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CONTENTS

- §1 Editorial
- §2 Features
- §3 News
- §4 Introducing ...
- §5 Events
- §6 Courses and Programmes
- §7 Jobs and Studentships

§1 EDITORIAL

It is with great pleasure that I return as guest-editor of

The Reasoner; my thanks to Jon Williamson and Federica Russo for the invitation. Dr. Xia Jiang kindly agreed to be this months' interviewee. After completing her doctorate in Biomedical Informatics at the University of Pittsburgh, Dr. Jiang was appointed Postdoctoral Scholar in that Department, where her research continues to thrive.



Dr. Jiang's work was brought to my notice when she kindly contributed a chapter to an edited volume I was working on. The clarity she brought to this work 'A Tutorial on Learning Causal Influences' (in Holmes, D. and L. Jain (Eds.): *Innovations in Machine Learning*, Springer-Verlag, NY, 2006), continues to be evident in her subsequent publications, thus making Xia a particularly suitable candidate for *The Reasoner* interview.

Dr. Jiang's research areas are listed as Bayesian networks, machine learning, bio-surveillance and bioinformatics, her focus being largely on Bayesian networks and their application. In a [recent paper](#), for example, Dr. Jiang and her colleagues developed a Bayesian network model for real-time estimation of an epidemic curve. Most recently, her [work](#) has culminated in the development of a new Bayesian-network-based spatial scan statistic, called BNetScan, which models the relationships among the events of interest and the observable events using a Bayesian network.

I am delighted to introduce Dr. Xia Jiang.

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

§2 FEATURES

Interview with Xia Jiang

Dr. [Xia Jiang](#) is a Postdoctoral Scholar in the Department of Biomedical Informatics at the University of Pittsburgh. Her current research is focused on the applications of Bayesian networks, and machine learning in biomedical informatics. She has published extensively, both on her own and with other distinguished scholars in her area.

Dawn Holmes: Would you like to tell us about your background?

Xia Jiang: I am currently a first year National Library of Medicine funded Postdoctoral scholar in the Department of Biomedical Informatics at the University of Pittsburgh. In December 2008, I received a Ph.D. in biomedical informatics from the Department of Biomedical Informatics (DBMI), University of Pittsburgh School of Medicine. Under the direction of Gregory F. Cooper, M.D.,Ph.D., I completed my doctoral dissertation "A Bayesian Network Model for Spatio-Temporal Event Surveillance."



DH: When was your interest in mathematics and computing first aroused?

XJ: I became interested in mathematics and computing when I studied for my master's degree in mechanical engineering at Rose-Hulman Institute of Technology in 1995. While doing my thesis research titled "The Evaluation of Stress Concentration Factors in Flat Plates", which involves the applications of both mathematical methods and computer technologies, I realized the importance of a combination of the two and its application to various domains of research.

DH: How did you first get into Bayesian networks as an area of research?

XJ: I started my research in Bayesian networks in 1999 while I was completing my master's degree in computer science with Richard Neapolitan (Dr. Neapolitan wrote his first book *Probabilistic Reasoning in Expert Systems: Theory and Algorithms* back in 1989, which was one of the earliest books on Bayesian networks). The title of my research project was "Learning Causal Influences from Data on Two Variables."

DH: Can you tell us something about your other research interests?

XJ: As a Ph.D. student in biomedical informatics, my area of concentration fell in the scope of clinical informatics, in particular, clinical decision support. It also overlapped greatly with the domain of public health informatics. I focused on probabilistic decision support and its application to the field of biosurveillance. Due to this focus, my research activities included but were not limited to algorithm design, Bayesian modeling, Bayesian inference, research in anomaly detection, ontology, natural language processing, data analysis, simulation, statistical analysis, and system evaluation.

As a postdoctoral scholar, I have shifted my research direction more towards translational informatics that overlaps with both clinical informatics and bioinformatics. Traditional medical or clinical informatics focuses on improving patient care through using computer-aided programs or technologies, such as electronic medical records (EMR), computer physician order entry (CPOE), human-computer interaction (HCI), natural language processing (NLP), and computer-aided decision support, while traditional bioinformatics focuses on applying computational methods to the field of molecular biology without further connecting the results to medical care. Therefore, my current research can well be categorized as translational research, which bridges traditional clinical informatics and bioinformatics.

DH: Do you support a particular philosophy of mathematics?

XJ: I am an applied mathematician, and I don't really philosophize all that much about mathematics or science. However, I behave somewhat as if I am a logical positivist in that my search for truth concerns creating mathematical models of reality and empirically testing them.

DH: What is the long term plan for your research? Is your area of research growing?

XJ: The long term plan for my research will continue to be applying my expertise in artificial Intelligence, machine learning, and algorithm design to improve the science, technologies, and outcomes in health sciences research and clinical practice. More specifically, I will continue to focus on translational research, especially in the cancer domain. I believe my area of research will grow very fast in the next ten years because first, it is a relative new area, and second, there are still so many unknowns in our understanding of cancer at the biological level.

DH: Through your research and textbook authorship, you are an educator and a communicator. What teaching opportunities do you particularly value?

XJ: I worked for three years as an instructor in the Department of Computer Science at Northeastern Illinois University. I taught both undergraduate and graduate courses including algorithm design and analysis of algorithms. Teaching these courses not only broadened but also deepened my knowledge in this area. This experience both directly and indirectly helped me complete my Ph.D. study in biomedical informatics in a timely manner.

DH: Statistics and probability graduate students rarely get the opportunity to study logic and philosophy; do you think it is important that they should?

XJ: Yes, definitely. One good reason is logic and philosophy hone graduate students' ability to think clearly.

DH: Are there any particular courses that you would recommend to statistics, computing and probability graduate students starting out today?

XJ: I would like to recommend the following courses: Bayesian Network and Bayesian Network Learning; Computer Aided Probabilistic Decision Making; Design and Analysis of Algorithms; Artificial Intelligence; Machine Learning; Biostatistics.

DH: Finally, in your view, what is an important open problem in Bayesian networks?

