tools. A couple of decades later, the counter movement emphasized the importance of studying the practice of empirical science. Most contemporary philosophers see their own work somewhere in the middle.

Nevertheless, there are certain visible trends. More and more, research in philosophy of science resembles, from an institutional perspective, a science lab. Specialization increases, labor is divided, papers are co-authored. Moreover, philosophers of science are, as I perceive it, increasingly interested in exchanging views with real scientists.

What about the other side, though? How do scientists see philosophy of science? Are there any scientists that consult philosophers in their daily work, in order to resolve intriguing methodological and foundational puzzles, as we consult a doctor when we have caught a bronchitis?

Personally, I know few scientists who do so. But luckily I know a philosopher who has collaborated with, and is consulted by, quite a few scientists. Namely Mark Colyvan from the University of Sydney. So why not ask him all these questions?

You can see, I am keeping this editorial short. There are people who have to say more on this issue. Before I proceed to the interview, let me briefly introduce myself: I am Jan Sprenger and I work at the Tilburg Center for Logic and Philosophy of Science (TiLPS), which is part of Tilburg University, situated in the beautiful Netherlands. Work is hard, as anywhere, but in general, life is quite laid-back. I have been told that this is typical of the province of Brabant, but anyway, I am used to that from my home town Cologne.

But back to topic: here are Mark's answers to the questions that pressed me.

Jan Sprenger
Tilburg Center for Logic and Philosophy of Science

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Features

Interview with Mark Colyvan

Mark Colyvan is probably one of the most fascinating philosophers of our time. An

academic late bloomer, he has contributed to the advance of science and philosophy in a amazingly wide variety of subjects, including philosophy of logic, philosophy of mathematics, philosophy of science, philosophy of ecology, decision theory, conservation biology, ecology, environmental ethics, metaphysics, and philosophy of law. As you can see from this list, Mark is not only busy with purely philosophical issues, but actually likes to link his research to problems in science and society. For his work, he has been rewarded with an impressive list of publications and grants. Reason enough to interview him on the relevance of philosophy to empirical science, the division of labor approach in writing philosophy papers, and some personal issues as well.

Currently, Mark is Professor of Philosophy at the University of Sydney and Director of the Sydney Centre for the Foundations Science. He will be visiting Europe at EPSA 2009 in October, and next April, at the 3rd Tilburg-Sydney conference on "The Future of Philosophy of Science" (TBA soon) which he co-organizes.

Jan Sprenger: Mark, the most stunning feature of your work is probably your incredible output. How do you manage to produce so many papers?

Mark Colyvan: I currently have a research only position at the University of Sydney, so apart from a being Director of the Sydney Centre for the Foundations of Science and being responsible for a few of the usual administrative chores, I have a lot of time for writing and research. I am also fortunate to have good colleagues and collaborators—people with whom I enjoy talking about philosophy, logic, ecology or whatever. With good colleagues it's not hard to get things finished and find fruitful new ideas to work on.

JS: How do you experience co-authoring papers with a lot of other philosophers? Do you think that division of labor is the key to more efficient philosophical research, just like in empirical science?

MC: I collaborate with other philosophers but also with quite a few scientists. Some collaborations are dictated by expertise and, as you suggest, we take a division of labour approach: none of the authors could have written the paper on their own because noone has all the relevant expertise. Other papers are written collaboratively because the people in question like working together. In some cases, the paper could have been written by any of the authors, but the paper is better for the collaborative approach taken. I also frequently collaborate because of time pressures. I have several funded projects on the go at any one time and I usually have a postdoc working on each project. I can't possibly carry out the research for all the projects on my own, but I direct the projects in question and collaborate with the postdocs on each project. This is a model of research I've borrowed from science.

JS: You are one of the few philosophers who has been working in highly disparate areas. Don't you find it hard to switch between so many different problems and approaches?

MC: One of the advantages of collaborating with others is that you can work in areas in which you are not an expert—you do not have to be on top of every aspect of each area you work in. I must admit that I do enjoy having a few papers in progress in different areas at the one time. I like the variety, but you're right that sometimes it is hard

to switch between projects. I find it particularly hard to get back into a technical paper in, logic or decision theory, when I've been thinking about other things for a while.

JS: Where did you make your most important contributions, in your own view?

MC: That's hard to say. Time will determine what's important and what's not, but let me make a couple of suggestions. In the philosophy of mathematics, in a number of articles and in my book, *The Indispensability of Mathematics* (OUP, 2001) I have argued that mathematics can be explanatory. That is, I have argued that there can be mathematical explanations of empirical facts. This runs counter to most of the accepted wisdom on explanation in science, and, in particularly, is at odds with the recent focus on causal explanations in science. If I am right about mathematics being explanatory, it will not only mean that much of the current work on scientific explanation needs to be reappraised, but it will also prove important for debates about realism in mathematics (where it is often implicitly assumed that mathematics plays a merely representational role in science).

My other major contribution, I guess, is in defending (with ecologist Lev Ginzburg in our book *Ecological Orbits: How Planets Move and Populations Grow*, OUP 2004) the inertial view of population dynamics. According to this view, populations grow exponentially unless acted upon by an "ecological force" and then that force acts via the second-order quantity, the rate of change of the population growth rate (rather than on the first-order quantity the growth rate). This theory is captured in a set of second-order differential equations (rather than the usual coupled first-order Lotka-Volterra predator-prey equations) and has a curious time lag (or "inertia") built into it. If this theory turns out to be right, it will have serious consequences for managing populations, as well as for our theoretical understanding of population ecology itself.

JS: Remarkably, you collaborate quite a lot with empirical scientists, mainly ecologists. What is the kind of expertise you are able to give them as a philosopher?

MC: I initially started working with ecologists and conservation biologists as a result of having some expertise in logic. The ecologists in question were interested in classifications that involved vague boundaries and I was able to help them with this by clearly separating uncertainty arising from vagueness and uncertainty arising from incomplete information. Moreover, we philosophers have a number of tools at our disposal to deal with vagueness: multi-valued logics, supervaluational logic, modal logics and so on. All of these approaches are improvements on arbitrarily drawing a line and defining the vagueness out of existence. I'd strongly encourage any philosopher interested in applying their skills to practical problems to do so. You'll find that, so long as you are willing to come up to speed on the details of the scientific problem, progress can often be made by applying some fairly well-known philosophical techniques. The work is not trivial though. It often takes quite a bit of time to see that the problem in question is, in fact one we are familiar with. I do find it very rewarding work and I learn a great deal about science as actually practiced.

JS: Do you feel that most scientists appreciate a philosophical take on the problems they are concerned with? Personally, I sometimes witnessed utterances like "OK, that's an interesting philosophical problem, but hard to connect to the questions I am interested in."

MC: The scientists I regularly work with are pretty keen to work with philosophers

and they appreciate the skills and expertise we have. After all, we bring a range of skills to the table: expertise in logic, mathematics, probability theory, decision theory, social choice theory, game theory, and epistemology. Moreover, we usually bring a broad overview of science and often quite a high level of mathematical competence. But we philosophers need to think about better ways of making the connections between philosophy and science. I can remember telling some conservation biologists about vagueness in endangered species classifications and the listeners rolling their eyes in boredom as I told them about the sorites paradox and how it was a very serious problem in philosophy and conservation biology alike. They were clearly unimpressed and thought that the sorites could easily be solved by drawing an arbitrary line. I then pointed out how the arbitrariness of the line could come back to bight them. I pointed out that if the cut off for the category "critical endangered", say, was determined by having a population less than or equal to n and if there are $n + 1$ black rhinos, say, then as a conservation biologists the best thing to do might be to kill a black rhino. This way the remaining black rhinos would get the help they so clearly needed. This got the attention of the audience in a way that proving that one black rhino was not endangered via sorites reasoning did not. I was surprised, though, for I thought my initial sorites presentation was the more compelling, but they saw the sorites as a bit of sophistry and of little interest. What grabs the attention of a philosopher and what grabs the attention of a scientist dealing with a very specific scientific problem can be quite different. We philosophers interested in formal methods need to do a better job of advertising our talents and establishing the relevance of what we do for broader scientific problems. This often means publishing in the relevant scientific journals, with the right kind of (realistic) examples to make a specific point.

JS: Philosophy of science is sometimes criticized on the grounds of being locked in an ivory tower, and dealing with too many meta-questions. Do you think that engaging with the work of empirical scientists is a way to increase the social relevance of philosophy of science?

MC: I think philosophy of science needs both researchers working on real scientific problems and those working on more theoretical issues (e.g., meta-questions). I hate the "ivory tower" charge and the charge that "it's merely an academic problem". The reference-class problem, say, in philosophy of statistics is a big problem almost everywhere in science, but science would be crippled if that were all people worried about. But likewise, science would be crippled if no one worried about the reference-class problem. The reference class problem is not "merely academic" in the sense that it has no practical import, but unless the practical import in the given situation is established, it can be set aside for the time being—or at least set aside for philosophers of statistics to think about, while others get on with their day-to-day work. It is important for philosophy of science not to get hung up on its own agenda though. I think philosophy of biology has been a good example for us all. Philosophers of biology have, by and large, tackled and made progress on questions that biologists take to be important. This is the best way to prove the usefulness and relevance of philosophy to science.

JS: In general, should philosophers feel obliged to deal with problems whose solution has some middle- or long-run benefits for society?

MC: I think we as philosophers should aim to make a difference but that doesn't

mean that every one of us needs to find medium- or long-term benefits to society in our work. History has shown time and again that some of the most useful ideas come from areas not thought to have applications at the time. Think of the pioneering theoretical work on computing by Alan Turing and centuries of work on number theory finally finding applications in public-key cryptography. So I don't think we should all drop what we are doing and work on preventing terrorism, fixing the economic crisis, slowing global warming, or preventing biodiversity loss, although I think some of us should be engaged in such work. Just as important, in my view, is work on various non-classical logics, the paradoxes of decision theory and understanding what mathematics is about. The benefits of work on the latter, more theoretical topics may be less obvious but there are likely to be benefits all the same.

JS: You are a late-comer to philosophy. What did you do before, and what attracted you about doing philosophy?

MC: I did quite a few things before philosophy. I was a tire fitter, a factory worker, a labourer, and a medical radiographer. I eventually came to philosophy from mathematics. The latter is a common enough breeding ground for philosophers. Your start out in mathematics; you worry about what a proof is, what mathematics is about, the connection between mathematics and the empirical sciences and so on. One minute I was writing an honours thesis on differential equations and the next I was a professor of philosophy. I still love mathematics but I don't regret making the switch to philosophy.

JS: Could you also imagine being in another profession now?

MC: I love the freedom one has as an academic to work on pretty much whatever one finds interesting, whenever one wants. For someone with my interests, philosophy is the perfect home. Philosophy is such a broad discipline that I am free to work on mathematics, logic, ecology and decision theory without ever being thought to be straying too far from the core business of philosophy. I could imagine working in a mathematics department or an ecology department, for instance, but I have no intention of doing so.

JS: What kind of things do you enjoy when you are not writing a paper, or travelling to a conference?

MC: I enjoy listening to music, running, and watching Australian Rules Football.

JS: What are your main projects for future work?

MC: I have a couple of book projects under contract at the moment. The first is a book on philosophy of ecology, in which I hope to spell out the various philosophical issues encountered in ecology. Philosophy of ecology is a relatively new area and I think it holds great promise for fruitful collaborations between philosophers of science and ecologists, and I hope the book will be useful to both parties. The other book is a text on the philosophy of mathematics. In this book I will be focussing on the issues attracting attention in contemporary work in philosophy of mathematics, as well as few topics I think should attract more attention than they do at present. After these books are out of the way, who knows, but I suspect something interesting will turn up. It usually does.

