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Contents

Editorial 66

Features 67

News 70

What's Hot in … 72

Events 74

Courses and Programmes 77

Jobs and Studentships 77

Editorial

This is my first interview for this fine gazette and being located in Munich myself made deciding on an interviewee very easy. My interview partner for this issue is Stephan Hartmann, and I am very glad that he immediately accepted. Before Stephan came to Munich in 2012, he held professorships at the London School of Economics and at Tilburg University. In addition to his degrees in philosophy (Master's degree 1991, PhD 1995), Stephan also holds a master's degree in physics (1991).

The first time I met Stephan Hartmann was in 2003, at the summer school Philosophy, Probability, and the Special Sciences in Konstanz, Germany. Stephan was one of the organizers and was located in Konstanz back then. The rigour and precision of certain philosophical thinking I came to know at this great summer school considerably influenced my own view on philosophy and its methods. This was one of my first encounters with what is nowadays called mathematical philosophy. Ten years later, mathematical philosophy is at its peak and Stephan Hartmann is one of its leading figures. Since 2012 he is chair in Philosophy of Science at the LMU Munich. In addition to that, Stephan was awarded an Alexander von Humboldt Professorship and teamed up with Hannes Leitgeb (Chair in Logic and Philosophy of Language at the LMU and also Alexander von Humboldt Professor) as a director of the Munich Center for Mathematical Philosophy. His Humboldt Professorship enabled Stephan to double the center's size, which makes for about fifty mathematical philosophers now working at the center.

Stephan Hartmann is very well-known for various work he has done. The book *Bayesian Epistemology* (with Luc Bovens, Oxford 2003) is already something like a modern classic. His philosophical work also includes research on coherence, philosophy of physics, social epistemology, and even more "applied" research like work on voting procedures and descriptive norms. He also is associate member of the Arnold Sommerfeld Center for Theoretical Physics (LMU Munich) and does research in the foundations of physics. One outcome of this is the recently edited a book on *Probabilities in Physics* (with Claus Beisbart, Oxford 2011). Being also a physicist by training, Stephan has a very scientific picture of philosophy. With the following interview we have tried to provide a sketch of this picture.

Albert J.J. Anglberger
Munich Center for Mathematical Philosophy, LMU

Interview with Stephan Hartmann

Albert J.J. Anglberger: With your Humboldt professorship, you are joining an already existing philosophical center, and have already made a number of additional hires. How does that complement (or alter) the previous focus of the Munich Center for Mathematical Philosophy (MCMP)?

Stephan Hartmann: The main goal of the MCMP is to address philosophical problems with mathematical methods, broadly construed. In the first two years, a lot has already been achieved in this respect and the MCMP became quite well known in the philosophical world and beyond. Hannes Leitgeb and his colleagues have done a fantastic job here, and I am delighted to have gotten the chance to join the MCMP. The new group, comprising three Assistant Professors as well as several Postdoctoral, Doctoral and Visiting Fellows, will round off the work done at the MCMP in several respects. First, we will add new methods to the toolbox of the MCMP. We use, for example, computer simulations, which are of great help, especially for the study of agent-based models of various social phenomena. Additionally, we want to use more empirical methods, e.g., experiments similar to the experiments done in cognitive and social psychology, as well as case studies. Second, we address new topics. For example, several of us do technical work in the philosophy of physics and in the philosophy of psychology, philosophy of the social sciences, and philosophy of economics. This research is often done in close collaboration with scientists, and we are fortunate enough to have a lot of scientists here at the LMU who like to work with philosophers like us. A number of us also became interested in formal ethics and various questions from political philosophy. In sum, we want to explore as many fields of philosophy as possible and see how formal (or scientific) methods can be used to make progress here. Third, the additional resources will help us to reach out more, to both the broader philosophical community and the general public. We will organise conferences that we hope will also appeal to non-formal philosophers in order to bridge the gap between different communities and approaches. And we offer public events that reach out to the general public. Julian Barbour's talk about the end of time during our Foundations of Physics conference at the Deutsche Museum is a case in point.

Lastly, let me mention that due to the MCMP's collaborative research style, which we endorse, the integration of the new group has been an effortless and enriching process for all involved. We discuss a lot, collaborate on various projects, run reading groups and organise many events. This, too, resembles the sciences and differs from the traditional style of doing philosophy.

AA: Computer simulations are getting used more and more in philosophy. What are the merits of using simulations in philosophy and how are you using them in your own research?

SH: Computer simulations have much to offer to the philosopher. They allow us to explore the consequences of more complicated assumptions than we would normally make because of our inability to deduce their consequences by pure thinking or by doing calculations by hand. We can then study more realistic scenarios and make fewer idealisations. Agent-based models are a case in point. With software such as Netlogo, it is possible to follow the "life" of a group of agents, who change their state according to a number of specified rules, and see which patterns (such as social or behavioral norms) emerge. These patterns are often unexpected and make you think. How could it be that such a pattern emerges? In my own work I found that analysing the visualisations that result from a computer simulation often leads to rather interesting answers and new ideas.

So far, only a few groups use computer simulations in philosophy. In my view, there is a lot of potential and many areas of philosophy can benefit from them. At the MCMP, I would like to explore to what extent computer simulations can be used in combination with logical approaches. In order to train our students and to show them that computer simulations are just another useful tool in the philosopher's toolbox, we offer regular courses at the LMU in which students learn how to design computer simulations and how to use them to solve philosophical problems.

AA: Is there a common theme underlying your philosophical work?

SH: I consider myself to be a scientific philosopher, which means that I address philosophical problems like scientists address scientific problems. That is, I start with a concrete problem and make (often idealised) assumptions, I consider empirical data, I conduct experiments, and I use all the methods available to solve the problem at hand. The challenge with this style of doing philosophy is that one has to integrate different approaches and methods, which is not a straightforward task. But regarding methodology, I am a pluralist and I believe that it is helpful to know a whole range of methods, indeed as many as possible, to solve various philosophical problems. And I encourage my students to get acquainted with different formal and empirical methods and to learn how to run simple computer simulations.

The problems I address are often interesting from a scientific point of view, but I insist that they are also interesting philosophically. For instance, much of my work is about individual and group rationality. This is obviously an issue of important philosophical concern. At the same time, rationality is also studied by the sciences, and it is clear that empirical data (e.g., from cognitive and social psychology) matter for the way we treat it philosophically.

Of course there are precursors for the kind of work I do. In a way, much of my work and my approach are inspired by the logical empiricists, who I feel were dismissed too fast. In fact, I believe that it is a good starting point to address a problem in the style of the logical empiricists.

AA: How did you get drawn to the philosophical questions you are dealing with now?

SH: I studied physics and philosophy and was first mostly interested in foundational problems in quantum field theory and methodological problems regarding modelling and simulation in the sciences. It took me a while to realise that it is much more fun to model and to run simulations myself rather than to only talk about them! Most of my early work could be described as naturalised philosophy of science. I conducted case studies and compared them with philosophical accounts from the literature.

While this was a refreshing approach to the philosophy of science at the time (compared to earlier work which was often too far away from the actual practice of science), I realised that I did not want to go on with this work. I wanted a more normative approach, and I wanted to do more well-founded constructive work myself. And I always liked to do calculations. Fortunately enough, I met Luc Bovens when I arrived as Assistant Professor at the University of Konstanz in 1998. Luc had a completely different background than I had (in ethics and political philosophy), and got me seriously interested in analytical philosophy and other areas of philosophy that I did not look much into before, such as decision theory and social and political philosophy. Most importantly, however, Luc suggested that we study Bayesian networks together. Luc heard about them and immediately saw their potential for philosophy. He was right. And so Bayesian networks and their applications in epistemology and philosophy of science kept me busy for a number of years. What we did in this work was analytical philosophy assisted by formal methods. That is, we used the Bayesian framework to make progress on issues such as the coherence theory of justification, testimony, and confirmation theory. Our formal results always had to be backed up and confronted with (our) intuitions, on which we heavily relied, especially in our work on coherence measures.