XJ: In my view, it is an important open problem to identify a good Bayesian scoring criterion for learning Bayesian networks. Through my research, I found that the performances of the different Bayesian network scoring criteria seem to be largely determined by the amount of the DAG [directed acyclic graph] penalty assigned by these scores. However, the proper amount of DAG penalty and the theory behind it still largely remain unknown to us. Furthermore, I have obtained recent results showing that we can get quite disparate results using the Bayesian scoring criterion even when all models have the same size (which means the DAG penalty is irrelevant).

DH: Thank you.

[TEMPUS DICTUM](#)

Technological Aids to Cognition <http://tempusdictum.com>

Two envelopes, two paradoxes

Much of the discussion of the famous [Two Envelopes Problem](#) has revolved around the question of how arbitrary the amounts in the two envelopes could have been, usually with one amount being twice the other (for references see the Wikipedia page linked to above). But that question is, I think, better addressed by a lesser known paradox. To begin with a simple Two Envelopes scenario, Mr. E. writes out cheques for £12 and £18, puts them into envelopes and asks his friend Miss Take to take one. Miss Take does so and finds herself £12 richer, whereupon Mr. E. tells her that one of the envelopes contained 50% more than the other and offers her the chance to exchange envelopes.

Miss Take works out that either the other envelope contains £12 + £6 = £18, or else it contains £8, since £8 + £4 = £12, and hence that by swapping she would either gain £6 or lose £4. She has no idea which envelope has the larger amount, and so she also

knows that she is as likely to lose as she is to gain from swapping. But being 50% likely to gain £6 and 50% likely to lose £4, her mathematical expectation from swapping is a gain of £1 (50% of £6 minus 50% of £4). So Miss Take decides to swap; but although she feels rather justified when she ends up with £18, she actually had no good reason to swap. Had she picked the other envelope to start with, her mathematical expectation would have been even greater (50% of £9 minus 50% of £6).

It is puzzling that she seemed to have a reason to swap, but in order to focus on that puzzle note that, while the original two wallets of M. Kraitchik (1953, *La mathématique des jeux*, Editions techniques et scientifiques) each contained an arbitrary amount of money, our puzzle is quite independent of how Mr. E. happened to think of the amounts £18 and £12. Maybe he was listening to Tchaikovsky's *1812*, or maybe it was the 18th of December. Our puzzle followed from Miss Take not knowing which envelope contained the most, nor what exactly both amounts were (although they were obviously less than a million). Now, to help us uncover Miss Take's mistake, Mr. E. kindly offers an identical pair of envelopes to his colleague Miss Tree, who also picks the one containing £12. But this time, when he offers her the chance to exchange envelopes, he tells her that the square of a third of the larger amount is twelve plus twice the smaller amount, in £.

Miss Tree works out that either the other amount is £18 (since 6 is a third of 18, and 6 squared is twelve plus twice 12), or else it is £2 (since 4 is a third of 12, and 4 squared is twelve plus twice 2), so that by swapping she would either gain £6 or lose £10. And since she considers a gain to be as likely as a loss, her mathematical expectation is a loss of £2. Nevertheless Miss Tree resists the intuitive force of that expectation—and so ends up with £18—because she knows that, since only one disjunct of any true disjunction has to be true, so Mr. E. could, by telling her *something* true about how the two amounts are related, have had her calculating almost any mathematical expectation. Her wariness when reasoning from disjunctions comes from having read P. N. Johnson-Laird (2008, 'How We Reason: A View from Psychology', *The Reasoner* 2(3), pp. 4–5).

So, the question of how arbitrary natural numbers can be would therefore be more clearly addressed by a paradox such as that attributed to P. Lévy by F. P. Cantelli (1935, 'Considérations sur la Convergence dans le Calcul des Probabilités', *Annals de l'Institut Henri Poincaré* 5, pp. 1–50). Let the selection of a number of some kind be *completely* arbitrary when any number of that kind might be selected, with none being more likely to be selected than any other. And suppose a god, Mystery, so selects two natural numbers, writes for each a note promising the bearer that many days in paradise, folds the notes into envelopes and asks Mr. E. to take one.

Mr. E. works out that whichever envelope he picks, the other will almost certainly have been the better choice. That is because given any natural number (the days in the note), there are only finitely many natural numbers that are smaller than it, and infinitely many—and hence more than a million times as many—equally likely numbers that are larger. Of course, it is absurd that the chance of *each* envelope being the better choice should be less than one in a million (if anything, it should be a half), and so it seems that such completely arbitrary selections are impossible.

Unsurprisingly there is no uniform *probability* distribution over the natural numbers. But there is one over the real interval [0, 1]—the unit square (with areas corresponding to probabilities)—and so, letting a *Real* be a real number between 0 and 1 whose selec-

tion was completely arbitrary, one wonders whether *Reals* are plausible. Any radioactive particle has a half-life, a period of time such that its chance of decaying in that time is exactly 50%, and so an endless sequence of such particles, each followed by such a period, could well give us a *Real* in binary notation—e.g. decays correspond to 1s, non-decays to 0s—if we ignore sequences with finitely many decays (since those with finitely many non-decays correspond to identical numbers), and if the particles are sufficiently independent (e.g. well spaced out). And such quantities of particles would plausibly exist were space infinite, or if other universes exist alongside ours (in a multiverse), or if the future is endless.

Mystery might know many endless lists of different real numbers, however, and so he might decide that if two *Reals* happened to be on the same list then he would use their natural numbered positions on that list to present Mr. E. with his two envelopes, rather paradoxically. (For resolutions see the blog post <http://enigmatically.blogspot.com/2010/03/resolving-levys-paradox.html>).

Martin Cooke

§3 NEWS

Modelling Interaction, Dialog, Social Choice, and Vagueness, 26–28 March

The EUROCORES programme “[LogICCC - Modelling Intelligent Interaction](#)” is a European Science Foundation (ESF) collaborative programme which aims to investigate the mathematical foundations of interaction of intelligent agents. The aim is to advance logical models of communication, cognition and computation. The programme is based on a number of different projects. Members of a number of these projects participated in a workshop “[Modelling Interaction, Dialog, Social Choice, and Vagueness \(MIDiSoVa\)](#)” at the Institute for Logic, Language and Computation of the University of Amsterdam on 26–28 March 2010. The workshop was organized by Jouko A. Väänänen with the assistance of Pietro Galliani. The participating projects in the workshop were:

- [CFCS \(Computational Foundations of Social Choice\)](#) aims at understanding algorithmic and complexity issues in social choice and use concepts and paradigms from social choice theory in artificial intelligence.
- [DiFoS \(Dialogical Foundations of Semantics\)](#) aims at advancing Lorenzen’s dialogical logic with applications in multiagent interaction.
- [LINT \(Logic for Interaction\)](#) aims at developing logical foundations for interaction in complex scenarios like conversation, teamwork, or games.
- [VAAG \(Vagueness, Approximation and Granularity\)](#) examines the topic of vagueness in general cognitive science, linguistic semantics, experimental psychology,

formal pragmatics and computer science.