JS: Finally, is there a particular thing you would like to have changed in professional philosophy?

MC: I don't care who changes this but I would like "applied philosophy" to include

more than just applied ethics and for "environmental philosophy" to include more than just environmental ethics. I would like for society at large to see philosophers as making contributions to decision making, public debate, public policy and the like, apart from the usual contributions from applied ethics. Applied philosophy should include logic, decision theory, social choice theory, game theory, philosophy of science, formal epistemology, and other areas as well. If I can make some small contribution to changing the current narrow conception of what applied philosophy is I will be very happy.

JS: Mark, thank you very much for this interview.

MC: My pleasure. Thanks Jan.

On the Logico-Conceptual Foundations of Information Theory in Partition Logic

A new logic of partitions has been developed that is dual to ordinary logic when the latter is interpreted as the logic of subsets rather than the logic of propositions. For a finite universe, the logic of subsets gave rise to finite probability theory by assigning to each subset its relative cardinality as a Laplacian probability. The analogous development for the dual logic of partitions gives rise to a notion of logical entropy that is related in a precise manner to Claude Shannon's entropy. In this manner, the new logic of partitions provides a logico-conceptual foundation for information-theoretic entropy or information content.

Subsets of a universe U are dual to partitions on U in the sense of the category-theoretic duality between monomorphisms and epimorphisms. Throughout algebra, we see this duality between subobjects (e.g., subgroups, subrings, etc.) and quotient objects (e.g., quotient groups, quotient rings, etc.).

A *partition* $\pi = B, B'$ on a universe set U is a set of non-empty subsets ("blocks") of U that are disjoint and jointly exhaust U. A partition may equivalently be viewed as an equivalence (relation) where the equivalence classes are the blocks. A partition $\sigma = C, C'$ is *refined* by a partition $\pi = B, B'$ if for every block B of π, there is a block C of σ such that $B \subseteq C$. The partitions on U are partially ordered by refinement with the minimum partition or bottom being the indiscrete partition $0 = U$ consisting of U as a single block, and the maximum partition or top being the discrete partition $1 = u, u', \ldots$ where each block is a singleton. Join and meet operations are easily defined for this partial order so that the partitions on U form a (non-distributive) lattice (NB: in much of the older literature, the "lattice of partitions" is written "upside down" as the opposite lattice). Then the lattice operations of join and meet can be enriched by other partition operations such as negation, implication, and the (Sheffer) stroke to form a partition algebra.

In the duality between subsets and partitions, the dual of an "element of a subset" is a "distinction of a partition" where an ordered pair (u, u') is a *distinction* or *dit* of a partition $\pi = B, B'$ if u and u' are in distinct blocks. In the algebra of all partitions on U, the bottom partition 0 has no dits and the top 1 has all dits [i.e., all pairs (u, u') where $u \neq u'$] just as in the analogous powerset Boolean algebra on U, the bottom $\oslash$ has no elements and the top U has all elements. Let $\mathrm{dit}(\pi)$ be the set of distinctions of π. The partial order in the *BA* of subsets is just inclusion of elements, and the refinement

ordering of partitions is just the inclusion of distinctions, i.e., σ is refined by π iff dit(σ) $\subseteq$ dit(π).

For a finite U, the finite (Laplacian) *probability* $p(S)$ of a subset ("event") is the ratio: $p(S) = |S|/|U|$. Analogously, the finite *logical entropy* (or *logical information content*) $h(\pi)$ of a partition π is the relative size of its dit set: $h(\pi) = |dit(\pi)|/|U \times U|$. If U is an urn with each "ball" in the urn being equiprobable, then $p(S)$ is the probability of an element randomly drawn from the urn being in S, and $h(\pi)$ is the probability that a pair of elements randomly drawn from the urn (with replacement) is a distinction of π.

Let $\pi = B_1, \ldots, B_n$ with $p_i = |B_i|/|U|$ being the probability of drawing an element of B_i. The number of indistinctions (non-distinctions) of π is $\sum_i |B_i|$ so the number of distinctions is $|dit(\pi)| = |U|^2 - \sum_i |B_i|^2$ and thus the logical entropy of π is: $h(\pi)[|U|^2 - \sum_i |B_i|^2]/|U|^2 = 1 - \sum_i p_i^2 = (\sum_i p_i)(\sum_i p_i) - \sum_i p_i^2 = \sum_i p_i(1 - p_i)$ since $\sum_i p_i = 1$.

In Shannon's information theory, the *entropy* $H(\pi)$ of the partition π (with the same probabilities assigned to the blocks) is: $H(\pi) = \sum_i p_i \log(1/p_i)$ where the log is base 2.

Each entropy can be seen as the probabilistic average of the "block entropies" $h(B_i) = 1 - p_i$ and $H(B_i) = \log(1/p_i)$. To interpret the block entropies, consider a special case where $p_i = 1/2^n$ and every block is the same so there are 2^n equal blocks like B_i in the partition. The logical entropy of that special equal-block partition is the logical block entropy: $\sum_i p_i(1-p_i) = (2^n)p_i(1-p_i) = (2^n)(1/2^n)(1-p_i) = 1-p_i = h(B_i)$.

Instead of directly counting the distinctions, we could take the number of binary equal-blocked partitions it takes to distinguish all the 2^n blocks. As in the game of "twenty questions," if there is a search for an unknown designated block, then each such binary question reduces the number of blocks by a power of 2 so the minimum number of binary partitions it takes to distinguish all the 2^n blocks is: $H(B_i) = \log(1/p_i) = \log(2^n) = n$.

To precisely relate the block entropies, we solve each for p_i which is then eliminated to obtain: $h(B) = 1 - [1/2^{H(B)}]$. The interpretation of the Shannon block entropy is then extended by analogy to the general case where $1/p_i$ is not a power of 2 so that the Shannon entropy $H(\pi) = \sum_i p_i H(B_i)$ is then interpreted as the average number of binary partitions needed to make all the distinctions between the blocks of π–whereas the logical entropy is the relativized count $h(\pi) = \sum_i p_i h(B_i)$ of the distinctions of the partition π.

The two notions of entropy boil down to two different ways to count the distinctions of a partition. Thus the concept of a distinction from partition logic provides a logico-conceptual basis for the notion of entropy or information content in information theory. [For more details, see: Counting Distinctions: On the Conceptual Foundations of Shannon's Information Theory, *Synthese* 168: 119–149, 2009.]

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A note on formal reasoning with extensible domains

Some logicians believe that the lesson of paradoxes is essentially about limitations in quantification and extensibility of domains. The topic can in fact be traced back to some early writings of Russell but has reawakened recently in the book *Absolute Generality*, Rayo, Uzquiano eds, OUP, 2006. I wish to show here that a critical revision of the theory of quantification, according to some theory of domain extensibility, could require changes in the extensions of the concepts of valid inference and valid formula in formal quantificational logic.

Still more recently, in "Can we consistently say that we cannot speak about everything?", *The Reasoner* 2(9), 5-7, 2008 and in "A note on self-reference and tokenism", *The Reasoner* 2(11), 4-5, 2008, I proposed a principled version of the theory of domain extensibility. Concretely, I argued for the principle that no intensional object (reasoning, proposition, concept, definition, etc.) quantifies over itself. There I tried to show not only that the principle seems able to solve some logical paradoxes but that there is independent intuitive support for it. Let me briefly recall the latter.

Quantification seems to be a good candidate for the linguistic representation of mental reference and mental reference can be thought of as intentional reference, that is, as the relation between an intentional act and its intentional object, in the terms of Phenomenology. Any intensional object can be conceived as an objectified intentional act or sequence of intentional acts. Now it appears that no intentional act can be its own intentional object; for instance, *while* I'm thinking that snow is white I can't be thinking that I'm thinking that snow is white. The corresponding impossibility in terms of quantification would be the impossibility for an intensional object to lie in the domain of quantification of its own quantifiers.

Intentional acts are *about* their intentional objects, and there are intentional acts about intentional acts or about outputs of intentional acts. As a consequence, there is a hierarchy of levels of intentionality. Any intentional act A_L stands on a level L and there is a set D_L containing all objects that are *possible* intentional objects at L. D_L comprises whatever can be *given* for an act at level L. No intentional act A_L is ever given for A_L, i.e. no A_L is in D_L. My current thought is not and cannot be given for my current thought. So restrictions on quantification and intentional reference can be understood as restrictions on possible *givenness*. Furthermore, not only A_L is not given for itself but whatever is only given if A_L is, is not given for A_L.

Correspondingly, no intensional object P can quantify over P or whatever can only be introduced in terms of P. If P is a definition, for example, then neither P nor whatever can only be defined by means of P are in the scope of P's quantifiers. I shall call this general limitation on quantification the Q-restriction. Please note that the Q-restriction is not a normative but a descriptive thesis; it is not a prohibition but a statement of impossibility.

I introduce now a set R by means of the following definition:

$$\text{(d)} \qquad \iota x \forall y \, (y \in x \leftrightarrow y \notin y)$$

where 'ι' is Russell's descriptor *iota*.

According to the Q-restriction, '$\forall y$' in (d) quantifies neither over (d) nor over whatever can only be defined by means of (d): (d) is not *given* for itself, so neither is R. R is not in the domain of '$\forall y$' in (d). By means of (d) the domain D on which (d) quantifies, is extended to the domain D $\cup$ {R}. Of course, this blocks the classical inference from (d) to

$$(1) \qquad \mathrm{R} \in \mathrm{R} \leftrightarrow \mathrm{R} \notin \mathrm{R}$$

since R is not available for instantiation in (d).

The Q-restriction renders (d)—and most probably the naïve comprehension schema of which (d) is an instance—innocuous. But once we admit (d) as a definition, we obtain by existential generalization:

$$(2) \qquad \exists x \forall y \, (y \in x \leftrightarrow y \notin y)$$

which contradicts the classical theorem (Thomson's theorem):

$$(\mathrm{TT}) \qquad \sim \exists x \forall y \, (S\,xy \leftrightarrow \sim S\,yy)$$

as soon as we read 'Sxy' as '$y \in x$'.

The validity of the inference from (d) to (1) and the validity of (TT) depend on a dubious assumption, namely, that all the quantifiers in a formula should quantify over the same domain. If the Q-restriction is true, then the assumption is far from natural because the existential quantifier in (2) is introduced over an individual (namely, R) over which '$\forall y$' does not quantify in (d) or (2). The introduction of the existential quantifier implies an extension of the previous domain of quantification, which now splits into a primitive segment D, which remains the domain of '$\forall y$', and an extended one, D $\cup$ {R}, the domain of '$\exists x$'.

Let me address a final concern: isn't the 'ιx' in (d) a quantifier quantifying over the defined object R? Well, a quantifier picks out a part or an element of a domain of objects. The descriptor 'ιx' can either *select* an item from a domain of independently given objects or *construct* an object, thus enlarging a domain with a new item. In the former case, the defined object can always be *given* independently of the definition that includes the descriptor, and this is why the descriptor can act as a quantifier over a domain containing the defined object (the impredicative definition of the *supremum* is a famous instance of this); in the latter case, the object is first given through the definition and the descriptor in it is no quantifier picking an item out of a domain of previously given objects. The latter seems to be the case here.

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Reasoning about *De re* Modality

One source of anti-realism about *de re* modality comes from Quine's (1961) *Reference and Modality*. There Quine presents a case and argues that the modal status of a property P given an object O, $< O, P >$, is relative to a manner of designating O and P.

Quine's case is (Q):

1. $\Box[9 > 7]$
2. 9 = The number of planets in the solar system.
3. $\Box$ [The number of planets > 7].