In the last couple of years, I understood that the right way to go in many interesting cases is to combine the two approaches that I used before. The naturalist approach provides the data and the input and it reminds us that we want to arrive at a philosophy for our world. The formal machinery, on the other hand, allows us to integrate everything into a bigger picture and provides a normative account. How to do this in practice is not always straightforward, but I am excited by the idea and hope to arrive at further interesting results.

AA: Are you interested in producing results that can be applied outside philosophy, and have you already done so?

SH: I do not think that philosophy has to be useful to count as good philosophy. It is a contribution to our intellectual culture that does not have to make the world better in any other way, to put it sloppily. Philosophy should be assessed on its own grounds. At the same time, I have no problem if good philosophical work is useful for society and relevant for public debates. And indeed it sometimes is, as examples from ethics, political philosophy, the philosophy of physics or the philosophy of climate science shows.

Personally, I am quite interested in exploring the consequences of certain philosophical positions for complex real-life problems of public policy. With Claus Beisbart and Luc Bovens, for example, I explored how the nations of the European Union should be represented in the Council of Ministers if we adopt utilitarianism or egalitarianism. To address this question, we modeled the situation and then ran detailed computer simulations. The results were surprising and elegant and were also supported by a rather different modelling framework that some political scientists had adopted. In my view, the challenge of doing this kind of applied philosophy is to do it in a way that is also considered to be good philosophy, and this is not always an easy task.

AA: What can we expect to see in your new book, and how does it compare to *Bayesian Epistemology*, which you wrote with Luc Bovens?

SH: This book, which I co-author with Jan Sprenger from Tilburg University, aims to develop Bayesianism into a full-fledged philosophy of science. While Bayesianism is traditionally assumed to be only a confirmation theory, we want to show that it can be used to address a whole range of problems and questions from philosophy of science. We do take the empiricist starting point that philosophy of science is always about the relation between theories and data. But confirmation is not the only concept that can be illuminated by this relation. So we go on to discuss issues such as scientific explanation, intertheoretic relations, and the role of theories, models and idealisations. We also study various non-deductive argument types that scientists use, such as the no-alternatives argument (click here for a popular account of it), and respond to challenges to Bayesianism such as the old-evidence problem. We might also add a chapter on social Bayesian epistemology to explore the important social aspects of science from a Bayesian perspective. In my view, Bayesianism is a wonderful modelling framework, and I am curious to see how far it can be pushed to make sense of the practice of science and its normative standards.

AA: How does your version of Bayesianism differ from more traditional accounts?

SH: I consider Bayesianism to be a rather flexible modelling framework that we adopt to address various problems. Bayesianism makes a number of serious idealisations (such as omniscience and sharp probabilities), which may be acceptable for some applications, but not for others. And yet, I would like to see what we can do with Bayesianism, before discussing its limits.

In line with the empiricist spirit that underlies Bayesianism, people have focused on direct evidence such as the black raven that confirms the hypothesis that all ravens are black. Evidence of this kind was considered to be certain. Later, Richard Jeffrey relaxed the assumption of certainty, but kept on focusing on direct evidence. I am interested in exploring other types of evidence that we find in science and in ordinary reasoning. In my recent work with Richard Dawid (Vienna) and Jan Sprenger on the no-alternatives argument, for example, we looked at 'social' evidence of the form "The scientific community has not yet found an alternative to *H*". How can this kind of evidence be integrated in the Bayesian framework? And is it evidence at all? With Soroush Rafiee Rad (Tilburg), I am also working on learning indicative conditionals, which are, as we know from the literature on conditionals, not events and therefore need to be modeled rather differently. In all these cases we showed that it is crucial to represent the underlying causal structure properly. This is in line with the work of Judea Pearl, who argued that the causal structure comes first, followed by the probability distribution that is defined on top of the causal structure. To sum up, there are a number of respects where I feel forced to deviate from the traditional Bayesian framework in order to make it better fit to contemporary science. But these are still rather minimal changes.

AA: Together with Hannes Leitgeb you are currently teaching the massive open online course Introduction to Mathematical Philosophy on Coursera. Tons of people enrolled already in this course and its online availability will certainly promote mathematical philosophy. What will be covered in this class and what do students need to know about mathematics in order to understand it?

SH: We are very happy to have the chance to do this. The idea of the course is to convince a large audience of non-experts that challenging philosophical problems can be successfully addressed with the help of a little bit of mathematics. We will, for example, talk about truth, belief, conditionals, confirmation, and individual and collective decision-making. The mathematics is always introduced on the way, and only in the depth necessary for the issue at hand. So we do our best to make sure that novices to the field can follow the course with ease. To follow the course, one only needs to be acquainted with some bits and pieces of high-school mathematics, and that's it. Mathematical philosophy is accessible, and we want to show how it can be part of an introductory philosophy curriculum—just as it has become an important part of academic philosophy.

On the Cause of the Unsatisfied Paradox

According to Peter Eldridge-Smith (2012: "The Unsatisfied Paradox", *The Reasoner* 6(12), 184–5), the cause of the following paradox is unlike that of other semantic paradoxes:

> My favourite predicate just happens to be 'does not satisfy my favourite predicate'. Crete satisfies 'does not satisfy my favourite predicate' iff Crete does not satisfy my favourite predicate. Therefore, Crete satisfies my favourite predicate iff Crete does not satisfy my favourite predicate.

There was nothing special about Crete, the same goes for any other object. So, insofar as any object satisfies Eldridge-Smith's favourite predicate, it does not satisfy it, but insofar as it does not, it does. That is clearly paradoxical if satisfaction is an all or nothing affair. But, why should we assume that it is?

For a simple intuition-pump, imagine that Homer is being treated for his baldness by having hairs added to his head one by one. If each and every addition leaves Homer in a state of baldness, then he will still be bald even after a full head of hair has been added. That is paradoxical—it is an example of the Sorites paradox—because hardly anyone thinks that with the addition of a single hair Homer can go from being bald to not being bald. A few people think that he can, but for any addition for which such a change is at all plausible it is at least as plausible that Homer was already as bald as not. At such times Homer would seem to satisfy 'is bald' as much as not. In other words, 'is bald' would seem to be about as true as not of Homer. 'Homer is bald' would seem to be (making a claim that is) about as true as not.

The problem with that is that truth seems, intuitively, to be an all or nothing affair. Statements are true when they describe how things are, as opposed to how they are not. For subjects S and predicates *p*, 'S is *p*' is true if, and only if, S is *p*. But, descriptions are not always that good, or that bad. We will usually tidy up a poor description, so that it is simply true, or else false, because we reason most naturally with such descriptions. But the semantic paradoxes concern given descriptions, which we cannot simply tidy up. And while we naturally want a bivalent logic, it seems that satisfaction is not necessarily an all or nothing affair. So I would say that 'S is *p*' is true insofar as S is *p*, which coheres with 'S is *p*' being as true as not insofar as S is *p* as not. (I am reluctant to define 'as true as not' more formally, e.g., as a third truth-value, because of the problem of higher-order vagueness.) Of course, one could instead conclude that satisfaction is an all or nothing affair. For good introductions to the debate see J.C. Beall (2004: *Liars and Heaps: New Essays on Paradox*, Oxford: Clarendon Press) and Roy Sorensen (2012: "Vagueness", in Edward N. Zalta, *The Stanford Encyclopedia of Philosophy*).