All the projects have a common theme of interaction of intelligent agents with varying techniques and contributions from researchers. The foci and perspectives include mathematical logic, artificial intelligence, formal methods, algorithms and complexity, game theory, cognitive science and linguistics.

The workshop consisted of a [series of talks](#) and discussions spanning three days with plenty of opportunities of interaction between the different project members. Four established external experts were also invited to the workshop: Samson Abramsky (theoretical computer science), Wilfrid Hodges (mathematical logic), Ewan Klein (computational semantics) and Jean-François Laslier (social choice theory).

The workshop was kick-started by Eva Hoogland, Eurocores coordinator for the cognitive sciences who presented an outline aims of the ESF in general and the aims of LogICCC and MIDISoVa in particular. Wilfrid Hodges gave a high level talk on paradigms for logical games. Sara Uckelman then shed more light on dialogical properties of obligations, a system of argumentation/disputation dating back to the medieval times. Claudia Lindner presented new results concerning cake cutting protocols which minimize envy. Peter Gardenfors brought a cognitive science perspective to the proceedings and discussed why language has to be vague.

On the second day of the workshop, various logical and vagueness aspects of multiagent interaction were discussed. Stephanie Solt, a linguist, shed light on the phenomena of vagueness when humans describe quantities. Robert van Rooij presented a more formal perspective to modeling vagueness and discussed fundamental issues in being tolerant about vagueness. Thomas Piecha presented a dialogue calculus with bearing on reasoning about complex definitions. This was followed by a joint presentation Denis Bonnay and Paul Egré. They discussed logical paradoxes about vagueness and their proposals to resolve them. Samson Abramsky discussed the Brandenburger-Keisler paradox - an interactive version of Russell's paradox. Pietro Galliani followed by introducing dynamic dependence logic. Dietmar Berwanger examined the promise and limitations of a game theory approach to the design of complex systems where constituent parts may not be in complete conflict. He was dismissive of the potential of research on 'price of anarchy' in such complex systems. Luca Tranchini, who gave the last talk of the second day, discussed truth, proofs and dialogues.

The final day was focused on the social choice theory perspective on multiagent interaction. Jean-François Laslier presented a survey from approval voting both from a theoretical and experimental aspect. The survey summarized findings from an upcoming handbook on approval voting which he was editing. Remzi Sanver, another renowned social choice theorist, then revisited approval voting within an extended model which incorporates elements of interpersonal comparability. Reshef Meir discussed plurality voting where players may have an incentive to misreport their preferences. He considered plurality voting from a normal game perspective where strategic behaviour may converge.

The MIDiSoVa provided a common ground for discussions on different perspectives on intelligent interaction. In that respect, it was a laudable effort.

Haris Aziz
Department of Informatics, Ludwig-Maximilians-University Munich

Mathematical Practice and Cognition, 29–30 March

The Symposium on Mathematical Practice and Cognition, organised by Alison Pease, Alan Smaill and Markus Guhe from the University of Edinburgh, took place on 29th – 30th March, 2010, the first and second day of the 36th annual convention of the Society for the Study of Artificial Intelligence and Simulation of Behaviour, at De Montfort University, Leicester. It brought together researchers from a range of different disciplines, including mathematicians, philosophers of mathematical practice, cognitive scientists, psychologists, educationalists and AI researchers, all investigating the question of how people do mathematics. Speakers were from the UK, USA, Canada, Germany, France, Belgium, The Netherlands, Norway and Lebanon.

Invited speaker Alexandre Borovik opened the symposium with the question “if intelligent beings other than humans developed mathematics, would their mathematics be different from ours?” This set the tone for a symposium which, amongst other topics, would revolve around the role of body and situatedness in mathematics. Aaron Sloman continued with a discussion on the origin of mathematical abilities and concepts, emphasising the need for more work in the intersection of mathematical cognition, artificial intelligence and robotics. The day proceeded with talks on diagrammatic proof checking (John Mumma), automatic processing of language in mathematical literature (Merlin Carl) and fitting mathematical discovery into a general reasoning framework based on global workspaces (John Charnley), before we moved on to talks related to the topic of embodied mathematics; the role of gestures in the production of mathematical proof (Tyler Marghetis), historical accounts of the role of the body in Renaissance arithmetic (Albrecht Heeffer) and the origins of spatial-numerical bias in humans (Martin Fischer). Valeria Giardino discussed the relationship between the use of diagrams and mathematical understanding, before Dirk Schlimm talked about the different ways axioms can enter mathematical theories. Invited speaker Brendan Larvor finished the first day with a talk on the application of argumentation theory to mathematics, discussing mathematical fields in light of this, with reference to the work of Toulmin on argumentation. The workshop dinner, held at a nearby Brazilian restaurant, brought a spirited close to the first day.

Ivor Grattan-Guinness, the third invited speaker, opened the second day with a talk about generality in mathematics, and different forms that it can take in mathematics and logics, and discussed the relationships of general theories to their predecessors and competitors. Benedikt Loewe spoke next about skills and mathematical knowledge, linking the Dreyfus-Dreyfus model of skills with a context-sensitive definition of mathematical knowledge. A series of talks related to psychological findings of relevance for mathematical cognition followed, such as one on measuring cognitive workload in analogical

reasoning tasks (Elke van der Meer), experimental findings on a spatial-musical bias — discussed in relation to the spatial-numerical bias from the day before (Martin Fischer), and a study of differences in numerical processing between literate and illiterate Arabic speakers (Samar Zebian). In an informal session of rapid-fire talks, Corinna Jones presented her PhD project on a cognitive model of students' different understanding of natural and decimal numbers, and Thomas Joyce and Alexander Svanevik presented their MSc projects on embodied mathematics. After lunch Benedikt Loewe gave a talk on peer review in mathematical practice, and Andrew Aberdein closed the talk sessions with an invited talk on the rationale of the mathematical joke, with references to argumentation theory and examples of informal reasoning in mathematics. The workshop closed with a lively discussion, chaired by Aaron Sloman with panelists Alexandre Borovik, Brendan Larvor, Ivor Grattan-Guinness and Andrew Aberdein, on the value, and likely success or failure, of a project to develop a baby robot capable of mathematical thought; distinguishing features of mathematical knowledge; different types of mathematical knowledge; and the importance, and difficulties, of finding a common language for researchers from different fields.