Given substitutivity, whereby terms flanking a true identity can be interchanged in all contexts, (3) follows from (1) and (2). But (3) is false. According to Quine we must reject substitutivity or hold that the modal status of <9, being greater than 7> is relative to how 9 is designated. Since it is preferable to preserve substitutivity, given that our intuitions about the modal status of <9, being greater than 7> vary depending on how 9 is designated, Quine concludes that modality is always a property of $< O, P >$ relative to a manner of designation. On his account the number 9 does not have any modal properties. Rather the statement '9 is greater than 7' has the property of being necessarily true. And the statement 'the number of planets is greater than 7' has the property of being contingently true. Quine's reasoning about *de re* modality involves the following methodological principle:

(r) If our intuitions about whether an object O has a property P accidentally or essentially vary depending on whether we refer to O via D_1 or D_2, then having P essentially or accidentally is not a property of O independently of how it is designated, but rather a property of $< O, P >$ relative to a manner of designation.

What is the basis for maintaining (r)? It appears that the reasoning that leads to (r) is not conclusive. Quine's case (Q) provides us with an instance of (a):

(a) Intuitions about whether object O has property P accidentally or essentially vary depending on whether we refer to O via D_1 or D_2.

Quine concludes

(b) The modal status of $< O, P >$ is relative to a manner of designation, and not a property of $< O, P >$ independent of a manner of designation.

However, (c) is also available from (a).

(c) Linguistic representations of objects and properties appear to distort the modal status of the properties an object has. Thus, linguistic representation may not be a transparent guide to the modal status of the properties of an object. As a consequence, conclusions about the metaphysical nature of modality should not be drawn on the basis of variation in modal intuition due to variations in manner of linguistic designation.

In order to reach (b) from (a) an additional premise that rules out (c) is required. One could argue that in cases where we judge that language is a transparent guide to reality the move from (a) to (b) is warranted. This approach will not work for cases where there are both variations in modal intuition in the presence of variations in manner of designation and we judge that language is *not* a transparent guide to reality. And it would not allow one to conclude global skepticism about *de re* modality from the presence of a single or small set of cases in which there is variation in modal intuition in the presence of variation in manner of designation. A stronger approach would be to endorse (d).

(d) If there are any cases in which our intuitions about whether object O has a property P accidentally or essentially vary depending on whether O is designated via D_1 or D_2, then the best explanation for why our intuitions about the modal status of P vary depending on how O is designated is because the modal status of $< O, P >$, in general, is relative to how it is designated.

With (d) in place, the move from (a) to (b) is warranted. But what reason is there for adopting (d)? Consider the following thought experiment (T). Let W be a world with an artificial language L, and a hypothetical object O, where our modal intuitions do not vary when the manner of designation is varied.

Suppose in world W in language L there are only four ways of referring to object O: t_1, t_2, t_3, t_4, the first two are proper names, and the second two are descriptions, and that O has four properties: P_1, P_2, P_3, P_4. Further suppose that neither the term used nor the property selected, changes anyone's modal intuitions in W. For all properties and all terms, everyone has the intuition that the property is contingent. For example, everyone in W has the intuition 't_1 is P_2' is contingent, and that 't_3 is P_4' is contingent.

Supposing that (Q) supports (d), what conclusion about de re modality should we draw from (T)? Option 1: Modality is a property of $< O, P >$ relative to how it is designated. Option 2: Modality is a property of $< O, P >$ irrespective of how it is designated. Since (d) is about variance in modal intuition in the presence of variance in manner of designation, it is silent over what conclusion to draw when there is invariance in modal intuition in the presence of variance in manner of designation. Consider (e) and (f) as ways of adjudicating between the options.

(e) While *variation* in modal intuition in the presence of *variation* in designation is *best explained* by modality being relative to manner of designation, *invariance* in modal intuition in the presence of variation in manner of designation is *not best explained* by modality being relative to manner of designation.

(f) While *variation* in modal intuition in the presence of *variation* in designation is *best explained* by modality being relative to manner of designation, *invariance* in modal intuition in the presence of variation in designation is *not best explained* by modality *not* being relative to manner of designation.

How should we reason about the relation between variance and invariance in modal intuition relative to variance in manner of designation with respect to conclusions about *de re* modality? While neither (e) nor (f) are conclusive of 1 or 2, (e) suggests 2, and (f) suggests 1. If the combination of (d) and (f) is required for complete skepticism

about *de re* modality generated from cases (Q) and (T), then some explanation of why one should adopt (f) over (e) for (T) is required. Of course one could discount (T) as irrelevant. But T appears to be relevant since anti-realism about *de re* modality isn't a contingent thesis about the metaphysics of modality. It is a thesis that maintains that it is impossible for modality to be a property of $< O, P >$ independent of the manner of designation. Thus it should say that either (T) is incoherent or it is best to adopt (f) over (e).

I would like to thank an anonymous referee for excellent critical comments that greatly improved the present discussion.

Anand Jayprakash Vaidya
Philosophy, San Jose State University

Inconsistent logics! Incoherent logics?

H. Slater famously argued (1995: "Paraconsistent logics?", *J.Phil.Log.*, 24, 451-4) that there are no paraconsistent logics, inasmuch as paraconsistent negation is not a proper negation. Such a vivid attack has been variously replied, including an appropriate reply by J.Y. Béziau (2006: "Paraconsistent logics! A reply to Slater", *Sorites*, 17, 17-25) where the author resorted to the same conceptual framework as Slater's argument: the theory of opposition. Slater argues that, in order to overcome the view that everything follows from an inconsistent set of premises: $p, \neg p \models q$, some paraconsistentists unjustifiably neglect a crucial property of logical negation: to ban contradictions. The point is to shed new light upon the concepts Slater used in his argument to depict paraconsistency.

Negation, first. According to Slater, paraconsistent negation is not a proper negation because it allows a formula and its negation to be both true. This is a contradiction, he claims. Béziau replied that not every logical negation is a contradictory-forming operator: only classical negation is, while intuitionist and paraconsistent negations correspond to contrary- and subcontrary-forming operators. If Béziau is right, then Slater's position is reduced to the doubtful statement that only classical negation is a logical negation. Who's right?

Our first statement is that Slater wrongly attacks paraconsistency in general while his real target is not inconsistency, but incoherence. And we say that he reasonably challenges the latter, only.

Contradiction, then. Two sentences are said to be contrary to each other whenever they cannot be both true but can be both false; contradictory to each other, whenever they cannot be either both true or both false (the one is true whenever the other is false, and conversely); subcontrary to each other, whenever they cannot be both false but can be both true. Slater's target was the paraconsistent negation as characterized by G. Priest (1979: "The Logic of Paradox", *J.Phil.Log.*, 8, 219-41), where one and the same sentence can be both true and false. Priest assigned both truth and falsehood to some

sentences, whereas Slater refused it in the name of contradiction. Who's right? Our answer is that it depends upon what is meant by being true or false.

Truth, finally. An ontic view of truth depicts it as binary relation between a non-linguistic proposition and a corresponding fact. But nothing compels the logician to adopt such a metaphysical stance. Rather, his real concern is the way in which human agents reason. Hence our preference for another, epistemic view of truth as a truth-claim, i.e. an agent's attitude towards a linguistic sentence whose content he holds to be true.

Let $\mathbf{AR_4}$ be a four-valued system that makes sense of this view. Its semantics is a matrix $\mathfrak{M} = < \neg, \wedge, \vee, \rightarrow, \mathscr{A}_4 = \{0, 1/3, 2/3, 1\}, \{1, 2/3\} >$, with usual logical connectives and a set $\mathscr{A}_4$ of four logical values that includes a subset of two designated values. Each logical value is an ordered pair of A-answers to corresponding Q-questions: $q_1(p)$ = "do you hold the sentence p to be true?", and $q_2(p)$ = "do you hold the sentence p to be false?". Each question is answered either affirmatively (+) or negatively (−), not both. Thus $a(p) = \langle a_1(p); a_2(p)\rangle$ is the resulting pair among a set of 4 logical values: $\langle +; -\rangle = 1$, $\langle +; +\rangle = 2/3$, $\langle -; -\rangle = 1/3$, and $\langle -; +\rangle = 0$.

Our second statement is that the variety of logical negations comes from the variety of falsity-claims by an agent.

Thus, inconsistent negation corresponds to an epistemic attitude in which the agent holds the same sentence p to be both true and false: $A(p) = 2/3$, in a restricted set of valuations $\mathscr{A}_3 = \{1, 2/3, 0\}, \{1, 2/3\}$.

As to the consistent and incomplete negations, they respectively refer to $A(p) = 0$ in $\mathscr{A}_2 = \{1, 0\}, \{1\}$ and $A(p) = 1/3$ in $\mathscr{A}_3 = \{1, 1/3, 0\}, \{1\}$. It can be thus established which theorems from classical logic $\mathbf{C_2}$ are still valid or not in $\mathbf{K_3}$ and $\mathbf{P_3}$, where $\mathbf{K_3}$ refers to Kleene's intuitionist logic and $\mathbf{P_3}$ to Priest's paraconsistent logic.

The reason why the domains of valuation are variously restricted is due to the conditions under which an answer can be given by agents. A classical agent cannot hold p to be both true and false or neither true nor false, given that "holding true" means "being true" from his perspective of truth. An intuitionist agent cannot hold p to be both true or false but can hold p to be neither true nor false, given his strong interpretation of "holding true" as "having the proof for p". As to the paraconsistent agent, he cannot hold p to be neither true nor false but can hold p to be both true and false, due to his weak interpretation of "holding true" as "having an evidence for p".

By this semantic way, we hope to do justice both to Béziau's plea for inconsistency and Slater's objection to incoherence. It is right to say that an agent may affirm both a sentence and its negation: $a(p) = \langle +; +\rangle$. This is inconsistency as subcontrary opposition. And it is right to say that no sentence can be both affirmed and denied in the same respect, i.e. given the same question about it: $a(p) = \langle \{+, -\}; \{-, +\}\rangle$. This is incoherence as contradictory opposition. Hence our third and final statement: that paraconsistency concerns inconsistency only, while Aristotle's Principle of Contradiction concerns incoherence.

Priest still claims to endorse incoherence, however: one and the same question might be answered both positively and negatively, in the light of $\mathbf{AR_4}$. Does his solution to the

Liar Paradox require such an attitude? The question remains open.

Fabien Schang
Philosophy, Nancy

§3
News

European Journal for Philosophy of Science

The European Philosophy of Science Association (EPSA) has signed a contract with Springer concerning the establishment of a new journal: the European Journal for Philosophy of Science (EJPS). The Editorial Team is a group of excellent philosophers of science with a variety of backgrounds and fields of expertise. The Editor-in-Chief is Carl Hoefer (Autonomous University of Barcelona, Spain) and the deputy editor is Mauro Dorato (University of Rome III, Italy). Franz Huber (Konstanz, Germany) Edouard Machery (Pittsburgh, USA), Michela Massimi (London, UK), Samir Okasha (Bristol, UK) and Jess Zamora (UNED, Spain) are Associate Editors. The Editorial Team will be assisted in its work by an Editorial Board of highly reputed philosophers of science from around the world.

EJPS is the official journal of EPSA and will appear three times a year, beginning in January 2011. EJPS will aim to publish first-rate research in all areas of philosophy of science. Information concerning submissions to EJPS will be announced in the forthcoming weeks by the Editorial Team.

Stathis Psillos
President of EPSA

Journal of Formalized Reasoning

Formal verification is the activity of proving the correctness of an assertion by means of automatic devices. The assertion can either refer to the semantic correctness of a piece of software (the fact that the software behaves as expected according to its specification) or to more traditional items of scientific knowledge like, say, a mathematical theorem. Differently from theorem proving, proof checking does not aim to automatize the process of searching for a proof, but merely that of verifying the logical correctness of the reasoning once the proof has been provided. Proof search is still in charge of the user, possibly assisted by suitable software tools, called proof assistants or interactive provers (mostly helping to transform a rigorous but informal reasoning into a fully formal argument, automatically filling the annoying syntactic details so typical of any foundational dialect).