Anyway, if truth and satisfaction are not, in general, all or nothing affairs, then it follows logically, from Crete satisfying Eldridge-Smith's favourite predicate insofar as it does not, that Crete satisfies it as much as not. That is, his favourite predicate is satisfied as much as not by everything. To put it another way, his favourite predicate is as true as not of everything. And that is like what happens with the other semantic paradoxes. E.g., if 'L is not true' expresses L, then L is true if, and only if, L is not true; and if truth is not an all or nothing affair, then from L being true insofar as it is not, it follows that L is as true as not. (For details see my "The Liar Paradox", *The Reasoner* 7(4).)

The example considered by Eldridge-Smith was the version of Russell's paradox (1902) that is commonly known as Grelling's paradox (it originally concerned the following predicate: to be a predicate that cannot be predicated of itself). To begin with, note that 'is short' is short, for a predicate expression. By contrast, 'is bald' does not describe itself. What about 'does not describe itself'? Well, it describes itself if, and only if, it does not, so it is paradoxical if satisfaction is an all or nothing affair. But if satisfaction is not necessarily like that, then it follows logically, from 'does not describe itself' describing itself insofar as it does not, that it describes itself as much as not. In other words (following Quine), 'not true of self' is as true as not of itself, if truth is not an all or nothing affair.

Incidentally, the paradoxes of denotation are semantic paradoxes of a different kind—they concern reference, rather than satisfaction and truth—but they do serve to underscore the above. E.g., what is the denotation of 'the things that are not now being referred to'? That expression refers to Crete, for example, only if it does not, but it only fails to refer to Crete if it does refer to it. But, if reference is not necessarily an all or nothing affair, then 'the things that are not now being referred to' refers as much as not to everything.

For an intuition-pump, suppose that Moses is wandering in a desert. He sees a mirage, which he takes to be a pool, and coincidentally there is a pool, just where he takes one to be, but it is obscured from his view by the mirage. As Moses approaches the pool, the image of the pool gradually replaces the mirage. Now, Moses is hot and thirsty, so he keeps thinking 'that pool looks cool', and as he approaches the pool, the denotation of 'that pool' gradually changes to the pool. So it will probably, at some point, have referred as much as not to the pool.

MARTIN COOKE

Two concepts of completing an infinite number of tasks

Is it logically possible to complete an infinite number of tasks, sequentially, in a finite time? James Thomson (1954, 'Tasks and Super-Tasks.' *Analysis*, 1–13) attempted, via his lamp example, to argue that it is logically impossible. A lamp begins off, and the button (that toggles the lamp between off and on) is pressed in one minute, then a half minute, then a quarter minute ... Thomson believed he had arrived at a contradiction by considering the state of the lamp at two minutes. Most people believe that Paul Benacerraf successfully replied to Thomson (by arguing that the story does not determine the state of the lamp at two minutes), and so believe that it is logically possible to complete an infinite number of tasks in a finite time. However, note that to answer the question—Is it logically possible to complete an infinite number of tasks in a finite time?—it is necessary to know what is meant by 'an infinite number'. Generally, 'an infinite number', in the context of considering infinitely many tasks, means that there is a first task, a second task, a third task . . . , as in Thomson's Lamp and many other similar supertasks.

Let us consider a different question, which will give rise to a different structure of tasks: Is it logically possible to complete an infinite number of tasks in a finite time, where each task takes the same amount of time? To my knowledge this question has not been considered. Let us call such a task an *equisupertask*. I suggest that an equisupertask is logically possible, that each task must be completed in an infinitesimal time, and that the structure of the tasks is the structure of an infinite integer in a nonstandard model of arithmetic. I argue that the infinite case is much like the finite case, and so let us begin with the finite case.

Imagine that we wish to complete some finite number of tasks, n, in a finite time, e.g., one hour. We wish to space the tasks equally. For finite n, we then perform a task every $1/n$ hours, where task m (for integers $m = 1, 2, 3, \ldots, n-1, n$) is completed at time $= m/n$. For example, when completing 5 tasks, we complete the third task at time $= 3/5$. Overall, we complete tasks at times $1/5, 2/5, 3/5, 4/5$, and $5/5$. The structure of the tasks is the ordinal structure of n.

The same, I suggest, holds if we replace finite numbers (integers) by infinite numbers (integers). Such nonstandard numbers were developed by Abraham Robinson in the 1960s. Imagine then that we wish to complete some infinite number of tasks, N, in a finite time, e.g., one hour (where N is an infinite integer in a nonstandard model of the reals). We wish to space the tasks equally. For infinite N, we then perform tasks every $1/N$ hours, where task m (for finite or infinite integers $m = 1, 2, 3, \ldots, N-1, N$) is completed at time $= m/N$. Note that the hyperreals form a field, and so in particular, they are closed under division. The overall structure of the tasks is the ordinal structure of N, which is $\omega + (\omega^* + \omega)\alpha + \omega^*$, where α is a dense linear order without endpoints. Note that as any infinite integer is either even or odd, the state of the lamp after an infinite number of tasks have been completed is determined: if an even number of button presses have been made, then the lamp is in its starting state; if an odd number of button presses have been made, then the lamp is opposite its starting state.

Before concluding, let me suggest an area for future research: Is there spatio-temporal continuity through an equisupertask? It is generally agreed that there is none through a supertask, so that Thomson's Lamp may be on or off (or have disappeared) at time two; this is the crux of Benacerraf's reply to Thomson. Yet it appears that there is spatio-temporal continuity through an equisupertask. I suggested above that if an infinite and even number of tasks are performed, then the lamp is in its starting state (opposite state for an odd number of tasks). And indeed, every individual task has both a predecessor and a successor, which supports the idea that there is spatio-temporal continuity. So it appears that there is spatio-temporal continuity through an equisupertask, but it is somewhat mysterious how there can be such continuity through an equisupertask, but not through a supertask, which structurally is a part of an equisupertask. And so I suggest that it is worthwhile to investigate the question: Is there spatio-temporal continuity through an equisupertask? A picture is as follows:

Supertask: ||||||||||| . . .

Equisupertask: ||||||||||| . . .   . ||||||||||||||||| . . .   . |||||||||||

A second area of research is to consider the question: Is it logically possible to complete one task in an infinitesimal time? Though accomplishing this feat seems difficult, let me briefly reply in two ways. First, logical possibility is a very weak form of possibility, and so I suggest that the burden of proof is on those who think it impossible. Second, though initially perhaps an odd and contradictory sounding claim, elsewhere I have argued (2012, On Infinite Number and Distance, *Constructivist Foundations*, pp. 126-130; Infinite Numbers are Large Finite Numbers, http://philpapers.org/rec/GWIINA) that there is a sense in which the infinite numbers discussed above are large finite numbers. If true, this provides one way that one task may be completed in an infinitesimal time, as in one sense, each task would have the duration of a very small real number.

If an equisupertask is logically possible, I suggest that the above is the correct way to model it. Completing an infinite number of tasks in a finite time, where each task takes the same amount of time to complete, is much like completing a finite number of tasks in a finite time, except that we must replace finite integers with infinite integers.