Some slides and further details can be found [here](#).

Alexander Karl Svanevik

School of Informatics, University of Edinburgh

Alison Pease

School of Informatics, University of Edinburgh

Scientific Philosophy: Past and Future, 13 April

A daylong [workshop](#) on the topic of *Scientific Philosophy: Past and Future* was held at Tilburg University. This workshop was organized for the purpose of investigating the relationship between philosophy and science and in order to explore possible ways in which philosophy might benefit from becoming, in various senses, more scientific.

Stephan Hartmann and Jan Sprenger (who organized this workshop along with Hannes Leitgeb) gave the most general talk of the day exploring the questions of the workshop directly. They offered a list of scientific philosophy's key commitments, which included commitments to progress in philosophy, clarity in philosophical theories and argumentation, and the application of mathematical and experimental methods to philosophical questions. They suggested a research method for scientific philosophy including the following three stages: 1. Conceptual analysis (in a preliminary clarifying role); 2. Mathematical modeling (giving structure and clarity to the analysis); and 3. Experimentation (to assess the descriptive-empirical adequacy of the model). Hartmann and Sprenger asserted that this approach deserves more attention and that it potentially provides us a more useful and relevant philosophy of our world.

A number of talks shared work within philosophy that has been advanced via scientific methods and insight. To this end, Hannes Leitgeb presented an overview of work on the pragmatic meaning of conditionals. He argued that the use of mathematical methods

in the service of philosophy was necessary for genuine advances on this topic. Christopher Hitchcock's talk aimed to show that metaphysical questions (e.g., is the time at which an event occurs an essential property of that event?) may receive answers when one makes use of formal modeling techniques. More specifically, Hitchcock argued this point by showing that the answers to such questions often fall out of the most accurate structural equation model of a particular causal scenario. Jörg Tremmel's presentation revealed one way in which knowledge gleaned directly from science could be applicable in philosophical debate. In particular, Tremmel claimed that Parfit's "repugnant conclusion" argument within philosophical ethics is manifestly misguided in the light of recent empirical studies on welfare from the social sciences.

As the title of the workshop suggests, the focus was not purely on current work in, and the future prospects of, scientific philosophy. Three speakers (Michael Friedman, Thomas Uebel, and Michael Stoeltzner) also explored scientific approaches taken in the history of 20th century philosophy - focusing in on such thinkers as Neurath, Einstein, Helmholtz, Schlick, and especially Carnap. One moral to this history was echoed throughout these talks: philosophers desiring to motivate a new science-focused sub discipline and / or scientific methodology within philosophy must be cautious not to lose sight of the relevance of their questions to science itself.

The workshop ended with a lively round-table discussion in which the questions of the workshop were raised once more. Leitgeb suggested three alternatives for the defining claim of scientific philosophy: 1. Philosophy is just a branch of science; 2. Philosophy should only be done in the service of science; and 3. Genuine philosophical problems may be approached and sometimes advanced in a scientific spirit. Some of those present took issue with this categorization, and there were differing opinions also on which of the three claims best represents scientific philosophy. However, in the end, the prevailing opinion seemed to be that scientific philosophy, in the third sense, ought to be pursued energetically, if with caution.

Jonah N. Schupbach
Dept. of HPS, University of Pittsburgh

The Future of Philosophy of Science, 14–16 April

A [conference](#) on the future of the philosophy of science was held over three days at Tilburg University. Stephan Hartmann (Tilburg) - who organized the conference along with Mark Colyvan (Sydney), Paul Griffiths (Sydney), and Jan Sprenger (Tilburg) - gave the welcome address where he outlined the conference's central goal. Hartmann noted the following recent trends, among others, within the philosophy of science: 1. A shift in focus back toward classic, general questions; 2. An increased use of scientific methods to pursue answers to philosophical questions; and 3. New connections being made between philosophical sub-disciplines. This conference aimed to explore, and exemplify work within, each of these three recent trends.

A focus on general issues in the philosophy of science (the first trend described above) was clear in several talks, including Jan-Willem Romeijn's. Romeijn discussed

the use of causal models in the general philosophy of experimentation. After revealing how such models “elucidate the intuition that observations during intervention are more informative than observations per se”, Romeijn offered several reasons for practicing caution when using causal models to study experimentation. Stephan Hartmann’s work (with Foad Dizadji-Bahmani and Roman Frigg) also had to do with classic, general issues. Hartmann represented Nagelian reduction in a Bayesian model in order to draw some conclusions about the confirmatory power of such reduction.

Many talks during the conference also exemplified the second trend above. Chiara Lisciandra and Ryan Muldoon co-presented their work on the emergence of social and descriptive norms in society. They used a particular mathematical model and computer simulations on that model in order to investigate whether two particular features of society are explanatory of the rise of such norms. In the same vein, Vincenzo Crupi summarized much of his recent work (with Katya Tentori) combining mathematical and experimental methods in order to analyze the notion of confirmation. Among other things, this work shows that probabilistic analyses of confirmation are useful both in describing people’s actual shifts in confidence (in the light of new evidence) and also in accounting for classic fallacies in human reasoning (e.g., the conjunction fallacy).

Hannes Leitgeb’s keynote talk constituted a nice example of work within the third recent trend. Leitgeb offered a representation theorem from the concept of belief simpliciter (from mainstream epistemology) to that of *degrees* of belief (from Bayesianism). Such a theorem manifestly provides a new connection between mainstream and formal epistemology and thus allows for a new level of fruitful interaction between these sub-disciplines. With respect to this same third trend, Mark Colyvan gave a presentation intended to show that the philosophy of science and the philosophy of mathematics have much to offer each other. Colyvan argued for this by providing concrete examples of how this is true from current work in these respective disciplines.