Formal verification has currently reached such a level of maturity as to allow correctness proofs of sophisticated hardware components, complex programs such as optimiz-

ing compilers, and even parts of modern operating systems. In mathematics, complex results in very different fields have been formalized and automatically checked, comprising for instance the asymptotic distribution of prime numbers, the four color theorem, or the Jordan curve theorem.

The Journal of Formalized Reasoning aims to be become the natural venue for the publication of this kind of work, providing a clear view of the current state of the field. In particular, the journal is meant to provide a forum for comparing alternative approaches, to enhance reusability of solutions, and to clarify the requirements for automatic and interactive tools supporting the formalization effort.

Andrea Asperti
Computer Science, Università di Bologna

Understanding human nature. Biological explanations and beyond, 11 May

Will science ever replace the traditional explanations of our rational reasonings and moral deeds? These traditional explanations, of what Wilfrid Sellars called our "manifest image" make essential reference to justificatory *reasons*. Logical reasons explain why we reach conclusions in thought, moral reasons explain why we prefer to perform some one act over another one. But this normative explanatory style stands in a tensed relation to the "scientific image", in which explanations are framed in terms of causes, instead of reasons. Evolutionary psychology (EP) is a recent manifestation of the claim that the scientific image should and will replace the manifest image. Evolutionary psychologists argue that workings of our minds are to be explained by particular adaptive mechanisms, aimed at the maximal distribution of our genes, and formed in ancestral environments, when the need to engage in co-operation with mutually beneficial results was urgent. Hence evolutionary psychologists have polemicized against the manifest treatment of our logical and ethical proclivities. Referring to the Wason test as proving that our logical abilities are wildly overestimated (we can't even deal with implication), they have proposed our capacities for reasoning derive not from a talent for logic *per se*, but from specialized, yet universally evolved, ancestral capacities to assess co-operative versus cheating inclinations in other people. Moral behavior is driven by quite similar, adaptive mechanisms. These adaptations, and nothing else, are what ultimately drive and explain apparently logical and moral behavior.

The conference *Understanding Human Nature* at the University of Antwerp (sponsored by the FWO-Flanders) provided a platform for reflection on the EP style of thinking regarding explanations of human behaviour.

Jesse Prinz showed how difficult, in the domain of ethics, the claim is to uphold that there are truly universal evolved mechanisms at work behind the scenes. For these even to be considered as valid *explanantia*, the *explanandum* should be uniform and universal. But, so Prinz argued, not even one example of a universal moral rule is to be found.

Fred Keijzer's talk made clear how much the computational view of the mind, under-

lying much of EP's theorizing about how the brain mechanisms of specific adaptations work, is a speculative theoretical framework, for which an (nonrepresentational) alternative exists, rather than a solid basis.

In their complementary presentations, Filip Buekens and Peter Goldie painted a picture of the manifest image as autonomous, but not totally detached from the scientific image. That is, no causal (evolutionary, neurobiological, ...) explanation will ever supersede the explanation that one arrived at 4x4=16 by following the rules of arithmetic. Yet there *are* interactions between the two styles of explanation. Causal explanations become appropriate when reason-explanations fail: When one has made calculation wrongly, or whenever we are confronted with failures of the "manifest" narratives for the behaviour and conduct of other humans. Beukens argued further that, if causal explanations are only invoked in the exceptional case, and since as, as a matter of logic, exceptions cannot constitute the rule, this implies that causal explanations can never fully replace reason-based explanations.

According to Andreas De Block, an analogous integration of the scientific image and the personal can be reached when we turn to the explanation of taboo-related behavior in cultural anthropology. The fact that basic disgust originated as an adaptive mechanism to avoid food contamination does not preclude that this basic emotion helped to shape a cultural order of the symbolically "impure". Disgust becomes a culturally learned emotion, while remaining at the same time firmly embedded in the biological make-up of humans.

Erik Myin and Willem Lemmens
Philosophy, University of Antwerp

Benelearn, 18–19 May

On 18 and 19 May 2009, Marieke van Erp, Herman Stehouwer and Menno van Zaanen, all researchers at the Tilburg Centre for Creative Computing (TiCC) organized Benelearn, which was held at Tilburg University. Benelearn 09 was the eighteenth in a series of successful annual conferences in the area of machine learning. The conference serves as a forum for researchers to present recent and on-going research, exchange ideas and foster collaborations in the field of machine learning. Even though the event aims at researchers from Belgium and the Netherlands, people from eight different countries participated.

The conference consisted of two invited talks, five sessions that each concentrated on a different topic, and a poster session with for each poster presenter the opportunity to give a four minute speed talk.

Steffen Pauws, the first invited speaker, talked about his experience in the Computational Intelligence group at Philips Research Europe. He concentrated on applied research on recommendation, physiology models for sleep and emotion and activity detection. Khalil Sima'an, who was the second invited speaker, discussed problems in and solutions to finding consistent estimators for non-parametric models that work well in the context of parsing and statistical machine translation.

The first main session contained two talks on applications. The first talk described research that aims to recognize names of monuments in free text, whereas the second talk was more philosophically oriented, describing how prediction theory can be applied to induction in the form of meta-induction.

The second session was on relations with the first talk describing the learning of intransitive reciprocal relations. The second talk tackled the traveling salesman problem by treating it as a ranking problem.

The third session contained two talks on structure with one talk on an inference-rules based learner that learns categorial grammars in the context of language acquisition and one talk one DFA learning in the context of grid administration.

The fourth session concentrated on empirical assessment. Again, this session contained two talks. The first talk looked at the classification accuracy of SVMs using a local context, whereas the second talk compared different one-class classification approaches.

The final session contained three talks on applications. The first focused on modeling ship trajectories using compression and clustering techniques. The second aimed at analyzing typing behavior by considering data retrieved from accelerometers in laptops and the final talk of the conference described means of preserving local structure in Gaussian process latent variable models.

In addition to the regular talks, the poster session and corresponding speed talk session contained talks on various topics, including language models, expert tracking, parameter tuning, clustering methods, probabilistic models, active learning, logic inference methods, structure learning, grammatical inference and various applications.

Overall, Benelearn 09 provided an informal meeting place for both junior and senior researchers in the area of machine learning and its applications. This informal aspect led to many interactive discussions, after each talk and also during the breaks. The location of the next Benelearn has not been decided yet, but keep in mind that it will be an excellent event to publish and receive useful feedback.

Menno van Zaanen, Herman Stehouwer and
Marieke van Erp
TiCC, Tilburg University

Preference Change Workshop, 28–30 May

Change of preferences is a phenomenon that everyone experiences in himself or herself. Yet how can preference change be explained and modelled? This important methodological question—which is far from settled—was the main focus of the Workshop on Preference Change, organized by the LSE Choice Group at the end of May 2009 at the London School of Economics.

The contributions and discussions at this workshop were marked by a shared goal of analysing preference change in new and often unconventional terms, and by a surprising amount of agreement to go beyond orthodox models of rational choice. How exactly to depart from classical models and which of their elements to retain was the object of

intense discussion and diverse proposals.

The contributions at this workshop can be largely divided into two groups. Some talks focussed primarily on foundational issues of explaining, modelling and representing preference change. Other talks focussed mainly on theoretical or practical implications of preference change, notably with regard to ethical theories, social choice theory, policy making and political philosophy.

Among the 'foundational' contributions, many took the notion of belief change as a starting point, either attempting to reduce preference change to belief change of some standard or (more often) non-standard type, or arguing for a richer understanding of belief changes to cover different types of preference change. In a belief revision approach, Sébastien Konieczny (CRIL-CNRS Lens) introduced improvement operators as a generalization of usual iterated belief revision operators. Brian Hill (HEC, Paris) analysed different Bayesian models and problems of disentangling preferences and beliefs from each other in a principled way. In a similar vein, though now in a model of epistemic logic, Sven Ove Hansson (Stockholm) showed that it is not possible to fully maintain a distinction between belief change and preference change. Richard Bradley (LSE) presented a probabilistic framework that extends Jeffrey-type conditioning to hypothetical imperatives. Peter Hammond (Warwick) proposed to generalize extensive form models in decision theory by introducing 'aberrant' events and allowing the decision tree to gradually 'unfold', which causes behaviour to change.

Other foundational talks proposed to explain preference change without explicitly involving beliefs at all, introducing other types explanations related to the agent or the environment. Christian List (LSE) and Franz Dietrich (LSE and Maastricht) introduced the notions of salient dimensions and motivating reasons to model preferences and preference change, arguing that they can be used to capture limited conceptualisation and limited imagination. Conrad Heilmann's (LSE) talk on multiple-selves introduced the notion of connectedness between selves to measure the stability of a decision-maker's preferences over time. Katie Steele (LSE) showed that important questions arise about what in fact are the objects of first-order desire when analysing higher-order desire.

Other talks focussed on various implications of change in preferences. Nick Baigent (Graz) analysed the relations between preference change and consequentialist rational choice and showed that preference change requires new conditions for a well-behaved choice function. Wlodek Rabinowicz (Lund) critically examined the conception of moral deliberation as a process of thought experimentation with concomitant preference change, and discussed implications for preference utilitarianism. Krister Bykvist (Jesus College, Oxford) showed that endorsement theories of well-being are faced with inconsistencies in cases where our preferences (endorsement attitudes) depend on and change with the context. Luc Bovens (LSE) discussed the possibility for the state to affect or improve people's preferences through 'nudges' (intended framing effects), raising the question of whether, and in what forms, liberal paternalism is justifiable.

Three days of stimulating talks and discussion resulted in a widespread agreement among the workshop participants that the phenomenon of preference change calls for extensions to formal theories of rationality.

Thanks to all the speakers and participants for making these days so enjoyable!

Franz Dietrich
CPNSS, LSE &
Quantitative Economics, Maastricht University

Conrad Heilmann
CPNSS, LSE

Christian List
Department of Government, LSE

Philosophy of Probability II, 8–9 June

The CPNSS organised a second graduate conference in philosophy of probability at the London School of Economics (LSE). The conference was concerned with the philosophical foundations of probability, and its application to the natural and social sciences, in particular.

On the first day, Alan Hájek's (ANU) keynote talk "All Values Great and Small" opened the conference. He discussed the Pasadena game which is a generalization of the St. Petersburg game where the former can also yield infinitely negative payoffs. It was argued that the attempts to mitigate the problem it presents to standard decision theory are not persuasive. Daniel Greco (MIT) presented on "Significance Testing in Theory and Practice", defusing some of the tension between significance testing and Bayesian prescriptions in actual practice: in many cases their prescriptions coincide. Moritz Schulz (Humboldt University) defended the position that subjective probabilities be constrained by evidential probabilities, as opposed to objective chances, using the "Crucial Constraint"–an analogue to the Principal Principle. Bengt Autzen (LSE) was concerned with whether the Principal Principle can be used to constrain the Bayesian likelihood calculation. It was argued that when the Principal Principle is understood by applying the orthodox definition of conditional probability it is either inconsistent or vacuous.

On the second day, Alastair Wilson (Oxford) proffered an argument to resist Hájek's claim that, owing to the chanciness of our best physical theories, most everyday counterfactuals are false. Wilson argued that the truth-value of counterfactuals is context-relative and that as within any particular context one can avoid an error theory of ordinary counterfactual judgements. Owen Rees (Bristol) presented on the validity of "Dutch Book" arguments. Various cases where credences and betting-odds come apart were suggested. It was argued that "Dutch Book" arguments suffer from underdetermination, in the sense that an agent's betting behaviour cannot be taken to be straightforwardly indicative of their real credences. Seamus Bradley (LSE) launched an attack on probabilism by arguing that there are situations where having betting quotients such that one is indifferent between buying and selling bets on some event seems irrational.