Jeremy Gwiazda
CUNY

News

The Analysis of Theoretical Terms, 3–5 April

The Munich Center for Mathematical Philosophy hosted the three-day conference The Analysis of Theoretical Terms organized by Paul Dicken, Norbert Gratzl and Thomas Meier from the 3rd to 5th of April 2013. The conference brought together researchers working on various issues and perspectives related to theoretical terms. This included the logic and semantics of scientific theories, the epistemology and metaphysics of theoretical terms and the philosophical consequences of these analyses for the philosophy of science and mathematics.

There were ten invited speakers: Holger Andreas (LMU Munich), Demetra Christopoulou (Patras), Jeffrey Ketland (Oxford), Hannes Leitgeb (LMU Munich), Sebastian Lutz (LMU Munich), Michela Massimi (Edinburgh), Ulises Moulines (LMU Munich), Stathis Psillos (Athens), Charlotte Werndl (LSE) and John Worrall (LSE) plus four additional contributing speakers: Michele Ginammi (Pisa), Xavier de Donato (Santiago), Gauvain Leconte (IHPST Paris) and Georg Schiemer (LMU Munich).

The first talk of the first day of the conference was by Holger Andreas who presented the advantages of his modal semantics of theoretical terms compared to other formal accounts of theoretical terms. Michele Ginammi reexamined Bangu's analysis of the Omega-Minus particle prediction and argued that Bangu's controversial reification principle does not need to be employed. This was followed by de Donato with a proposed extension of Zalta's abstract object theory to account for the nature of the references of theoretical terms. Michela Massimi discussed the difficulties of Boyd's and LaPorte's strategies to account for reference-fixing and meaning change over time for natural kind terms. The last talk of the first day was by Ulises

Moulines who argued against the position that causes play no role in fundamental physics on the basis that the introduction of theoretical terms in higher-level theories play the role of causes in explaining the lower-level data.

The second day kicked off with a talk by Demetra Christopoulou on "Implicitly defining mathematical terms". She argued that Horwich's existence problem for scientific terms re-emerges for implicitly defined mathematical terms. Gauvain Leconte discussed the indispensability of theoretical terms by considering suggested solutions and problems for the explicit definability of theoretical terms through observational terms. Georg Schiemer gave a detailed formal discussion of Carnap's suggested use of epsilon terms for the explicit definition of theoretical terms and discussed its compatibility with a structuralist view.

The conference continued with Hannes Leitgeb arguing that in a Carnapian view, Ramsification does not destroy a theory's inductive systematization of observations. Jeff Ketland continued with a talk on Leibniz Equivalence of spacetime models where he argued that the notion of diffeomorphisms usually considered in the debates about the hole argument and Leibniz Equivalence can be replaced by the more general symmetry of arbitrary permutations of the spacetime points. The last talk of the day was by Stathis Psillos who reconsidered objections to the causal descriptivist account of reference.

The last day of the conference started with a talk by Charlotte Werndl. She proposed and defended a new justification for interpreting the measure in Boltzmannian Statistical Mechanics as a typicality measure. Sebastian Lutz argued that none of the extant criteria for the empirical significance of terms can be used to determine the significance of sentences, but that some criteria may be helpful when discussing non-reductive physicalism and mathematical concepts in scientific theories. In the last talk of the conference, John Worrall defended the Ramsey sentence account of Structural Realism against a number of trivialization claims.

The conference was a great event for interaction between researchers working on different aspects of theoretical terms. Videos of all talks are available on the iTunesU site of the MCMP. The conference was generously supported by the German Research Council (DFG), the Munich Center for Mathematical Philosophy (MCMP) and the Alexander von Humboldt Foundation through a Humboldt Professorship.

Radin Dardashti
MCMP, LMU

Models and Decisions, 10–12 April

Early April this year saw "Models and Decisions", the sixth edition of the now Munich-Sydney-Tilburg (MST) conference series on philosophy of science. The conference was a special event in two ways. It was the first workshop in the series to be organized by the new series partner Munich Center for Mathematical Philosophy (MCMP). At the same time, Models and Decisions served as the kickoff conference for Stephan Hartmann's Munich based research group on Philosophy of Science. Winning the prestigious and highly endowed Humboldt professorship last autumn, Hartmann decided to combine forces with the recently established Munich Center for Mathematical Philosophy, thereby doubling the size of the center. To introduce the Hartmann group to the Munich philosophical tradition, there was a special evening lecture given by the prominent German political philosopher Julian Nida-Rümelin on the relationship between rationality and cooperation.

The general theme of the conference was to elaborate on the relationship between modelling and decision making, bringing together research on decision making with the ever-growing modelling community. While some talks were solely concerned with modelling or decision making, a good many contributions dealt with the interplay between those two. Some interesting issues arise from this interplay, including complexity of models, different levels of structural uncertainty, data size and the individuation of parameters. A further focus of the conference was on the climate change debate as a prominent case for the application of models in decision making.

In her invited talk, Claudia Tebaldi presented a variety of existing climate models and their divergence in predictions. One of the big issues in the climate debate is the structural uncertainty in our current understanding of climate phenomena. Tebaldi argued that the simultaneous use of several models helped both in identifying and hedging against the influence of structural uncertainty and substantial assumptions built into the models.

The problem of complexity was addressed by Michael Strevens. Real life phenomena tend to be so complex that models of these need to ignore some factors causally connected to the explanandum. The main question then is which factors can safely be ignored and which need to be accounted for in the model. To this end, Strevens develops an account of difference making. He then utilizes this account to identify which factors are necessary in a difference-making sense.

The problem of data size featured prominently in the invited talk of Ulrike Hahn. She argued that the expected number of repetitions plays a crucial role in the way humans indulge in decision making under risk. In particular, different procedures might be at work, depending on whether we expect a decision situation to appear once in a lifetime or repeatedly. For the case of repeated interactions, she argues that the expected value as used in decision theory is an adequate measure. However, arguments for the expected value usually invoke the law of large numbers and thereby presuppose a sufficient number of iterations. Thus they do not apply to single show events. For the latter Hahn suggests the median value as an alternative measure to evaluate risky decisions. She presented computer simulations showing that median-based procedures outperform mean-based procedures on small sample spaces. Hahn also showed that median-based reasoning provides a way to explain the empirical part of the St. Petersburg paradox, the difference between the (infinite) expected value of the game and the price people are actually willing to pay for it.

In a further invited talk Itzhak Gilboa challenged the long standing result that rationality implies a form of Bayesian reasoning. To this end he specified his concepts of rationality and Bayesian reasoning. He presented a novel concept of rationality which triggered a vivid discussion. The punch line of his concept is: an actor acted irrationally only if, when informed about the reasons for his irrationality, he is willing to change behavior respectively or admit that he has been irrational. Gilboa then showed that this concept of rationality does not necessarily imply Bayesian-style reasoning.

The conference gave an idea of the excellent multimedia facilities run by the MCMP. There are video abstracts and recordings of all invited lectures freely available on the web in the MCMP talk database. They can be accessed through the conference's media page. Models and Decisions will also result in a special issue of the journal *Studies in History and Philosophy of Science*.

Overall, the conference produced lively discussion and deepened understanding between the two communities. Models and Decisions was an excellent start for an entire series of philosophy of science related events at MCMP. Upcoming events include Carnap on Logic (July), Foundations of Physics (July) and Reduction and Emergence in the Sciences (November).