A large and energetic round-table discussion took place near the end of the conference explicitly on the future of the discipline of philosophy of science. Questions discussed included the following: 1. Should there be a general move back to focusing on general and foundational questions of science?; 2. What role should HOPOS [history of philosophy of science] have in the philosophy of science today?; and 3. Should philosophers of science have a higher appreciation for issues that have direct bearing on the sciences?

Jonah N. Schupbach
Dept. of HPS, University of Pittsburgh

Calls for Papers

ADVANCES AND PERSPECTIVES IN THE MECHANIZATION OF MATHEMATICS: special issue of *Mathematical Structures in Computer Science*, deadline 28 June.

FINAL CAUSES AND TELEOLOGICAL EXPLANATIONS: special issue of *Logical Analysis and History of Philosophy*, deadline 30th June.

JOINT ACTION: WHAT IS SHARED?: special issue of the *Review of Philosophy and Psychology*.

ogy, deadline 15 August.

BIOLOGICAL AND ECONOMIC MODELLING: special issue of *Biology and Philosophy*, deadline 31 August.

LOGIC AND NATURAL LANGUAGE: special issue of *Studia Logica*, deadline 3 September.

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

AILACT ESSAY PRIZE: in Informal Logic / Critical Thinking / Argumentation Theory, with publication on *Informal Logic*, deadline 31 October.

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

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

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

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.

§4

INTRODUCING . . .

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

Lewis Carroll

Pen name of Charles L. Dodgson (1832–1898). British logician better known for his widely quoted "Alice" tales. He published *The Game of Logic* (1886) and *Symbolic Logic: Part I* (1896). Fragments of *Part 2* appeared in 1977. He invented rectilinear diagrams for solving syllogisms and pioneered the use of trees to test the validity of sorites. He is best remembered for two papers in the journal *Mind*: "A logical paradox" (1894) and "What the Tortoise said to Achilles" (1895). The latter is often considered as the best exposition of the difference between a premise and a rule of inference.

Amirouche Moktefi

IRIST, Université de Strasbourg & LHSP Archives H. Poincaré, Nancy-Université

***Principia Mathematica*, A. N. Whitehead and B. Russell**

One of the most important intellectual achievements of the last century, the *Principia* is an epic attempt to demonstrate that logic underlies mathematics. The work is at least as important for its symbolic value as its actual content: it is a monument of logic.

Frege argued for logicism: the thesis that mathematical truth is reducible to logical truth. Early in his career, Russell came to agree with Frege, and wrote *The Principles of Mathematics* in 1905, which argued for logicism in informal prose. Alfred North Whitehead had reached similar conclusions and at the same time. To vindicate the logicist programme, though, someone would eventually need to do the hard work of starting from primitive logical assumptions, and reasoning step by step with no gaps up to the basic theorems of set theory, arithmetic, analysis (calculus) and geometry. Between 1910 and 1913, Russell and Whitehead produced the *Principia*, which purports to do just that.

Frege himself had attempted such a feat in his own “concept notation,” but the system turned out, quite surprisingly, to be trivial—in it one could have proved anything at all. The *Principia*, therefore, was preoccupied with avoiding the paradoxes of Frege’s system, and to this end in a long but accessible introduction, Russell explains his solutions: the vicious circle principle (VCP) and type theory. The VCP says that “whatever involves all of a collection must not be one of that collection.” This bans, among other things, any kind of self-reference. The theory of types is a technical structure to support mathematics built to the specifications of the VCP.

Because the theory of types is a complex and demanding system, it has not been widely adopted. The main body of the *Principia*, too, is an uncompromising procession of logical formulae, unusual at the time and still today requiring patience to read. A proof that $1 + 1 = 2$ does not appear until several hundred pages into the first volume. Above all, the *Principia* fell short of its goals, because a few non-logical assumptions—the axioms of infinity and reducibility—were required for the proofs, and most doubt that these are parts of pure logic. So the complete reduction of mathematics to logic faltered.

In the end, Whitehead and Russell contributed their own money to publish the three volumes of *Principia*. Russell wrote of having bad dreams in which the books lay, dusty and unread, on forgotten library shelves, and spoke afterward of the irreparable mental toll its writing had exacted on him.

Nevertheless, the *Principia* was epochal, the meticulous proofs an inspiration and confirmation that informal mathematical practice could, if we wanted, be exactly translated into formal symbolism and carried out with absolute precision. The book made an indelible impression on philosophers such as Wittgenstein and Quine. And perhaps most importantly, the *Principia* was the system in which Gödel carried out his 1931 incompleteness proofs. For a most important era, the *Principia* was exactly what Russell

and Whitehead hoped it would be—a tangible, logical foundation for mathematics.

Zach Weber

Sydney Centre for the Foundations of Science & School of Philosophy and Social Inquiry, Melbourne

§5 EVENTS

MAY

PHILOSOPHY OF PSYCHOLOGY: BEYOND CARTESIANISM?: University of Southern Denmark, Odense, 3–4 May.

EXTERNALISM CHALLENGED? EXTERNALISM VS. INTERNALISM TODAY: Stockholm University, 4–5 May.

GRADUATE STUDENT LOGIC CONFERENCE: CUNY Graduate Center, New York, USA, 7–8 May.

THOUGHT AND LANGUAGE: University of Cincinnati, 7–8 May.

VAGUENESS AND SIMILARITY: Ecole Normale Supérieure, Paris, 7–8 May.

MODELS AND SIMULATIONS: University of Toronto, 7–9 May.

REASON TODAY. FROM DIFFERENTIATION TO UNITY: Babes-Bolyai University, Cluj-Napoca, Romania, 7–9 May.

KR: 12th International Conference on the Principles of Knowledge Representation and Reasoning, Toronto, Canada, 9–13 May.

AAMAS: 9th International Conference on Agents and Multi Agent Systems, Toronto, Canada, 10–14 May.

WARWICK TRANSCENDENTAL REALISM WORKSHOP: University of Warwick, 11 May.

FORMAL EPISTEMOLOGY FESTIVAL: Learning From Experience & Defeasible Reasoning, University of Toronto, 11–13 May.

FOIS: Toronto, Canada, 11–14 May.