A broader framework for representing uncertainty by lower and upper probabilities was introduced. The conference closed with a panel session with Katie Steele (LSE) and Jonathan Wolff (UCL) on "Risk and Probability in Philosophy of Public Policy". Jonathan (Wolff) discussed the role of probabilities in safety regulations and argued that risk assessments in Health and Safety are contingent on which underlying interpretation of probability is used. Katie Steele (LSE) argued that the precautionary principle is best conceived as providing guidelines for specifying decision problems with large stakes, rather than challenging the idea that uncertainty can be represented by a probability function.

Thanks to all speakers and commentators (Brendan Clarke (UCL), Ittay Nissan (LSE), Wolfgang Pietsch (Technische Universität München), Luke Glynn (Oxford), Jonny Blamey (KCL), Iñaki San Pedro (Universidad Complutense Madrid))!

Foad Dizadji-Bahmani and Conrad Heilmann
CPNSS, LSE

Formal Methods in the Epistemology of Religion, 10–12 June

Over a span of three days, the conference hosted thirteen talks and was attended by approximately forty-five international participants. An impressive list of speakers included many well-established figures in the field, as well as a number of younger researchers.

The event opened with a classic talk by Richard Swinburne (Oxford), who presented his views on the issue of theism and cosmological fine-tuning. Rafal Urbaniak (Ghent/Gdansk) followed with a formalization of Swinburne's argument for the existence of the soul, aiming at assessing the probative force of the so-called substitution objection. Day one ended with Graham Oppy (Monash), who provided a trenchant criticism of Koons' recent 'Epistemological Foundations for the Cosmological Argument'.

Benjamin Jantzen (Carnegie Mellon) started day two, with an engaging talk on the topic of testimony and miracles, drawing on research into various manuscripts of C.S. Peirce. Testimony and miracles were also on the menu in the next talk, with Tim & Lydia McGrew (Western Michigan) offering an historically-informed discussion of Condorcet's formula. Alan Hájek (ANU) was on after lunch, with a brilliant follow-up to his influential 'Waging War on Pascal's Wager'. Josh Thurow (Mount Marty), discussed a case in which awareness of disagreement on religious issues ought to lead to consensus rather than suspension of judgment, and applied the structure of this case to the discussion on the theism/atheism debate. The day ended with Michael Tooley (Boulder, Colorado), whose perceptive participation in the Q&A sessions punctuated the conference. He offered a careful and novel discussion of the problem of evil within a Carnapian inductive framework, arguing for a particular upper bound on the probability of God's existence.

Day three kicked off with Edward Wierenga (Rochester), who presented his latest work on the issue of middle knowledge in the context of a defense of Molinism, discussing alternative formulations of so-called "conditionals of freedom". Following, Paul Bartha (British Columbia) applied a formal Darwinian model of deliberation to a

number of Pascalian Wagers, with some very interesting results. In the next talk, David Glass (Ulster) offered a discussion of the concept of "explaining away", as discussed in the *AI* literature, and its application to the debate over theism and fine-tuning. After lunch, Lara Buchak (Berkeley), gave an analysis of the concept of rational 'faith' and its relation to I.J. Good's theorem on the value of information, arguing that a prima facie tension could be resolved by endorsing a particular alternative to classical utility theory. The final talk of the conference was given by Herman Philipse (Utrecht) who provided a provocative counterpoint to the opening talk, offering a battery of objections to Swinburne's views on theism. A lively discussion was stopped only by the time of the session ticking away.

From formal epistemology, to incursions into philosophy of religion, from the application of formal methods on religious topics to penetrating overviews on the theism/atheism debate, the conference was of interest to a wide variety of different-minded researchers. In the tradition of the scholastic and modern philosophy debates over religion, all participants brought their arguments out to defend their positions against the background of an extremely enthusiastic atmosphere.

The conference was a big success, through the number of participants relative to a quite selective topic, the quality of the talks, and the thought-provoking discussions that arose at every Q&A session. Jacob Chandler (Formal Epistemology Project, KULeuven) and Victoria Harrison (Centre for Philosophy and Religion, University of Glasgow) deserve the merit of a pristine organization and we hope that this experience will encourage a second installment in the not-too-distant future.

Carlo Martini
Tilburg Centre for Logic and Philosophy of Science, Tilburg University

Vagueness: Predication and Truth, 12–13 June

The V Navarra Workshop on Vagueness was organised by the Department of Philosophy of the University of Navarra (Pamplona, Spain). Six talks were presented, each followed by a brief commentary and an open discussion.

"Some Clarifications Concerning Ontic Indefiniteness" by Will Bynoe (University of London) was intended to clarify what constitutes the commitment to 'ontic vagueness'. A distinction was proposed between the question about the possibility of a distinctively metaphysical account of indefiniteness and the technical problem of accommodating indefinite states of affairs. Barnes and Williams' recent proposal was examined, showing that primitivism about indefiniteness does not rule out epistemicism and does not, therefore, offer any metaphysical account of ontic indefiniteness.

"Vagueness, Language and Ontology" by Howard Robinson (Central European University) contained a recapitulation of his approach to vagueness in *PAS* 2009, plus some fresh developments on ontological matters. His proposal was that natural language should not be treated as a unitary formal system, but as containing several 'representational ontologies', not fully consistent with the 'basic ontology'. As the basic ontology cannot be vague, the problem of counterfactual identity was used to argue in favour of

a basic ontology of kinds. The distinction between the realist and the conceptualist interpretation of the different levels of discourse illuminated the problems in Aristotle's analysis of substance.

"Semi-orders and Vagueness" by Robert van Rooij (University of Amsterdam) brought together several issues into a unified framework. Luce's notion of semi-order was presented as ruling out sorites paradoxes by eliminating transitivity. A qualitative notion of preference was presented that imposed some constraints on the similarity relation, "significantly taller than" was defined in terms of a pair of contrary choice functions, a tolerant-entailment relation was defined, and the gap-theory was presented as the most natural account on vagueness.

"Necessarily Borderline Sentences" by Eugenio Orlandelli (University of Bologna) examined the problem that necessarily borderline sentences seem to pose for the supervaluationist notion of global validity, and proposed a formal semantics to avoid it. Two main flaws in Montminy's recent exposition of this problem were denounced: the use of a notion of 'world-validity', and the confusion between necessity and validity. The proposed semantics, presumably not committed to necessarily borderline sentences, would in any case allow the distinction between conceptual truth, necessary truth and validity.

"Polarity, Context, and Change" by María Cerezo (University of Murcia) offered a criticism of Fara's interest-relativist account of vagueness, and some arguments for a distinction between relational vague predicates and non-relational ones. Several examples were given to show that the complexity of some interests excludes ordinary polar cases, and some cases were presented of gradable properties which are independent of any interest. The overall thesis was that different kinds of vague predicates demand different solutions to the problem of vagueness.

"This Magic Moment: Horwich on the Boundaries of Vague Terms" by Hartry Field (New York University) focused on Horwich's reluctance to admit restrictions to the application of the least number principle to vague concepts. First, several examples were presented that showed the counterintuitiveness of sharp boundaries. Second, a weakening of the least number principle was proposed. Finally, a least number principle version of Berry's paradox was constructed. The vagueness case and the semantic paradox case were presented as extreme situations where a weakening of the logic was recommended.

Some initial comments on each paper were given by Pablo Cobreros (Navarra), Enrique Romerales (Madrid), Paul Egré (Paris), Paloma Pérez-Ilzarbe (Navarra), Lucian Zagan (Amsterdam), and Richard Dietz (Leuven).

Paloma Pérez-Ilzarbe
Philosophy, University of Navarra

North American Computing and Philosophy, 14–16 June

Following last year's success, the North American Computing and Philosophy conference was again hosted by Colin Allen (Indiana) and skillfully directed by Anthony Beavers (Evansville) at Indiana University in Bloomington. Luciano Floridi's presidential address and Edward Zalta's Covey Award lecture opened the conference by setting

equally high standards for technical sophistication and philosophical depth.

Floridi (Hertfordshire and Oxford) presented new material from his forthcoming *The Philosophy of Information* by setting out a *correctness* theory of truth for suitably translated semantic information. Arguing that correctness is neither correspondence nor coherence, Floridi showed how his correctness theory of truth can be used to analyze semantic paradoxes and clarify systems for users and designers alike.

Upon accepting the IACAP's Covey Award for Excellence in Research in the Area of Computing and Philosophy, Zalta (Stanford) presented an argument that the Leibnizian ideal of computational metaphysics can be met, with important qualifications, by deploying automated reasoning tools like Prover9 to explore carefully formalized metaphysical arguments. Using Anselm's argument for the existence of God as an example of computationally illuminable metaphysics, Zalta showed how Prover9 reduced Anselm's argument to a single non-logical assumption.

William Bechtel (University of California, San Diego) gave the Herbert A. Simon Keynote Address on the critical role of complex hormonal and neural networks in mammalian circadian phenomena. Paraphrasing Bechtel, in 2003 we thought we understood the circadian clock provided by the suprachiasmatic nucleus sufficiently well that the full story would shortly be told, but all bets are now off with the discovery of oscillating mechanisms in peripheral structures and the enormously complex dynamics of the resulting network. Olaf Sporns' (Indiana) Douglas C. Engelbart Keynote address described methods for modeling the human connectome and showed how these models can be deployed to make predictions about neural function. Receiving the Goldberg Graduate Award, Matteo Turilli (Oxford) used the example of the UK's VOTES system of networked medical records to highlight the ethical challenges software engineering faces. Turilli introduced a new formalism, 'Control Closure', which can be used to translate morally prescriptive constraints into conditions on software design.

Among too many valuable presentations and discussions to describe here, two sessions bear special mention. First, during the Social Network Effects panel session Craig Condella (Salve Regina University) explored network 'friendships' in light of classical conceptions of friendship; Dylan Wittkower (Coastal Carolina University) argued that vast social networks succeed to the extent that they permit users efficient control of the "glut of the commons"; Margaret Cuonzo (Long Island University Brooklyn) located the fascination with social networks in an evolutionary past of 'verbal grooming' alliances; and Michael V. Butera (Virginia Tech) described how social networks permit constructions of personal and public self-representations.

Second, Patrick Grim (SUNY Stony Brook) led the Modeling, Epistemology, and Cooperation session with a counter-intuitive result from spatialized game theory for the epistemic implications of social networks whereby fully connected research networks are not always superior to some sparsely connected alternatives; Nicolas Payette (Université du Québec à Montréal) gave preliminary results from a rich model formalizing Hull's 'Science as a Process' evolutionary epistemology; and Stephen Crowley (Boise State University) described an application of the ISI publication database to expose and explore emerging cross-disciplinary research.

This is at best a thumbnail sketch of the fascinating scholarship NA-CAP draws:

Please see here for additional details about the conference.

Don Berkich
Philosophy, Texas A&M University-Corpus Christi

North American Fuzzy Information Processing Society, 14–17 June

On June 14–17, 2009, the Annual Conference of the North American Fuzzy Information Processing Society (NAFIPS), one of the main conferences of fuzzy community, took place in Cincinnati, Ohio.

The conference started with a tutorial, by Madan Gupta, on the relation between neural networks and fuzzy logic. Both techniques are related to reasoning: fuzzy logic describes how we reason about imprecise "fuzzy") notions like "small", while neural networks describe biological processes behind reasoning. The need to combine these techniques comes from the fact that many reasoning problems are computationally difficult (NP-hard)—i.e., crudely speaking, there is no efficient universal algorithm for solving these problems. We humans often solve these problems by using intuition, heuristics, etc. Artificial neural networks is a technique that simulates, on the level of individual neurons, how our brain solves these problems. The tutorial described different combinations of neural and fuzzy, and successes and challenges of such combinations.