Dominik Klein
TiLPS, Tilburg University

Mathematising Science, 16–17 May

One of the principal aims of the *Mathematising Science* conference was to bring together a number of researchers working in different areas of philosophy of science and discuss the scope and status of the mathematical concepts and tools employed in various scientific domains. In this spirit, the first day of the conference comprised two main sections: the first dedicated to the philosophy of biology and the second on the philosophy of linguistics. Dr. Marion Vorms' (IHPST Paris I) keynote address proposed a novel framework for thinking about the theoretical and experimental elements involved in the emergence of classical genetics. Her argument focused on the roles that abstract representational formats play in the development and unification of distinct theoretical hypotheses initially associated with Mendelian genetics and cytology. Jonathan Birch's (Cambridge) talk challenged the received view that mathematical tools are used within evolutionary biology exclusively for the development of dynamical models and argued that mathematical tools may be used to capture 'snapshot' tools that serve either as unification or bridge principles in the practice of developing realistic models within evolutionary biology. Iulia Mihai (Ghent) articulated an alternative way of understanding D'Alembert's conception of the application of mathematics to natural science. From within this broadly historical perspective her talk then focused on the more general notion of the applicability of one science to another science.

The section on the philosophy of linguistics started with an address by Prof. Michael Glanzberg's (Northwestern), who discussed the similarities and dissimilarites of model-theoretic and 'absolute' semantics approaches to linguistic meaning. Arguing that even a minimal amount of mathematics can go a long way in the field of natural language semantics, he opened the debate about what is the appropriate sense in which one can talk about mathematisation in the language sciences. This theme was further pursued in Thomas Meier's (MCMP Munich) talk which traced the origins of the project of mathematising syntax (as a branch of linguistics) back to structural linguistics. Katherine Ritchie (Texas Austin) questioned the realist commitments that may be supported by the practice of developing abstract semantic theories of natural language.

The second day of the conference addressed the impact that the mathematisation of science has for the evaluation of other salient features of scientific theories and practices, such as empirical adequacy and unity. Dr. Silvia de Bianchi's (Dortmund) keynote talk proposed a way of reconciling causal accounts of explanation with the specific explanatory functions of models of stochastic resonance, while Dr. Charlotte Werndl's (LSE) arguments challenged the divide between deterministic and indeterministic models on grounds of their indirect empirical evidence. Sebastian Lutz (MCMP Munich) proposed a reconceptualisation of the notions of abstraction and idealisations in terms of omissions and distortions that would help shed new light on the applicability of mathematics to science. Vincent Ardourel (Paris 1) argued that discrete mechanics may be conceived as a distinctive mathematical formulation of classical mechanics which allows for new insights into the evaluation of the theory as a whole. Francesca Pero's (Florence) talk raised the question of the adequacy of the partial structures framework as a representative of the semantic view of scientific theories. She argued that the former framework cannot properly accommodate the representationalist commitments of the semantic view. Conor Mayo Wilson's (MCMP Munich) discussion of agent-based models brought into view the importance of circumscribing the variables and generalisations tracked by such models with respect to the evaluation of their explanatory function. As with other talks, his main arguments brought together philosophical points and a scientific practice-based perspective.

Maria Serban
Philosophy, University of East Anglia

Calls for Papers

The Square of Opposition: special issue of *History and Philosophy of Logic*, deadline 30 June.
Infinite Regress: special issue of *Synthese*, deadline 1 July.
The Life and Work of Leon Henkin: Mara Manzano, Ildiko Sain and Enrique Alonso eds, deadline 1 September.

What's Hot in . . .

Logic and Rational Interaction

111 years ago, in late 1902 Gottlob Frege had one of the most unpleasant experiences an academic writer could have. Immediately after sending the second volume of his *Grundgesetze der Arithmetik* to the publisher, he received a letter by Bertrand Russell undermining the very foundations of this book. Frege set out to find a solid axiomatic logical foundation for arithmetic. To do so, he made heavy use of two simple principles about sets. The first of them, extensionality, states that two sets are equal if and only if they have the same elements. Comprehension, the other principle, claims that for any property there is a set containing exactly those entities satisfying this property. Unfortunately, these two together give rise to Russell's famous paradox—as Russell informed Frege in his letter.

Demotivated by Russell's finding, Frege abandoned his logicist program and left logic. Fortunately, there were others to take over and bring his program to a successful end. Various ways to avoid Russell's paradox were suggested, the first of them being Russell's type theory from 1903. All of these proposals had in common that they maintained extensionality while weakening comprehension to a level that avoids Russell's paradox. It wasn't until 1908 that Zermelo came up with what would later become the ZF-axioms, the by now standard axiomatization of set theory. The flavour of ZF is that sethood isn't anything that can be claimed from outside, but sets are constructed from other sets—and ZF guarantees the existence of at least one set to start from. In ZF sets are tiny compared to the universe of all sets, a set cannot contain but an infinitesimal portion of the class of all sets. In particular there is no set of all sets in ZF. The comprehension axiom is invalid in ZF, but comprehension restricted to sets is valid, i.e., for every set A and every property p there is a subset of A containing exactly those elements satisfying p.

ZF turned out to be a good starting point for mathematics, while to some philosophers it seemed unnatural for various reasons such as the non-existence of a set of all sets.

In his famous essay "New Foundations", W.V.O. Quine suggested a different axiomatization of mathematics, now also known as New Foundations, or NF. Instead of constructing sets from a starting point he allowed for full comprehension, but limited the amount of properties to be used in the comprehension axiom. Properties used in the comprehension axiom are usually described by logical formulae. Quine observed that the formulae needed to describe Cantor-style paradoxes have a certain amount of built in circularity. To capture the notion of non-circularity, he defined the notion of a stratified formula and only allowed comprehension over stratified formulae. The resulting set theory exhibits certain philosophically interesting properties, for instance the set of all sets exists and the Fregean definitions of numbers still work. On the downside, it is harder to construct mathematics in NF since one is in constant need to show that the formulae used are stratified.

One of the most interesting questions to ask about an axiomatic system is whether it is consistent. Already in the original paper, Quine asked for a clarification of the relationship between ZF and NF. This problem turned out to be extremely hard. Though some progress was made, little was known until last year Randall Holmes wrote a little post that electrified the NF community. Holmes claims to have solved Quine's 75 year old problem by showing that NF is equiconsistent to Mac-Lane set theory, a weaker form of ZF. Late spring saw a NF meeting in Cambridge where Holmes presented his proof to a wider public. As rumors go, the proof seems to be confirmed by the community, though nothing has been published yet.

LORIweb is always happy to publish information on topics relevant to the area of Logic and Rational Interaction—including announcements about new publications and recent or upcoming events. Please submit such news items to Rasmus Rendsvig, our web manager or to the loriweb address.

Dominik Klein
TiLPS, Tilburg University

Uncertain Reasoning

I.J. Good was invited by Teddy Seidenfeld and Marco Zaffalon to speak at the second *International Symposium on Imprecise Probabilities and Their Applications* held in Lugano, Switzerland, on July 14–17, 2003. He could not travel to the meeting, but prepared a contribution titled 'The accumulation of imprecise weights of evidence'. In it, Good outlined a proposal which doesn't seem to have caught on in the literature, namely to use imprecise weights of evidence, rather than imprecise probabilities, to account for second-order uncertainty.

When it comes to making decisions, by and large, we know very little. So an essential aspect of effective decision-making in real-world contexts consists in gathering information. Yet not all information is born equal. Indeed one of the key questions in both pure and applied uncertain reasoning is to do with telling apart signal from noise, that is to say distinguishing information which is *relevant* to a particular decision from information which is not. Now, the idea that information is not uniformly relevant to a given problem played a key role in the statistical work carried out by Alan M. Turing and his chief assistant—I.J. Good—at Bletchley Park during World War II.