AISTATS: 13th International Conference on Artificial Intelligence and Statistics, Chia Laguna, Sardinia, Italy, 13–15 May.

LOGIC IN COGNITIVE SCIENCE: Torun, Poland, 13–15 May.

THE MENTAL AS FUNDAMENTAL. PANPSYCHISM AND THE HARD PROBLEM OF CONSCIOUSNESS: Departement of Philosophy, University of Vienna, 14 May.

DEGREES OF BELIEF VS BELIEF: University of Stirling, 14–15 May.

PSF: Philosophy of Science in a Forest, Internationale School voor Wijsbegeerte (ISvW), The Netherlands, 14–15 May.

NMR: Workshop on Commonsense and Non-Monotonic Reasoning for Ontologies, Sutton Place, Toronto, Canada, 14–16 May.

CASI: Conference of Applied Statistics in Ireland, Portrush, 16–18 May.

AUTOMATED KNOWLEDGE BASE CONSTRUCTION: Grenoble, France, 17–19 May.

MEANING, MODALITY AND APRIORITY: University of Cologne, Germany, 17–20 May.

INFINITY: Infinite and Infinitesimal in Mathematics, Computing, and Natural Sciences, Cetraro, Italy, 17–21 May.

FLAIRS: 23rd Florida Artificial Intelligence Research Society Conference, Daytona Beach, Florida, 19–21 May.

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

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

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

PHILMILCOG: 8th Annual Graduate Conference in Philosophy of Mind, Language, and Cognitive Science, University of Western Ontario, 22–23 May.

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

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

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

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

BENELEARN: 19th Annual Machine Learning Conference of Belgium and The Netherlands, Katholieke Universiteit Leuven, Belgium, 27–28 May.

SPE3: Semantics and Philosophy in Europe, Institut d'Histoire et de Philosophie des Sciences et des Techniques (IHPST) and Ecole Normale Supérieure (ENS), Paris, 27–29 May.

PHILOSOPHY AND MATHEMATICS: A memorial conference in honour of Professor John J. Cleary, Trinity College Dublin, 28–29 May.

ST ANDREWS-RUTGERS CONFERENCE ON EVIDENCE: University of St Andrews, 29–30 May.

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

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

JUNE

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

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

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

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

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

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

MODERN FORMALISMS FOR PRE-MODERN INDIAN LOGIC AND EPISTEMOLOGY: Hamburg, 4–6 June.

IIS: Intelligent Information Systems, Siedlce, Poland, 8–10 June.

DGL: 4th Workshop in Decisions, Games & Logic, Paris, France, 9–11 June.

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

WOC: Workshop on Context, Genoa, Italy, 11–12 June.

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

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

FOUNDATIONS OF LOGICAL CONSEQUENCE: Arché Research Centre, The University of St Andrews, 11–15 June.

WHAT'S TRUTH GOT TO DO WITH IT?: University of East Anglia, 12 June.

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

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

PHILOSOPHY OF CONSCIOUSNESS: University of Birmingham, UK, 16 June.

ADJECTIVES AND RELATIVE CLAUSES: SYNTAX AND SEMANTICS: Venice, 16–17 June.

LOGIC AND KNOWLEDGE: Department of Philosophical and Epistemological Studies, University La Sapienza, Rome, 16–19 June.

GANDALF: 1st International Symposium on Games, Automata, Logics and Formal Verification, Minori, Amalfi coast, Italy, 17–18 June.

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

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

PCC: 9th Proof, Computation and Complexity, Bern, Switzerland, 18–19 June.

FROM PRACTICE TO RESULTS IN LOGIC AND MATHEMATICS: Nancy, France, 21–23 June.

LCM: 4th International Conference on Language, Culture and Mind, Turku, Finland, 21–23 June.

MPC: 10th International Conference on Mathematics of Program Construction, Québec City, Canada, 21–23 June.

PAKDD: 14th Pacific-Asia Conference on Knowledge Discovery and Data Mining, Hyderabad, India, 21–24 June.

CCA: 7th International Conference on Computability and Complexity in Analysis, Zhenjiang, China, 21–25 June.

ICML: 27th International Conference on Machine Learning, Haifa, Israel, 21–25 June.

LOGICA: Hejnice, northern Bohemia, 21–25 June.

HUMAN-ROBOT PERSONAL RELATIONSHIPS: Leiden University, The Netherlands, 23–24 June.

HOPOS: International Society for the History of Philosophy of Science, Central European University, Budapest, Hungary, 24–27 June.

MIND, SCIENCE AND EVERYTHING!: University of Glasgow, 25–26 June.

POP III: 3rd Graduate Conference in Philosophy of Probability, Centre for Philosophy of Natural and Social Science, London School of Economics, 25–26 June.

ILP: 20th International Conference on Inductive Logic Programming, Firenze, Italy, 27–30 June.

WORK IN PROGRESS IN CAUSAL AND PROBABILISTIC REASONING: University of Kent, Paris Campus, 28–29 June.

IPMU: 13th International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems, Dortmund, Germany, 28 June - 2 July.

CiE: Computability in Europe: Programs, Proofs, Processes, Ponta Delgada (Azores), Portugal, 30 June - 4 July.

JULY

AAL: Australasian Association for Logic Conference, Sydney, Australia, 2–4 July.

METHODS OF APPLIED PHILOSOPHY: St Anne's College, Oxford, 2–4 July.

MAXENT: 30th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering, Chamonix, France, 4–9 July.

AISC: 10th International Conference on Artificial Intelligence and Symbolic Computation, CNAM, Paris, France, 5–6 July.

LOFT: 9th Conference on Logic and the Foundations of Game and Decision Theory, University of Toulouse, France, 5–7 July.

IWAP: 5th International Workshop on Applied Probability, Universidad Carlos III de Madrid, Colmenarejo, Madrid, Spain, 5–8 July.

IWSM: 25th International Workshop on Statistical Modelling, Department of Statistics, University of Glasgow, 5–9 July.

CONFERENCES ON INTELLIGENT COMPUTER MATHEMATICS: Paris, France, 5–10 July.

INC: 8th International Network Conference, Heidelberg, Germany, 6–8 July 2010.

WoLLIC: 17th Workshop on Logic, Language, Information and Computation, Brasília, Brazil, 6–9 July.