The main plenary talk was given by Lotfi A. Zadeh, the founding father of fuzzy logic. Fuzzy logic enables us to incorporate fuzzy notions (and reasoning about such notions) into a traditional reasoning framework. This logic has been very successful, e.g., in incorporating imprecise rules of expert controllers into efficient intelligent control systems. However, in addition to imprecise notions, experts also use imprecise reasoning rules like "if our degrees of confidence in A and $A \rightarrow B$ are high, then we are reasonably confident in B", or, more interestingly, "if many objects with a property P satisfy Q, and very few such objects satisfy $\sim Q$, then P implies that Q holds with a high degree of confidence". We can use fuzzy logic to formalize such fuzzy inference rules—and get an extended fuzzy logic, in which not only notions are fuzzy, but some inference rules are fuzzy as well. This extended fuzzy logic can be used to further develop practically useful fuzzy analogues of mathematical notions such as "an almost straight line", "small region", etc.

An example of such reasoning was given by Bernadette Bouchon-Meunier who showed that fuzziness is one of the main keys to a successful implementation of reasoning by analogy. Another example is the notion of a fuzzy function advocated by Burhan Turksen as a successful alternative to fuzzy rules—e.g., in clustering applications.

At NAFIPS'09, we heard 100+ talks on different aspects of fuzzy theory and applications, including applications to economics (Rafik Aliev) and to modeling of social networks like Facebook (Ronald Yager).

In many of these applications, fuzzy techniques were successfully combined with other reasoning methods. In particular, an overview of combining fuzzy and probabilistic approaches was given by Dan Ralescu. Our fuzzy community is eager to combine the features of reasoning captured by fuzziness with yet other approaches. We hope to

see you all at future NAFIPS meetings!

Anca Ralescu
Computer Science, University of Cincinnati

Asli Celikyilmaz
EECS, University of California, Berkeley

Atsushi Inoue
Computer Science, Eastern Washington University

Vladik Kreinovich
Computer Science, University of Texas at El Paso

Decisions, Games and Logic, June 15-17

The third Decisions, Games and Logic Workshop took place from June 15 to 17, in HEC Lausanne. The workshop featured three tutorials, a number of poster presentations and commented graduate talks, the "P. van Emde Boas Swap Session" (see the separate report on this on: http://loriweb.org/?p=1336), and a panel discussion on the theme "What is Rationality?". In total nineteen young researchers presented their work, and many others attended the three-day conference.

Tutorials are the meeting points of DGL. They allow the participants to get acquainted with each other's methods and tools, which are rather diverse in our heterogeneous community. This year started with a tutorial on logic, more precisely on the mu-calculus, by Jacques Duparc (HEC, Lausanne). Jacques gave a nice and colorful walk-through of this rather technical topic, going from abstract fixed-points to infinite games, and even featuring a live reconstitution of the "Muddy Children" puzzle! On the second day Pierpaolo Battigalli (Bocconi, Milano) brought the participants very high up the hierarchy of interactive beliefs, with his in-depth tutorial on type spaces and epistemic game theory. Pierpaolo's concern for the "problem of redundant types" sparked the interest of logicians, as the problem seems to call for a closer examination of the "language" of type spaces, and lead to a discussion that went on far into lunch time. Luc Bovens rounded up the tutorials with his presentation of Bayesian epistemology and coherentism. Luc was in great shape, elegantly maneuvering between technical material and intriguing examples, and doing so despite the fact that he started the tutorial by confessing that he had promised himself a few years ago never to talk about this topic again! Needless to say that we were very happy he did not keep this promise!

The core of DGL is the presentations by young researchers. This year we had nine of them on stage: four graduate talks and five poster presentations. Karin Enflo (Uppsala) started with a talk on diversity measure on choice sets. As it quickly appeared during the discussion that followed, this exiting new area of ethics connects with numerous fields, notably statistical analysis. Giacomo Sillari (Pennsylvania) followed with a

talk on the relevance of "Agreeing to Disagree" theorems for the question of peer disagreements in epistemology. Giacomo's talk went on way after the end of this first day, as the significance and plausibility of the common priors assumption dominated the dinner's discussion! On the second day Julien Dutant (Geneva) presented his very own version of epistemic logic, in which methods for acquiring beliefs are central, and knowledge is defined as belief acquired via infallible methods. During the comments and the question period many pointed out connections with existing "alternative" epistemic logics, and semantics for them: neighborhood semantics, logics for awareness and justification logics. Peter Brössel (Constance) gave the fourth graduate presentation, an encompassing analysis the truth-conduciveness of various coherence requirements for scientific theories. The poster session featured presentations by Tijmen Daniels (Berlin), Mareile Drechsler (LSE), Oliver Walker (Oxford), Umberto Grandi (ILLC, Amsterdam) and Rosja Mastop (Delft). Tijmen presented his recent work on noise (independence) in global games, Mareile talked about adaptive preferences in the Jeffrey-Bolker approach to decision theory, and Oliver about awareness, decision-theoretic style. Rosja and Umberto were more on the logical side, the first talking about "value-based" design, an application to deontic and preference logic to technology and engineering, and the second on Arrow's theorem and its derivation in first order logic. Five presentations that reflected well the three axes of DGL, and which lead to a lively discussion afterward.

The panel discussion on rationality featured three senior researchers and was chaired by M. Tomassini (HEC, Lausanne). He opened with an overview of the various theories of rationality put forward in the last century, and then gave the floor to the three disputants. Richard Bradley (LSE) set the tone right away, with a series of strong and crisp claims about what rationality is, what it is not, and what a theory of rationality should look like. He argued that rationality is essentially a matter of coherence of recognized reasons. As such it is a matter of principles whose value is rather independent from the empirical success they bring, and whose normativity conditions any "science" of rationality. Ullrich Hoffrage (HEC, Lausanne) had obviously a quite different story to tell about rationality. For this collaborator of the "ABC Research Group," strong proponent of the "Adaptive Toolbox" view, rationality is a matter of fast, frugal and highly context-dependent heuristics that make agents better off in real-life situations. Pascal Engel (Geneva), in turn, reminded us that rationality is a multi-faced notion, one that reaches way beyond the realm of decision-making. He questioned the relation between theoretical and practical rationality, its normative source, and the very possibility of jointly satisfying all criterions one intuitively attributes to this notion. The relevance of empirical success and of evolutionary explanation for the concept of rationality occupied a good part of the discussion between Bradley and Hoffrage. But Engels' concerns brought the debate to a more general level, giving rise to a lively discussion on how satisfying an account of rationality purely in terms of coherence can be and, as he put it, asking how many bullets can a decision theorist like Bradley bite before his stomach starts to feel heavy!

All in all, DGL was very successful, with simulating discussions against the beautiful landscape of Lake Léman and the French Alps. It ended with good news: Brian Hill inviting all participants, and indirectly all the readers of this report, to the next edition,

DGL, in Paris somewhere in late spring next year!

Olivier Roy
Philosophy, Groningen

Conrad Heilmann
CPNSS, London School of Economics

Calls for Papers

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

Psychological Approaches to Argumentation and Reasoning: Special issue of *Informal Logic*, deadline 1 July.
Epistemic Boundaries: Special issue of *Spontaneous Generations*, deadline 10 July.
David Hume's Epistemology and Metaphysics: Special issue of *Logical Analysis and History of Philosophy*, deadline 31 July.
Is Logic Universal?: Special issue of *Logica Universalis*, deadline 31 August.
Robot Ethics and Human Ethics: Special issue of *Ethics and Information Technology*, deadline 1 September.
Logic and Social Interaction: Special issue of *Synthese KRA*, deadline 1 September.
Psychology and Psychologies: which Epistemology?: Special issue of *Humana.Mente*, deadline 5 September.
Experimental Philosophy: Forthcoming issue of *The Monist*, deadline April 2011.

§4
What's Hot in . . .

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

Formal Epistemology

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.

Luc Bovens explained that there are good reasons for taking the Judy Benjamin Problem to be a Sleeping Beauty Problem. The key is a generalisation across self-locating belief. He argued for the parallel between the two cases, and then argued for a particular solution to the Judy Benjamin Problem. If these two moves work (and I could not see what was wrong with them), then the reasoning around the Judy Benjamin Problem can be carried back over to the Sleeping Beauty Problem. More support for the Thirders! Irrespectively of how one turns with either problem, if the proof of a parallel goes through, then expect some rapid-fire rethinking of the issues in the very near future.

Tomoji Shogeni has proposed a new method for measuring justification. This measuring function builds on Tomoji's previous measure of coherence. Tomoji's presentation at FPS involved putting the justification measure to work, specifically to the problem of Underdetermination. When this justification measure is applied to empirically equivalent hypotheses, there is no output distinction. In this case, you are always more justified in believing the disjunction than you are in believing any of the disjuncts.

Next month...nothing! The FEP Team are on "holiday", or frantically running from conference to conference. If you see any of us, mention the Reasoner and we'll buy you a drink.

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

Sebastian Sequoiah-Grayson
Formal Epistemology Project, Leuven

Logic and Rational Interaction

Besides up-to-date information on publications, works in progress and conferences, `loriweb.org` features also a number of glossary entries. These are short pieces where leading researchers present their own area, or define keywords. This month we added three entries: belief revision, written by Sven Ove Hansson, social software by Rohit Parikh and temporal logic by Wiebe van der Hoek. More are coming up!

The organizers of PALMYR-VIII (8th Paris-Amsterdam Logic Meeting of Young Researchers . . . this time held in Geneva!) have written an extensive report on this event, whose theme was formal epistemology. For the first time we also joined force with *The Reasoner*, and jointly published two additional reports, one on the Preference Change Workshop and the other on the Language, Communication and Rational Agency Workshop, held at the London School of Economics and at Stanford University, respectively.

In terms of publications, we gladly announced the Yearbook 2008 of the Logics for Dynamics of Information and Preferences Seminar, held at the ILLC in Amsterdam. You can stay in touch with `loriweb.org` by registering to the newsletter, or to our recently improved RSS feed. You can find all details about these on `loriweb.org`. Logic and Rational Interaction welcomes any contributions relevant to the theme. We are also constantly looking for new collaborators. So, if you would like to joint the team, of if you have information to share with the broader research community, please do not

hesitate to contact our web manager, Rasmus Rendsvig.

Olivier Roy
Philosophy, Groningen

§5
Introducing . . .

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

Hilbert's Programme

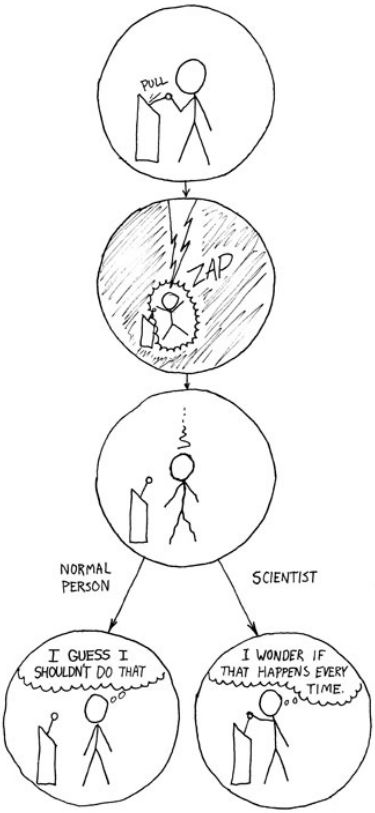
Hilbert's Programme was one of the three major responses to the foundational crisis in mathematics of the early 20th century. In contrast to Russell's logicism and Brouwer's intuitionism, Hilbert's programme, also called formalism, viewed mathematics purely as a meaningless formal system and so the task was to find such a system within which all, and only, true mathematical statements could be derived. In addition, a proof of the consistency of this axiomatization of mathematics is required, using what Hilbert referred to as 'finitary methods'. Hilbert was unwilling to accept Cantor's view whereby infinite sets were treated as completed objects or entitites in their own right and so he used the term 'finitary' to refer to methods that did not depend on the existence of these infinite totalities.