As I recalled in my June 2012 column, Turing led a group of statisticians whose goal was to decipher the Enigma machine used by the Nazis for their (naval) communication. In tackling this problem Turing invented the method of *Bamburismus* which involved centrally what was to become known in statistics as the *odds form of the Bayes Factor*. Let $P(\cdot \mid \cdot)$ be a conditional probability function and let the *odds in favour of H given E* be defined by

$$O(H \mid E) = \frac{P(E \mid H)}{P(\neg E \mid H)}. \tag{1}$$

Then the *Bayes Factor in favour of a hypothesis H provided by evidence E given background information G* is defined as

$$\begin{aligned} BF(H : E \mid G) &= \frac{P(H \mid E \wedge G)}{P(H \mid \neg E \wedge G)} \\ &= \frac{O(H \mid E \wedge G)}{O(H \mid G)}, \end{aligned}$$

the latter equivalence being a consequence of (1) together with the standard properties of probability functions. The Turing-Good definition of *the weight of evidence provided by E in favour of H given G* is then taken to be the logarithm of the the Bayes factor, namely

$$W(H : E \mid G) = \log \frac{O(H \mid E \wedge G)}{O(H \mid G)}.$$

The mathematical properties of the function $W(\cdot : \cdot \mid \cdot)$ and its applicability in statistics are detailed in I.J. Good (1950: *Probability and the Weighing of Evidence*, Griffin, London). However what Good (2003) introduces is the following intriguing consideration.

Whilst interval-valued probability is a natural extension of point-valued probability when it comes to capturing certain features of second-order uncertainty, reasoning with and modelling intervals is far more complicated than dealing with real-valued probabilities. Among the many argument in support of this view, Good focusses on the unavoidable arbitrariness of the endpoints of an interval representation of uncertainty:

> Since the ends of the intervals are too arbitrary I prefer a model where imprecise logodds and weights of

> evidence have (level-two) normal (Gaussian) distributions. Call this the (level-two) *normal* model (for weights of evidence). This device won't do for probability and odds because they don't extend from minus to plus infinity [...] I am merely claiming that this new "normal" model is better than the "interval valued" model. The new "normal" model has the further advantage that the sums and differences of normal random variables (not *mixtures*) are again normally distributed. (Good 2003, pp. 4–5)

The paragraph, and indeed the paper, ends with some qualifying remarks on the conditions under which the computational advantages of imprecise weights of evidence over probability intervals are obtained. Yet the very notion of "imprecise weights of evidence" is not fleshed out at all. Nor does it seem to have attracted much subsequent work. The search "The accumulation of imprecise weights of evidence" performed on Google on 14 May 2013, returned 17 results, including no research paper. Yet the idea is indeed an intriguing one. For a crucial weakness of second-order uncertainty models, and in particular of imprecise probabilities, is to be found in the difficulty of calculating with them. As a consequence, a model allowing for relatively straightforward calculations, like the one envisaged by Good (2003), would be of great interest for the decision-relevant quantification of uncertainty. (Thanks to Jacopo Amidei for drawing my attention to Good's paper.)

Hykel Hosni
Scuola Normale Superiore, Pisa
CPNSS, LSE

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Events

June

Stegmüller: Stegmüller and Analytic Philosophy, LMU Munich, 1 June.

Benelearn: 22nd Belgian-Dutch Conference on Machine Learning, Nijmegen, Netherlands, 3 June.
Formal Epistemology Festival: Toronto, 3–5 June.
BSPS: British Society for the Philosophy of Science Annual Conference, University of Exeter, 4–5 June.
BAYSM: Bayesian Young Statistician Meeting, Milan, Italy, 5–6 June.
BISP: 8th Workshop on Bayesian Inference in Stochastic Processes, Milan, Italy, 6–8 June.
Logic of Simplicity: Carnegie Mellon University, Pittsburgh, USA, 7–9 June.
LORI: 4th International Workshop on Logic, Rationality and Interaction, Hangzhou, China, 9–12 June.
CADE: 24th International Conference on Automated Deduction, Lake Placid, USA, 9–14 June.
Carnap: Perspectives on Carnap, University of East Anglia, 10 June.
Necessity, Analyticity & A Priori: Oslo, 10–11 June.
ICAIL: 14th International Conference on Artificial Intelligence & Law, Rome, Italy, 10–14 June.
IWINAC: 5th International Work-Conference on the Interplay between Natural and Artificial Computation, Palma de Mallorca, Spain, 10–14 June.
Randomization: Workshop on Randomization and Related Topics in Causal Inference in Medicine, Bristol, 11 June.
Priestfest: Conference in honour of Graham Priest, University of Melbourne, 12–14 June.
SPE: 6th Semantics and Philosophy in Europe Colloquium, St. Petersburg, Russia, 12–14 June.
Heuristic Reasoning: Rome, 13–15 June.
INEM: Conference of the International Network for Economic Method, Erasmus University Rotterdam, The Netherlands, 13–15 June.
SocPhilPsych: 39th Meeting of the Society for Philosophy and Psychology, Brown University, Providence, RI, 13–15 June.
CMNA: 13th Workshop on Computational Models of Natural Argument, Rome, Italy, 14 June.
AALP: Annual Meeting of the Australasian Association for Logic, University of Melbourne, 15–16 June.
ICML: 30th International Conference on Machine Learning, Atlanta, 16–21 June.
TRoREC: The Reach of Radical Embodied or Enactive Cognition, University of Antwerp, 17–19 June.

DGL: Decisions, Games, & Logic, Stockholm, Sweden, 17–19 June.
LOGICA: Hejnice, Czech Republic, 17–21 June.
TAP: 7th International Conference on Tests and Proofs, Budapest, Hungary, 18–19 June.
GP@50: The Gettier Problem at 50, University of Edinburgh, 20–21 June.
ICFIE: 2nd International Conference on Fuzzy Information and Engineering, Kanyakumari, India, 22–23 June.
Frege@Striling: Frege's Epistemology of Basic Logical Laws, University of Stirling, 22–23 June.
ISF: 33rd International Symposium on Forecasting, Seoul, Korea, 23–26 June.
HDIA: High-Dimensional Inference with Applications, University of Kent, Canterbury, 24–25 June.
ALSP: Association for Legal and Social Philosophy Annual Conference, Stirling, 24–25 June.
CMFP: Constructive Mathematics Conference, Serbia, 24–28 June.
IFSA-NAFIPS: Joint conference of the International Fuzzy Systems Association and the North American Fuzzy Information Processing Society, Edmonton, Canad, 24–28 June.
LLM&SI: Logicality, Lexical Meaning and Semantic Invariance, Barcelona, 25 June.
CSR: 8th International Computer Science Symposium in Russia, Ekaterinburg, Russia, 25–29 June.
BW8: 8th Barcelona Workshop on Issues in the Theory of Reference, Barcelona, 26–28 June.
Cognitio: Montréal, Canada, 26–28 June.
Cognition: Ruhr-University-Bochum, 27–29 June.
Roles of Knowledge: University of Cambridge, 28–29 June.
Applied Philosophy: Society for Applied Philosophy Annual Conference, University of Zurich, 28–30 June.