BEYOND RATIONALITY: University of Mississippi, 7–9 July.

DEON: 10th International Conference on Deontic Logic in Computer Science, Florence, 7–9 July.

ISPDC: 9th International Symposium on Parallel and Distributed Computing, Istanbul, Turkey, 7–9 July.

IPTA: International Conference on Image Processing Theory, Tools & Applications, Paris, France, 7–10 July.

GECCO: Genetic and Evolutionary Computation, Portland, Oregon, 7–11 July.

BSPS: British Society for the Philosophy of Science Annual Conference, University College, Dublin, 8–9 July.

UAI: 26th Conference on Uncertainty in Artificial Intelligence, Catalina Island, California, 8–11 July.

ICCSIT: 3rd IEEE International Conference on Computer Science and Information Technology, Chengdu, China, 9–11 July.

FLoC: 5th Federated Logic Conference, University of Edinburgh, 9–21 July.

METAPHYSICS AND EPISTEMOLOGY IN CHINESE PHILOSOPHY: School of Philosophy, Renmin University of China, Beijing, China, 10–11 July.

IDTGT: Interactive Decision Theory and Game Theory, Atlanta, USA, 11–12 July.

LICS: Logic in Computer Science, Edinburgh, Scotland, UK, 11–14 July.

SCSC: 2010 Summer Computer Simulation Conference, Ottawa, ON, Canada, 11–14 July.

TMFCS: International Conference on Theoretical and Mathematical Foundations of Computer Science, Orlando, FL, USA, 12–14 July.

UNCERTAINTY IN COMPUTER MODELS: Sheffield, UK, 12–14 July.

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

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

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

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

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

SIGIR: Feature Generation and Selection for Information Retrieval, Geneva, Switzerland, 23 July.

STRUCTURE AND IDENTITY: University of Bristol, 23–25 July.

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

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

JULIAN JAYNES CONFERENCE ON CONSCIOUSNESS: Charlottetown, Canada, 29 July.

BWGT: Brazilian Workshop of the Game Theory Society, University of São Paulo, 29 July–4 August.

AUGUST

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

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

MSN-DS: 2nd International Workshop on Mining Social Network for Decision Support, Odense, Denmark, 9–11 August.

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

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

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

CONFERENCE ON MATHEMATICAL LOGIC AND SET THEORY: Chennai, India, 15–17 August.

ARCOE: Automated Reasoning about Context and Ontology Evolution, Lisbon, 16–17 August.

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

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

TRUTH MATTERS: Toronto, 18–20 August.

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

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

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

CSL: Annual Conference of the European Association for Computer Science Logic, Brno, Czech Republic, 23–27 August.

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

ESPP: Meeting of the European Society for Philosophy and Psychology, Bochum and Essen, Germany, 25–28 August.

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

BECAUSE II: Humboldt-Universität zu Berlin, Germany, 30 August - 1 September.

ASAI: 11th Argentine Symposium on Artificial Intelligence, Ciudad Autónoma de Buenos Aires, 30–31 August.

SEPTEMBER

KSEM: 4th International Conference on Knowledge Science, Engineering and Management, Belfast, Northern Ireland, UK, 1–3 September.

FEW: 7th Annual Formal Epistemology Workshop, Konstanz, 2–4 September.

TIME: 17th International Symposium on Temporal Representation and Reasoning, Paris, France, 6–8 September.

PRINCIPLES AND METHODS OF STATISTICAL INFERENCE WITH INTERVAL PROBABILITY: Durham, 6–10 September.

CAUSATION AND DISEASE IN THE POSTGENOMIC ERA: 1st European Advanced Seminar in the Philosophy of the Life Sciences, Geneva, Switzerland, 6–11 September.

LOGIC, ALGEBRA AND TRUTH DEGREES: Prague, Czech Republic, 7–11 September.

PLURALISM IN THE FOUNDATIONS OF STATISTICS: University of Kent, Canterbury, UK, 9–10 September.

CNL: 2nd Workshop on Controlled Natural Languages, Marettimo Island, Sicily, Italy, 13–15 September.

PGM: 5th European Workshop on Probabilistic Graphical Models, Helsinki, Finland, 13–15 September.

EPISTEMIC ASPECTS OF MANY-VALUED LOGICS: Prague, 13–16 September.

AS: Applied Statistics, Ribno, Bled, Slovenia, 19–22 September.

IVA: 10th International Conference on Intelligent Virtual Agents, Philadelphia, Pennsylvania, USA, 20–22 September.

LRR: Logic, Reason and Rationality, Centre for Logic and Philosophy of Science, Ghent University, Belgium, 20–22 September.

WORLD COMPUTER CONGRESS: International Federation for Information Processing, Brisbane, Australia, 20–23 September.

ECML: European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, Barcelona, Spain, 20–24 September.

MATES: 8th German Conference on Multi-Agent System Technologies, Karlsruhe, Germany, 21–23 September.

TRUTH, KNOWLEDGE AND SCIENCE: 9th National Conference of the Italian Society for Analytic Philosophy, University of Padua, 23–25 September.

&HPS3: Integrated History and Philosophy of Science, Indiana University, Bloomington, 23–26 September.

LOGIC AND LANGUAGE CONFERENCE: Northern Institute of Philosophy, University of Aberdeen, 24–26 September.

SMPS: 5th International Conference on Soft Methods in Probability and Statistics, Mieres (Asturias), Spain, 28 September - 1 October.

OCTOBER

E-CAP: 8th European Conference on Computing and Philosophy, Muenchen, Germany, 4–6 October.

AIAI: 6th IFIP International Conference on Artificial Intelligence. Applications & Innovations, Ayia Napa, Cyprus, 5–7 October.

CALCULATION, INTUITION, AND A PRIORI KNOWLEDGE: Tilburg University, The Netherlands, 5–8 October.

CAUSALITY IN THE BIOMEDICAL AND SOCIAL SCIENCES: Erasmus University Rotterdam, 6–8 October.

LPAR: 17th International Conference on Logic for Programming, Artificial Intelligence and Reasoning, Yogyakarta, Indonesia, 10–15 October.

PHILOSOPHY OF MIND, REDUCTION, NEUROSCIENCE: University of Lausanne, Switzerland, 12–16 October.