This was the downfall of Hilbert's Programme since, following Gödel's proofs, it was generally accepted that no finitary consistency proof of arithmetic can be given.

However, some researchers, for example Solomon Feferman, have continued to work on a modified formalism, known as Relativized Hilbert Programs, which have been influential in proof theory.

For a philosophical discussion of these issues see: Detlefsen, Michael, 1990, "On an alleged refutation of Hilbert's program using Gödel's first incompleteness theorem", *Journal of Philosophical Logic*, 19: 343-377.

Dawn Holmes
Statistics and Applied Probability, University of California, Santa Barbara


PULL
ZAP
NORMAL PERSON
SCIENTIST
I GUESS I SHOULDN'T DO THAT
I WONDER IF THAT HAPPENS EVERY TIME.
(c) xkcd.com

§6
Events

July

Two Streams in the Philosophy of Mathematics: Rival Conceptions of Mathematical Proof, University of Hertfordshire, Hatfield, UK, 1–3 July.
ECSQARU: 10th European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty, Verona (Italy), 1–3 July.
EDM: Educational Data Mining, Cordoba, Spain, 1–3 July.
SING: 5th Spain, Italy, Netherlands Meeting on Game Theory, VU University Amsterdam, The Netherlands, 1–3 July.
E-CAP: Computing and Philosophy, Universitat Autònoma de Barcelona, 2–4 July.
Metaphysics of Science: University of Melbourne, 2–5 July.
Proof Theory and Constructivism: Leeds, 3–16 July.
European Epistemology Network Conference: Formal Epistemology Project, Brussels, 4–5 July.
NCMC: National Conference on Machine Consciousness, Gandhi Institute for Technology, Bhubaneswar, 4–6 July.
Set Theory Meeting: in Honour of Ronald Jensen, Mathematical Research and Conference Center, Bedlewo, Poland, 5–10 July.
Metaphysics of Mind: University of Edinburgh, 6 July.
CALCULEMUS: 16th Symposium on the Integration of Symbolic Computation and Mechanised Reasoning, Ontario, Canada, 6–7 July.
FTP: International Workshop on First-Order Theorem, Oslo, Norway, 6–7 July.
TARK: 12th Conference on Theoretical Aspects of Rationality and Knowledge, Stanford University, 6–8 July.
Information Fusion: 12th International Conference, Grand Hyatt, Seattle Washington, 6–9 July.
TABLEAUX: Automated Reasoning with Analytic Tableaux and Related Methods Oslo, Norway, 6–10 July.
Varieties of Experience Graduate Conference: University of Glasgow, 7–8 July.
Metaphysics of Consciousness: An International conference in honour of Timothy L. S. Sprigge (1932-2007), University of Edinburgh, 7–9 July.
Converging Technologies, Changing Societies: 16th International Conference of the Society for Philosophy and Technology, University of Twente, Enschede, The Netherlands, 7–10 July.
TACL: Topology, Algebra and Categories in Logic, Institute for Logic, Language and Computation University of Amsterdam, 7–11 July.
Interdisciplinary Social Sciences: Athens, 8–11 July.
JOUAL: Just One Universal Algorithm, Pisa, CNR, Italy, 10 July.
ICCRD: International Conference on Computer Research and Development, Perth, Australia, 10–12 July.
ICMLC: International Conference on Machine Learning and Computing, Darwin, Australia, 10–12 July.

ARCOE: Automated Reasoning about Context and Ontology Evolution, Pasadena, 11-12 July.
Aim of Belief: Centre for the Study of Mind in Nature, University of Oslo, 11–13 June.
IJCAI: 21st International Joint Conference on Artificial Intelligence, Pasadena, CA, 11–17 July.
ISHPSSB: International Society for the History, Philosophy, and Social Studies of Biology, Emmanuel College, St. Lucia, Brisbane, Australia, 12–16 July.
Hume and the Enlightenment: Flinders University, Adelaide, Australia, 13–14 July.
Logic and Heresy in the Middle Ages: Leeds Medieval Congress, 13–16 July.
WORLDCOMP: World Congress in Computer Science, Computer Engineering, and Applied Computing, Las Vegas, Nevada, USA, 13–16 July.
MJCAI: 1st Malaysian Joint Conference on Artificial Intelligence, Kuala Lumpur, Malaysia, 14–16 July.
ICLP: 25th International Conference on Logic Programming, Pasadena, California, 14–17 July.
ISIPTA: 6th International Symposium on Imprecise Probability: Theories and Applications, Durham University, 14–18 July.
DGL: 3rd Workshop in Decisions, Games & Logic, HEC Lausanne, Switzerland, 15–17 June.
AIME: 12th Conference on Artificial Intelligence in Medicine, Verona, Italy, 18–22 August.
Computability in Europe: Mathematical Theory and Computational Practice, Heidelberg, Germany, 19–24 July.
ViC: Vagueness in Communication, Bordeaux, France, 20–24 July.
ICCBR: 8th International Conference on Case-Based Reasoning, Seattle, Washington, 20–23 July.
IWSM24: 24th International Workshop on Statistical Modelling, Cornell University in Ithaca, NY, 20–24 July.
ICBO: 1st International Conference on Biomedical Ontology, Buffalo, 20–27 July.
LMSC: Workshop Logical Methods for Social Concepts, Bordeaux, France, 20–31 July.
Case-Based Reasoning in the Health Sciences: Seattle, Washington, 21 July.
EPR2: Expressivism, Pluralism & Representationalism, Centre for Time, University of Sydney, 22–24 July.
IAMA: International Conference on Intelligent Agent & Multi-Agent Systems, Chennai , India, 22–24 July.
Emmy Noether Armchair Lab: Workshop on Issues in Philosophical Methodology, University of Cologne, 28–29 July.
History of Science and Technology: XXIII International Congress of History of Science and Technology: Ideas and Instruments in Social Context, Budapest, Hungary, 28 July–2 August.
ID-AI Symposium: Intelligent Design & Artificial Intelligence: The Ghost in the Machine? Hilton Pasadena, California, USA, 30 July –2 August.
Logic Colloquium: Sofia, 31 July–5 August.

Naturalism and Hume's Philosophy: Hume's Contribution to the Development of Modern Science, Halifax, Nova Scotia, Canada, 2–6 August.
CADE-22: 22nd International Conference on Automated Deduction, McGill University, Montreal, 2–7 August.
Logic and Mathematics: University of York, 3–7 August.
Science in Society: University of Cambridge, UK, 5–7 August.
The Skeptic's Toolbox: The Scientific Method: Annual Conference of the Committee for Skeptical Inquiry, University of Oregon, 6–9 August.
Meaning, Understanding and Knowledge: 5th International Symposium of Cognition, Logic and Communication, Riga, Latvia, 7–9 August.
ICAINN: International Conference on Artificial Intelligence and Neural Networks, Beijing, China, 8–11 August.
Model Theory: The Banach Center, Bedlewo, Poland, 9–14 August.
LCC: 10th International Workshop on Logic and Computational Complexity, Los Angeles, 10 August.
LICS: Logic in Computer Science, Los Angeles, 11–14 August.
Probability and Stochastic Processes: Isfahan University of Technology, Iran, 14–15 August.
FSKD: 6th International Conference on Fuzzy Systems and Knowledge Discovery, Tianjin, China, 14–16 August.
ICNC: The 5th International Conference on Natural Computation, Tianjin, China, 14–16 August.
Responsible Belief in the Face of Disagreement: VU University Amsterdam, the Netherlands, 18–20 August.
CCA: 6th International Conference on Computability and Complexity in Analysis, Ljubljana, Slovenia, 18–22 August.
ASAI: X Argentine Symposium on Artificial Intelligence, Mar del Plata, Argentina, 24–25 August.
ICSO: Issues in Contemporary Semantics and Ontology, Buenos Aires, 26–28 August.
LGS6: Logic, Game Theory, and Social Choice 6, Tsukuba Center for Institutes, Japan, 26–29 August.
PASR: Philosophical Aspects of Symbolic Reasoning in Early Modern Science and Mathematics, Ghent, Belgium, 27–29 August.
EANN: Artificial Neural Networks in Engineering, University of East London, 27–29 August.
Networks, Markets and Organizations: University of Groningen, The Netherlands, 27–29 August.
Practice-based Philosophy of Logic and Mathematics: ILLC, Amsterdam, 31 August–2 September.

Systems Research: Lessons from the Past - Progress for the Future: St Anne's College, Oxford University, UK, 1–2 September.
Foundations of Uncertainty: Probability and Its Rivals, Villa Lanna, Prague, Czech Republic, 1–4 September.
Trends in Logic VII: Trends in the Philosophy of Mathematics, Goethe-University Frankfurt, 1–4 September.
NZSA: New Zealand Statistical Association Conference 2009, Victoria University of Wellington, 2–3 September.
WNPDE: Workshop in Nonlinear Elliptic PDEs, Université Libre de Bruxelles, Belgium, 2–4 September.
SOPHA: Triannual congress of the SoPhA, the Société de Philosophie Analytique, University of Geneva, 2–5 September.
The Berlin Group: Knowledge, Probability, Interdisciplinarity, Paderborn, Germany, 3–5 September.
CMM: Centre for Metaphysics and Mind Graduate Conference, University of Leeds, 4 September.
Conditionals and Conditionalization: Centre for Logic and Analytic Philosophy, Institute of Philosophy, University of Leuven, Belgium, 4–6 September.
Mathematics, Physics and Philosophy: in the Interpretations of Relativity Theory, Budapest, 4–6 September.
Naturalism and the Mind: Kazimierz Dolny, Poland, 4–8 September.
Agency and Control: Philosophical and Psychological Aspects: Behavioural Science Institute, Radboud University Nijmegen, 7 September.
MALLOW: Multi-Agent Logics, Languages, and Organisations Federated Workshops, Torino, Italy, 7–11 September.
UC: 8th International Conference on Unconventional Computation, Ponta Delgada, Portugal, 7-11 September.
OR51: Operational Research, University Warwick, 8–10 September.
CLIMA: 10th International Workshop on Computational Logic in Multi-Agent Systems, Hamburg, Germany, 9–10 September.

Mechanisms and Causality in the Sciences

University of Kent, Canterbury, UK, 9–11 September

Phloxshop II: Humboldt-Universität, Berlin, 9–11 September.
MATES: Seventh German Conference on Multi-Agent System Technologies, Hamburg, Germany, 9–11 September.
Ecos de Darwin: São Leopoldo, state of Rio Grande do Sul, Brazil, 9–12 September.
Darwin's Impact on Science, Society and Culture: Braga, Portugal, 10–12 September.
Metacognition, Belief Change and Conditionals: Department of Philosophy and Institute for Advanced Studies, University of Bristol, 11–12 September.
MoS: Grand Finale Conference of the Metaphysics of Science AHRC Project, Nottingham, 12–14 September.