July

Unconceived Alternatives and Scientific Realism: Durham University, 1–2 July.
LMiAP: 7th Latin Meeting in Analytic Philosophy, Institut Jean Nicod, Paris, 1–2 July.
CaEitS: Causality and Experimentation in the Sciences, Paris, 1–3 July.
CEPE: Ambiguous Technologies: Philosophical Issues, Practical Solutions, Human Nature, Lisbon, Portugal, 1–3 July.
SIROCCO: 20th International Colloquium on Structural Information and Communication Complexity, Ischia, Italy, 1–3 July.
Influences on the Aufbau: MCMP, Munich, 1–3 July.
CiE: The Nature of Computation, Milan, Italy, 1–5 July.
ISIPTA: 8th International Symposium on Imprecise Probability: Theories and Applications, Compiegne, France, 2–5 July.
IC-EpsMsO: 5th International Conference on Experiments/Process/System Modeling/Simulation/Optimization, Athens, Greece, 3–6 July.
YSM: Young Statisticians' Meeting, Imperial College London, 4–5 July.
Carnap on Logic: MCMP, Munich, 4–6 July.
ECSQARU: 12th European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty, Utrecht University, The Netherlands, 7–10 July.
AAP: Australasian Association of Philosophy Conference, University of Queensland, 7–12 July.
GDRR: 3rd Symposium on Games and Decisions in Reliability and Risk, County Cork, Ireland, 8–10 July.
CCA: Computability and Complexity in Analysis, Nancy, France, 8–10 July.
ICALP: 40th International Colloquium on Automata, Languages and Programming, Riga, Latvia, 8–12 July.
Scepticism: New Perspectives on External World Scepticism, MCMP, LMU Munich, 9–10 July.

What Can Category Theory Do For Philosophy?

University of Kent, Canterbury, 9–11 July

Gödel: From Logic to Cosmology, Aix-en-Provence, 11–13 July.
IUKM: 3rd International Symposium on Integrated Uncertainty in Knowledge Modelling and Decision Making, Beijing, China, 12–14 July.
AAAI: 27th AAAI Conference on Artificial Intelligence, Bellevue, Washington, USA, 14–18 July.
StaRAI: 3rd Workshop on Statistical Relational Artificial Intelligence, Bellevue, Washington, USA, 15 July.
ACSL: Workshop on Approaches to Causal Structure Learning, Bellevue, WA, USA, 15 July.
EetN: Formal Methods in Philosophy, Gdańsk, Poland, 15–17 July.
IACAP: Annual Meeting of the International Association for Computing and Philosophy, University of Maryland at College Park, 15–17 July.
PLS: 9th Panhellenic Logic Symposium, National Technical University of Athens, Greece, 15–19 July.
AI4FM: 4th International Workshop on the use of AI in Formal Methods, Rennes, France, 22 July.
DMIN: International Conference on Data Mining, Las Vegas, USA, 22–25 July.
LC2013: Logic Colloquium, Évora, Portugal, 22–27 July.
FoP: Foundations of Physics, LMU, Munich, 29–31 July.
Uncertainty Handling: Practical and Theoretical Concerns on Uncertainty Handling in AGI, Beijing, China, 31 July.
AGI: 6th Conference on Artificial General Intelligence, Beijing, China, 31 July–3 August.

August

AIBD: 1st Workshop on Artificial Intelligence for Big Data, Beijing, China, 3–4 August.
ITDAS: International Workshop on Information and Trust Dynamics in Artificial Societies, Beijing, China, 3–5 August.
WL4AI: Weighted Logics for AI workshop, Beijing, China, 3–5 August.
GKR: Graph Structures for Knowledge Representation and Reasoning, Beijing, China, 3–5 August.
NRAC: 10th International Workshop on Nonmonotonic Reasoning, Action and Change, Beijing, China, 3–5 August.
TAFA: 2nd International Workshop on Theory and Applications of Formal Argumentation, Beijing, China, 3–5 August.
IJCAI: 23rd International Joint Conference on Artificial Intelligence, Beijing, China, 3–9 August.
WCP: 23rd World Congress of Philosophy, Athens, Greece, 4–10 August.
BLAST: Chapman University, Southern California, 5–9 August.
KSEM: International Conference on Knowledge Science, Engineering and Management, Dalian, China, 10–12 August.

MLG: 11th Workshop on Mining and Learning with Graphs, Chicago, 11 August.
LMoGDM: Logical Models of Group Decision Making, Düsseldorf, Germany, 12–16 August.
WoLLIC: 20th Workshop on Logic, Language, Information and Computation, Darmstadt, Germany, 20–23 August.
Prior: Arthur Prior Centenary Conference, Oxford, 21–22 August.
RACR: 4th International Conference on Risk Analysis and Crisis Response, Istanbul, Turkey, 27–29 August.
EPSA: European Philosophy of Science Association, University of Helsinki, Finland, 28–31 August.
EoM: Epistemology of Modality, University of Lisbon, 29–31 August.

September

ICSCCW: 7th International Conference on Soft Computing, Computing with Words and Perceptions in System Analysis, Decision and Control, Izmir, Turkey, 2–3 September.
LSFA: 8th Workshop on Logical and Semantic Frameworks with Applications, Sao Paulo, Brazil, 2–3 September.
DiAL: Dialectic in Aristotle's Logic, Groningen, Netherlands, 2–4 September.
CSL: 22nd EACSL Annual Conference on Computer Science Logic, Turin, Italy, 2–5 September.
ECAL: 12th European Conference on Artificial Life, Taormina, Italy, 2–6 September.
ENPOSS: European Network for the Philosophy of the Social Sciences and the Philosophy of Social Science, University of Venice Ca' Foscari, 3–4 September.
Many-Val: Games, Decisions, and Rationality, Prague, Czech Republic, 4–6 September.
WPMSIIP: 6th Workshop on Principles and Methods of Statistical Inference with Interval Probability, Switzerland, 5–10 September.
MCU: Machines, Computations and Universality, University of Zurich, 9–12 September.
ITA: 5th International Conference on Internet Technologies and Applications, Glyndwr University, Wrexham, North Wales, UK, 10–13 September.
HAIS: 8th International Conference on Hybrid Artificial Intelligence Systems, Salamanca, Spain, 11–13 September.
SOCO: 8th International Conference on Soft Computing Models in Industrial and Environmental Applications, Salamanca, Spain, 11–13 September.
SEFA: Seventh Meeting of the Spanish Society for Analytic Philosophy, University Carlos III, Madrid, 11–14 September.
SOPhiA: Salzburg Conference for Young Analytic Philosophy, University of Salzburg, Austria, 12–14 September.
SMLC: Synthetic Modeling of Life and Cognition: Open Questions, Bergamo, 12–14 September.
AIGM: 3rd Workshop on Algorithmic issues for Inference in Graphical Models, Paris, 13 September.
CLIMA: 14th International Workshop on Computational Logic in Multi-Agent Systems, Corunna, Spain, 16–17 September.
SUM: 7th International Conference on Scalable Uncertainty Management, Washington DC, 16–18 September.
SIFA: Graduate Conference on Language, Logic and Mind, University of Cagliari, 16–18 September.
CLPS: International Conference on Logic and Philosophy of Science, University of Ghent, 16–18 September.
ASAI: Argentine Symposium on Artificial Intelligence, UNC, Córdoba Capital, Argentina, 16–20 September.
ALC: Asian Logic Conference, Guangzhou, 16–20 September.
KI: 36th Annual Conference on Artificial Intelligence, Koblenz, 16–20 September.
DKB: Dynamics of Knowledge and Belief, Koblenz, Germany, 16–20 September.