SEFA: 6th Conference of the Spanish Society for Analytic Philosophy, University of La Laguna, Tenerife, 14–16 October

THE NATURE OF BELIEF: The Ontology of Doxastic Attitudes, University of Southern Denmark, Odense, 18–19 October.

FMCAD: International Conference on Formal Methods in Computer-Aided Design, Lugano, Switzerland, 20–23 October.

ADT: 1st International Conference on Algorithmic Decision Theory, Venice, Italy, 21–23 October.

WORKSHOP ON BAYESIAN ARGUMENTATION: Department of Philosophy & Cognitive Science, Lund University, Sweden, 22–23 October.

NonMon@30: Thirty Years of Nonmonotonic Reasoning, Lexington, KY, USA, 22–25 October.

IJCCI: 2nd International Joint Conference on Computational Intelligence, Valencia, Spain, 24–26 October.

BNAIC: 22nd Benelux Conference on Artificial Intelligence, Luxembourg, 25–26 October.

ICTAI: 22th International IEEE Conference on Tools with Artificial Intelligence, Arras, France, 27–29 October.

NOVEMBER

LogKCA: International Workshop on Logic and Philosophy of Knowledge, Communication and Action, Donostia, San Sebastián, Spain, 3–5 November.

MICAI: 9th Mexican International Conference on Artificial Intelligence, Pachuca (near Mexico City), Mexico, 8–12 November.

TAAI: Conference on Technologies and Applications of Artificial Intelligence, Hsinchu, Taiwan, 18–20 November 18-20.

DECEMBER

CACS: International Congress on Computer Applications and Computational Science, Singapore, 4–6 December.

NIPS: 24th Annual Conference on Neural Information Processing Systems, Vancouver, B.C., Canada, 6–11 December.

FROM COGNITIVE SCIENCE AND PSYCHOLOGY TO AN EMPIRICALLY-INFORMED PHILOSOPHY OF LOGIC: Amsterdam, 7–8 December.

ICDM: International Conference on Data Mining, Sydney, Australia, 13–17 December.

SILFS: International Conference of the Italian Society for Logic and Philosophy of Sciences, University of Bergamo, Italy, 15–17 December.

§6

COURSES AND PROGRAMMES

Courses

FORMAL EPISTEMOLOGY SCHOOL: Northern Institute of Philosophy at the University of Aberdeen, 14–18 June.

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

FIRST EUROPEAN SUMMER SCHOOL ON LIFE & COGNITION: Donostia-San Sebastian, Basque Country, Spain, 22–26 June.

MODEL THEORY: LMS/EPSRC Short Course, University of Leeds, 18–23 July.

AII: Asian Initiative for Infinity, Graduate Summer School in Logic, National University of Singapore, 28 June - 23 July.

ISSSEO: International Summer School in Social and Ecological Ontology, Castello Tesino and Cinte Tesino, Italy, 5–9 July.

THE SCIENCE OF THE CONSCIOUS MIND: Vienna, 5–16 July.

UCLA LOGIC CENTER: Undergraduate Summer School in Mathematical Logic, Los Angeles, USA, 5–23 July.

NN: Summer School on Neural Networks in Classification, Regression and Data Mining, Porto, Portugal, 12–16 July.

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

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

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

SIPTA: 4th school of the Society for Imprecise Probability: Theories and Applications, Durham, UK, 1–6 September.

LOGIC OR LOGICS?: Mini-course and Workshop, Arché Research Centre, St Andrews, Scotland, 27 September–1 October.

BLT: Bochum-Lausanne-Tilburg Graduate School: Philosophy of Language, Mind and Science on Calculation, Intuition, and A Priori Knowledge, Tilburg University, The Netherlands, 5–8 October.

Programmes

DOCTORAL PROGRAMME IN PHILOSOPHY: Language, Mind and Practice, Department of Philosophy, University of Zurich, Switzerland.

HPSM: MA in the History and Philosophy of Science and Medicine, Durham University.

MASTER PROGRAMME: Philosophy of Science, Technology and Society, Enschede, the Netherlands.

MA IN COGNITIVE SCIENCE: School of Politics, International Studies and Philosophy, Queen's University Belfast.

MA IN LOGIC AND THE PHILOSOPHY OF MATHEMATICS: Department of Philosophy, University of Bristol.

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.

MSc IN MATHEMATICAL LOGIC AND THE THEORY OF COMPUTATION: Mathematics, University of Manchester.

MSc IN ARTIFICIAL INTELLIGENCE: Faculty of Engineering, University of Leeds.

MA IN REASONING

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

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

MSc IN COGNITIVE SCIENCE: University of Osnabrück, Germany.

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

MASTER OF SCIENCE: Logic, Amsterdam.

§7

JOBS AND STUDENTSHIPS

Jobs

ASSISTANT PROFESSOR: in Philosophy of the Social Sciences (especially Economics), Faculty of Philosophy at Erasmus University Rotterdam, deadline 1 May.

POST-DOC POSITION: part of the subproject Perspectival Thoughts and Facts, Centre for Metaphysics, University of Geneva, deadline 15 May.

POSTDOCTORAL RESEARCH FELLOW POSITION: in the project “Understanding and the A Priori”, Philosophy Department, University of Cologne, deadline 15 May.

POST-DOC POSITION: in the VIDI Project “Reasoning about quantum interaction: Logical modelling and verification of multi-agent quantum protocols”, University of Groningen, deadline 7 June.

RESEARCH AND TEACHING POSITION: in Philosophy of Science, UNAM, Mexico City, deadline 6 August.

Studentships

PHD SCHOLARSHIP: in Automated Reasoning, School of Computer Science, University of Manchester, deadline 14 May.

PHD POSITION: in the VIDI project “A Formal Analysis of Social Procedures”, Tilburg Center for Logic and Philosophy of Science, deadline 21 May.

TWO PHD POSITIONS: in the VIDI Project “Reasoning about quantum interaction: Logical modelling and verification of multi-agent quantum protocols”, University of Groningen, deadline 7 June.

JACOBSEN FELLOWSHIPS AND ROYAL INSTITUTE OF PHILOSOPHY BURSARIES: for the academic year 2010–2011, deadline 11 June.

BSPS DOCTORAL SCHOLARSHIP: in Philosophy of Science, deadline 1 August.

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