S.Co.: Complex Data Modeling and Computationally Intensive Statistical Methods for Estimation and Prediction, Politecnico di Milano, Italy, 14–16 September.
The New Ontology of the Mental Causation Debate: Old Shire Hall, Durham University, 14–16 September.
GAP.7: 7th International Conference of the Society for Analytic Philosophy, Bremen, 14–17 September.
ISMIS: The Eighteenth International Symposium on Methodologies for Intelligent Systems, University of Economics, Prague, Czech Republic, 14–17 September.
ESSA: 6th European Social Simulation Association Conference, University of Surrey, Guildford, 14–18 September.
LPNMR: 10th International Conference on Logic Programming and Nonmonotonic Reasoning, Potsdam, Germany, 14–18 September.
KI: 32nd Annual Conference on Artificial Intelligence, Paderborn, Germany, 15–18 September.
WI-IAT: IEEE/WIC/ACM International Conferences on Web Intelligence (WI'09) and Intelligent Agent Technology (IAT'09), Milano, Italy, 15–18 September.
Complex Systems and Changes: Darwin and Evolution: Nature-Culture Interfaces, Sant Feliu de Guixols, Spain, 15–20 September.
Artificial by Nature: 4th International Plessner Conference, Erasmus University, Rotterdam, 16–18 September.
FroCoS: Frontiers of Combining Systems, Trento, Italy, 16–18 September.
History of Statistics and Probability: Santiago de Compostela, Galicia, Spain, 17–18 September.

Progic

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

Reductionism, Explanation and Metaphors in the Philosophy of Mind: Universität Bremen, 17–18 September.
Forecasting & Time Series Predictions with Artificial Neural Networks: Wallenberg Centre, Institute of Advanced Study Stellenbosch University, South Africa, 17–19 September.
Logic, Language, Mathematics: A Philosophy Conference in Memory of Imre Ruzsa, Budapest, 17–19 September.
Evolution, Cooperation and Rationality: Bristol, 18–20 September.
ICAPS: 19th International Conference on Automated Planning and Scheduling, Thessaloniki, Greece, 19–23 September.
Applied Statistics: Ribno (Bled), Slovenia, 20–23 September.
The Social Self: Summer School in Neuroscience and Philosophy of Mind, Alghero, Sardinia, Italy, 20–27 September.
International Darwin Conference: Norcroft Centre, University of Bradford, 24–26 September.
Humanities and Technology Annual Conference: Special Topic: Technology, Democracy, and Citizenship, University of Virginia, 24–26 September.

Conversations on Method in Practical Philosophy: University of Bern, 25–26 September.
LACSI: The Logic and Cognitive Science Initiative Conference on Ontology, North Carolina State University, 25–26 September.
SYNASC: 11th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing, Timisoara, Romania, 26–29 September.
KES: Knowledge-Based and Intelligent Information & Engineering Systems, Santiago, Chile, 28–30 September.
Philosophy for Science in Use: Scandic Linköping Väst, Sweden, 28 September – 2 October.
ASCS: The 9th conference of the Australasian Society for Cognitive Science, Macquarie University, Sydney, 30 September – 2 October.

October

Amsterdam Graduate Philosophy Conference: Universiteit van Amsterdam, 1–3 October.
Joint Attention: Developments in Developmental and Comparative Psychology, Philosophy of Mind, and Social Neuroscience, Bentley University, Greater Boston, 1–4 October.
Buffalo All X-Phi Weekend: University at Buffalo, 2–3 October.
IC3K: International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management, Madeira, Portugal, 6–8 October.
The Normativity of Belief and Epistemic Agency: Instituto de Investigaciones Filosóficas, UNAM, México City, 8–9 October.
A Priori Workshop: University of Nottingham, 9 October.
Hugh MacColl Centenary: Boulogne sur Mer, 9–10 October.
Boulder Conference on the History and Philosophy of Science: University of Colorado at Boulder, 9–11 October.
MWPMW 10: 10th annual Midwest PhilMath Workshop, University of Notre Dame, 10–11 October.
EPIA: 14th Portuguese Conference on Artificial Intelligence, Universidade de Aveiro, Portugal, 12–15 October.
Linguistic Intuitions Workshop: Oslo, 15–16 October.
Case Studies of Bayesian Statistics and Machine Learning: Carnegie Mellon University, Pittsburgh, PA, 16–17 October.
Breaking Down Barriers: Blackwell Compass Interdisciplinary Virtual Conference, 19–30 October.
P-NPMW: Paris-Nancy PhilMath Workshop, Nancy, 21–22 October.
EPSA: 2nd Conference of the European Philosophy of Science Association, 21–24 October.
Understanding Mental Disorders: 12th International Conference for Philosophy and Psychiatry, Lisbon, Portugal, 22–24 October.
RR: Third International Conference on Web Reasoning and Rule Systems, 25–26 October.

Law and Neuroscience: Acquafredda di Maratea, Italy, 26–31 October.
Darwin Conference: Chicago, Illinois, 29–31 October.
CFE: 3rd International Conference on Computational and Financial Econometrics, Cyprus, 29–31 October.
ERCIM Working Group on Computing & Statistics: Cyprus, 29–31 October.
Language, Epistemology and History: 2nd SIFA Graduate Conference, Bologna, Italy, 29–31 October.

November

Darwin in the 21st Century: Nature, Humanity, and God: University of Notre Dame, Indiana, USA, 1–3 November.
ACML: 1st Asian Conference on Machine Learning, Nanjing, China, 2–4 November.
ICMI-MLMI: 11th International Conference on Multimodal Interfaces and Workshop on Machine Learning for Multi-modal Interaction, Boston, 2–6 November.
Logic, Epistemology, and Philosophy of Science: Universidad de los Andes, Bogotá, Colombia, 4–6 November.
AAAI: Fall Symposium on Complex Adaptive Systems, Arlington, VA, 5–7 November.
AICI: Artificial Intelligence and Computational Intelligence, Shanghai, China, 7–8 November.
Arché Graduate Conference: CSMN, University of St Andrews, 7–8 November.
Epistemology, Context, and Formalism: Université Nancy 2, France, 12–14 November.
SPS: Science and Decision, Third Biennial Congress of the Societe de Philosophie des Sciences, Paris, 12–14 November.
M4M-6: 6th Workshop on Methods for Modalities, Copenhagen, Denmark, 12–14 November.
ICITE: International Conference on Information Theory and Engineering, Kota Kinabalu, Malaysia, 13–15 November.
VI Conference: Spanish Society for Logic, Methodology and Philosophy of Science, Valencia, Spain, 18–21 November.
LENLS: Logic and Engineering of Natural Language Semantics,Campus Innovation Center Tokyo, Minato-ku, Tokyo, 19–20.
Knowledge, Value, Evolution: An international conference on cross-pollination between life sciences and philosophy, Prague, 23–25 Novermber.
NDNS+: Statistics and the Life Sciences: High-dimensional inference and complex data, Groningen, 23–25 November.
ISKE: The 4th International Conference on Intelligent Systems & Knowledge Engineering, Hasselt, Belgium, 27–28 November.

December

Human Nature, Artificial Nature: Genoa, Italy, 3–4 December.
(Dis)Entangling Darwin:Cross-Disciplinary Reflections on the Man and his Legacy: University of Porto, Portugal, 4–5 December.
ICDM: The 9th IEEE International Conference on Data Mining, Miami, 6–9 December.

Interpretation and Sense-Making: University of Rouen, France, 9–11 December.
NaBIC: World Congress on Nature and Biologically Inspired Computing, Coimbatore, India, 9–11 December.
Emergence and Reduction in the Sciences: 2nd Pittsburgh-Paris Workshop, Center for Philosophy of Science, University of Pittsburgh, 11–12 December.
FIT: International Conference on Frontiers of Information Technology, Abbottabad, Pakistan, 16–18 December.
Seventeenth Amsterdam Colloquium: University of Amsterdam, 16–18 December.
MBR: Abduction, Logic, and Computational Discovery, Campinas, Brazil, 17–19 December.

§7
Jobs

Visiting Fellowships: Joseph L. Rotman Institute of Science and Values, University of Western Ontario, deadline 1 July.
Lectureships: in Psychology, School of Psychology, Birkbeck, London, deadline 3 July.
One-year Lectureship: History and Philosophy of Science, Philosophy, University of Leeds, deadline 10 July.
Post-doc position: EPSRC-funded research project "Efficient Decentralised Approaches in Algorithmic Game Theory", Computer Science, University of Warwick, deadline 17 July.
Post-doc: Theoretical Philosophy, Friedrich Alexander Universität Erlangen-Nürnberg, deadline 30 July.
Readership: Mathematical Logic, Mathematical Institute, University of Oxford, deadline 17 August.
Visiting International Fellowship: Department of Sociology, University of Surrey, Guildford, deadline 30 September.
Post-docs: Instituto de Investigaciones Filosóficas, UNAM, Mexico, deadline 10 October.
Templeton Research Fellowship: Oxford University, deadline 19 November.

§8
Courses and Studentships

Courses

HPSM: MA in the History and Philosophy of Science and Medicine, Durham University.
Master Programme: Philosophy of Science, Technology and Society, Enschede, the Netherlands.
MA in Rhetoric: School of Journalism, Media and Communication, University of Central Lancashire.

MSc in Mathematical Logic and the Theory of Computation: Mathematics, University of Manchester.
MSc in Artificial Intelligence: Faculty of Engineering, University of Leeds.

MA in Reasoning

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

MSc in Cognitive & Decision Sciences: Psychology, University College London.
MSc in Cognitive Science: University of Osnabrück, Germany.
MSc in Philosophy of Science, Technology and Society: University of Twente, The Netherlands.
Master of Science: Logic, Amsterdam.
APTS: Academy for PhD Training in Statistics, University of Warwick.
MEi:CogSci: Middle European interdisciplinary master programme in Cognitive Science, application deadline 1 July.
Statistical Learning: Fundación BBVA, Madrid, Spain, 2–3 July.
NN: Summer School in Neural Networks in Classification, Regression and Data Mining, Porto, Portugal, 6–10 July.
ISSCSS: 1st Graduate International Summer School in Cognitive Sciences and Semantics, University of Latvia, Riga, 16-26 July.
EPR: Expressivism, Pluralism & Representationalism, Pre-conference Winter School, Centre for Time, University of Sydney, 20–21 July.
ESSLLI: 21st European Summer School in Logic, Language and Information, Bordeaux, France, 20–31 July.
Philosophy and Medicine: Summer School & Workshop, University of Rostock, Germany, 27 July–1 August.
USMS: Utrecht Summer School in Mathematical Sciences on Dynamical Systems and their Applications, University of Utrecht, 17–28 August.
ACAI: Advanced Course in Artificial Intelligence, School of Computing and Mathematics, University of Ulster, Northern Ireland, 23–29 August.
Fourth Cologne Summer School: Reliabilism and Social Epistemology: Problems and Prospects, Cologne, 24–28 August.
Small Area Estimation: Department of Statistics, Waikato University, NZ, 28 August.
EASSS: European Agent Systems Summer School, University of Torino, Italy, 31 August – 4 September.
Quantifying and Evaluating Forensic Evidence: Postgraduate Statistics Centre, Lancaster University, 24–25 September.
Small Area Estimation: Southampton Statistical Sciences Research Institute, 12–14 October.
Cluster Randomised Trials: University of Auckland, New Zealand, 25–26 November.
ISLA: 3rd Indian School on Logic and its Applications, University of Hyderabad, Gachibowli, India, 18–29 January.

Advanced Small Area Estimation: Southampton Statistical Sciences Research Institute, 15–16 February.

Studentships

PhD Studentship: 3-year AHRC studentship in the Foundations of Logical Consequence project, University of St Andrews, until filled.
PhD position: Cork Constraint Computation Centre (4C), University College Cork, deadline 1 July.
PhD Scholarship: for research on natural kinds, Philosophy, UPMF Grenoble, deadline 5 July.
PhD Fellowships: in statistics, School of Mathematical Sciences, University College Dublin, deadline 17 July.
PhD Studentship: in Computer Models of Argument, Argumentation Research Group, School of Computing, University of Dundee, deadline 17 July.