Progic

The sixth workshop on Combining Probability and Logic. Special focus: combining probability and logic to solve philosophical problems. Munich, 17–18 September

Mathematical Values: London, 17–19 September.
CAEPIA: 15th Conference of the Spanish Association for Artificial Intelligence, Madrid, Spain, 17–20 September.
IJCCI: 5th International Joint Conference on Computational Intelligence, Algarve, Portugal, 20–22 September.
FotFS: History and Philosophy of Infinity, Cambridge, UK, 20–23 September.
PT-AI: Philosophy and Theory of Artificial Intelligence, Oxford, 21–22 September.
MFCA: 4th MICCAI Workshop on Mathematical Foundations of Computational Anatomy, Nagoya, Japan, 22 September.
TbiLLC: 10th International Tbilisi Symposium on Language, Logic and Computation, Georgia, 23–27 September.
AIAI: 9th IFIP International Conference on Artificial Intelligence Applications and Innovations, Paphos, Cyprus, 30 September–2 October.

October

APMP: 2nd International Meeting of the Association for the Philosophy of Mathematical Practice, University of Illinois at Urbana-Champaign, USA, 3–4 October.
LORI: 4th International Workshop on Logic, Rationality and Interaction, Zhejiang University, Hangzhou, China, 9–12 October.
Investigating Semantics: Ruhr-University-Bochum, 10–12 October.
Experimental Philosophy: State University of New York, Buffalo, 11–12 October.

Inductive Logic and Confirmation in Science

University of Kent, Paris Campus, 17–18 October

IDA: 12th International Symposium on Intelligent Data Analysis, London, UK, 17–19 October.
FPMW: French PhilMath Workshop, Paris, France, 17–19 October.
ICPI: International Conference on Philosophy of Information, Xian, China, 18–21 October.
LENLS: Logic and Engineering of Natural Language Semantics, Kanagawa, Japan, 27–28 October.
HaPoC: 2nd International Conference on the History and Philosophy of Computing, Paris, France, 28–31 October.

November

CHPS: 29th Boulder Conference on the History and Philosophy of Science, University of Colorado at Boulder, 1–3 November.
Madrid IV: Inferentialism in Epistemology and Philosophy of Science, Madrid, 11–13 November.

Reduction and Emergence: Reduction and Emergence in the Sciences, LMU Munich, 14–16 November.
Philosophy of Medicine Roundtable: Columbia University, New York, 20–21 November.
SCAI: 12th Scandinavian Conference on Artificial Intelligence, Aalborg, Denmark, 20–22 November.

Courses and Programmes

Courses

RISS-WOW: 2nd Robotic International Summer-School, Robots as Intelligent Systems Working in the Outer World, CAAS, Dubrovnik, Croatia, 17–22 June.
ACAI Summer School 2013: Computational Models of Argument, King's College London, UK, 1–5 July.
EASSS: 15th European Agent Systems Summer School, Kings College London, 1–5 July.
ESSLLI: 25th European Summer School in Logic, Language and Information, Heinrich Heine University in Düsseldorf, Germany, 5–16 August.
MLSS: The Machine Learning Summer School, Max Planck Institute for Intelligent Systems, Tübingen, Germany, 26 August–6 September.
EthicSchool: Virtual Summerschool on Ethics of Emerging Technologies, 9–13 September.

Programmes

APhil: MA/PhD in Analytic Philosophy, University of Barcelona.
Doctoral Programme in Philosophy: Language, Mind and Practice, Department of Philosophy, University of Zurich, Switzerland.
HPSM: MA in the History and Philosophy of Science and Medicine, Durham University.
Master Programme: in Statistics, University College Dublin.
LoPhiSC: Master in Logic, Philosophy of Science & Epistemology, Pantheon-Sorbonne University (Paris 1) and Paris-Sorbonne University (Paris 4).
Master Programme: in Artificial Intelligence, Radboud University Nijmegen, the Netherlands.
Master Programme: Philosophy and Economics, Institute of Philosophy, University of Bayreuth.
Master Programme: Philosophy of Science, Technology and Society, Enschede, the Netherlands.
MA in Cognitive Science: School of Politics, International Studies and Philosophy, Queen's University Belfast.
MA in Logic and the Philosophy of Mathematics: Department of Philosophy, University of Bristol.
MA Programmes: in Philosophy of Science, University of Leeds.
MA in Logic and Philosophy of Science: Faculty of Philosophy, Philosophy of Science and Study of Religion, LMU Munich.
MA in Logic and Theory of Science: Department of Logic of the Eotvos Lorand University, Budapest, Hungary.
MA in Metaphysics, Language, and Mind: Department of Philosophy, University of Liverpool.
MA in Mind, Brain and Learning: Westminster Institute of Education, Oxford Brookes University.
MA in Philosophy: by research, Tilburg University.
MA in Philosophy of Biological and Cognitive Sciences: Department of Philosophy, University of Bristol.
MA in Rhetoric: School of Journalism, Media and Communication, University of Central Lancashire.
MA programmes: in Philosophy of Language and Linguistics, and Philosophy of Mind and Psychology, University of Birmingham.
MRes in Cognitive Science and Humanities: Language, Communication and Organization: Institute for Logic, Cognition, Language, and Information, University of the Basque Country, Donostia, San Sebastian.
MRes in Methods and Practices of Philosophical Research: Northern Institute of Philosophy, University of Aberdeen.
MSc in Applied Statistics: Department of Economics, Mathematics and Statistics, Birkbeck, University of London.
MSc in Applied Statistics and Datamining: School of Mathematics and Statistics, University of St Andrews.
MSc in Artificial Intelligence: Faculty of Engineering, University of Leeds.

MSc in Cognitive & Decision Sciences: Psychology, University College London.
MSc in Cognitive Science: University of Osnabrück, Germany.
MSc in Cognitive Psychology/Neuropsychology: School of Psychology, University of Kent.
MSc in Logic: Institute for Logic, Language and Computation, University of Amsterdam.
MSc in Mathematical Logic and the Theory of Computation: Mathematics, University of Manchester.
MSc in Mind, Language & Embodied Cognition: School of Philosophy, Psychology and Language Sciences, University of Edinburgh.
MSc in Philosophy of Science, Technology and Society: University of Twente, The Netherlands.
MRes in Cognitive Science and Humanities: Language, Communication and Organization: Institute for Logic, Cognition, Language, and Information, University of the Basque Country (Donostia San Sebastián).
Open Mind: International School of Advanced Studies in Cognitive Sciences, University of Bucharest.
PhD School: in Statistics, Padua University.

Jobs and Studentships

Jobs

Post-doc Position: in Set Theory, Torino University, until filled.
Assistant Professor: in Logic or Analysis, Department of Mathematics, University of Connecticut, until filled.
Post-doc Position: in Artificial Intelligence, Institute for Artificial Intelligence, University of Georgia, until filled.
Professor: in Theoretical Philosophy, AOS: Logic, Stockholm University, Sweden, deadline 11 June.
Post-doc Positions: in Philosophy of Language / Neurolinguistics / Neurosemantics, Ruhr University Bochum, deadline 15 June.

PROFESSOR: in Theoretical Philosophy, University of Vienna, deadline 21 June.
POST-DOC POSITION: in Philosophy of Science, University of Johannesburg, deadline 15 July.

Studentships

PHD POSITION: on project "Non-Classical Foundations of Mathematics," Department of Mathematics and Statistics, University of Canterbury, New Zealand, until filled.
PHD POSITION: on the project "Models of Paradox," Philosophy, University of Otago, until filled.
PHD POSITION: on "Managing Severe Uncertainty" project, Department of Philosophy, Logic and Scientific Method at the London School of Economics and Political Science, deadline 15 June.
PHD POSITION: in Philosophy of Language / Neurolinguistics / Neurosemantics, Ruhr University Bochum, deadline 15 June.