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Contents

Editorial

I gladly return as guest editor for this issue of *The Reasoner*. In the past, I used this space to reflect about the role of philosophy with respect to the sciences or to societal issues and about our role as philosophers interacting with scientists and with the public. This month's editorial and interview follow the trend.

This time, the trigger has been taking part in two academic events: the 5th Workshop in the Philosophy of Information (PI) and the 4th biannual meeting of the Society for the Philosophy of Science in Practice (SPSP). In both these meetings, Sabina Leonelli was there, playing key roles such as being invited speaker or member of the steering committee. What was I doing there? And what was Sabina doing there? Why engaging with PI? Why with SPSP?

I have known Sabina for quite a while now. Sometimes a few years elapsed in between our meetings, but I was always struck by the proximity of our views, notably about what is interesting in philosophy of science. So I was there. She was there too. Is it just coincidence? Is there a common cause? I don't think we were both there just by chance. My best guess is that we are looking for other perspectives to feed into 'traditional' philosophy of science. I asked these questions to Sabina. Quite unsurprisingly, my guess and her answers largely converge.

I don't want to anticipate too much what Sabina is going to say. Let me just stress how much I share her views about active engagement of philosophy with scientific practice, collegiality in doing research, and the need for a diversity of approaches in philosophy of science. Just like Sabina, I am struck by the fact that PI and SPSP have grown outside mainstream and traditional forums like the European Philosophy of Science Association. But things may be changing. Check out the programme of the 2013 EPSA meeting in Helsinki and you will find a symposium on 'Causality and information', whose contributions are very much in the SPSP spirit.

Enjoy the interview!

Federica Russo
Center Leo Apostel, Vrije Universiteit Brussel
Centre for Reasoning, University of Kent

Features

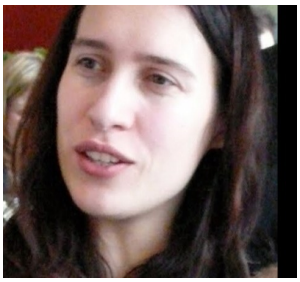
Interview with Sabina Leonelli

Sabina Leonelli is senior lecturer in philosophy at the University of Exeter in the UK. As I am writing, Sabina informs me that she has just been appointed Associate Director of Exeter Centre for the Study of the Life Sciences (Egenis). Kudos! Sabina is interested in understanding scientific activities such as modelling, theory-making, and data integration and interpretation, especially in the life sciences, and in many other things.

To know more, read the interview.

Federica Russo: Thank you Sabina for agreeing to be this month's interviewee of *The Reasoner*. Would you like to tell our Reasoners about your intellectual history, what brought you into philosophy of science, and in the particular type of philosophy of science you do?

Sabina Leonelli: Hi Federica, thanks so much to you and *The Reasoner* for your invitation. I have been fascinated by human attempts to understand the world for as long as I can remember. I could never decide whether I liked better the humanities or the sciences—as an Italian and Greek citizen, raised by two architects, I never really bought into that separation anyhow. My secondary education in Italy encouraged this tendency: I managed to enroll in a state-funded (!) "liceo" which provided high-level teaching in literature, philosophy and classics, as well as physics, maths, biology and three foreign languages. This continental disdain of specialization served me well until the time came to choose a university degree. Thankfully I stumbled upon the BSc in History, Philosophy and Social Studies of Science offered at University College London, which was a real eye-opener for me.



Brilliant teachers such as Hasok Chang and Joe Cain proved decisive in shaping my commitment to and understanding of philosophy and its relation to other disciplines. Ever since the end of my undergraduate studies, I have been seeking to produce a philosophy of science that is deeply engaged with (1) scientific work as it is being performed today, (2) the historical roots of that work, and (3) its political and social significance. These days, I call myself an "empirical philosopher of science": my main interest lies in understanding the activities and reasoning patterns that result in the production of scientific knowledge, and particularly the ways in which localized, highly situated sets of practices give rise to abstract and sometimes general knowledge claims. My way of doing philosophy of science is itself an attempt to exploit the productive tension between the particular and the general, since it is heavily grounded on a historical and ethnographic investigation of the specific conditions under which scientific claims are produced. Being based in the Department of Sociology, Philosophy and Anthropology in Exeter enables me to pursue this approach in dialogue with several like-minded colleagues, which is wonderful.

At the moment, I am working on two books that exemplify this approach. One is a monograph on the epistemology of data-centric biology, where I use an empirical analysis of contemporary practices of data handling and dissemination to reflect on the status of data, theories and experiments in contemporary biology (and I take the occasion to dispel a few myths concerning the power of so-called "big data" and how they are actually impacting research). The other is a joint monograph with Rachel Ankeny on the ways in which organisms are used as models in experimental biology: starting from a history of the role of key model organisms in 20th century science (such as the nematode C. elegans, the fruit-fly Drosophila melanogaster and the thale cress Arabidopsis thaliana), we investigate the significance, generality and representativeness of biological claims obtained through very localized and standardized research routines.

FR: What do you think we philosophers have to (or can) tell scientists? Or, more broadly, how do you see (or practice) the relationship between philosophers and scientists?

SL: I see the relationship between philosophers and scientists as fluid and multifaceted. It can take a variety of different forms, particularly since it is not always obvious that philosophers and scientists could or should work together. In my experience at the Exeter Centre for the Study of the Life Sciences (Egenis), given the different types of training, goals and skills involved, a fruitful collaboration takes years to build. I found it extremely productive, and generative for both my philosophical work and the work of scientists I worked with, to build collaborations with scientists on well-circumscribed issues of mutual interest (such as, in my case, the use of bio-ontologies as classification systems for data dissemination). Some of the biologists and bioinformaticians I have been working with are now also involved as advisors in the ERC project I am about to start on the Epistemology of Data-Intensive Science: I look forward to seeing how that open-ended collaboration, which is centered on philosophical rather than scientific outcomes, will work out.

Another realm in which I found philosophical and scientific exchanges to be useful is that of science policy: in my role as elected member of the Global Young Academy, I routinely witness how useful the philosophy of science can be in expressing and debating current concerns with funding guidelines, Open Access mandates and the ways in which scientific excellence and impact are overseen and supported. I remain unconvinced by philosophical work that claims to be able to improve science (and, sometimes, tell scientists what to do) without actually engaging with scientists and developing some awareness of the constraints and opportunities afforded by specific research environments. For similar reasons, I am also wary of philosophical arguments that use scientific references as authoritative sources of evidence, without a critical eye to the specific context from which such results emerged.

FR: You are part of the organizing committee of the SPSP and have been supporting their activities for quite a while. What do you think is the specificity of this approach?

SL: From what I have said already, it will be clear that doing philosophy of science in practice is central to my work and thus I am proud and honored to foster and support SPSP. When the society was started, I was wondering whether we needed yet another philosophy of science organization; but the success and high level of the past 5 meetings, as well as the unique quality of the intellectual space offered by SPSP, convinced me that this was a very productive forum, not only for philosophers of science but for philosophy in general (particularly when considered in conjunction with experimental philosophy approaches). The specificity of our approach is to investigate, rather than taking for granted, what it is that we mean by 'science' in our philosophical work. This investigation can happen through a wide variety of means: a strong point of SPSP is precisely the fact that we are pluralists about what it means to 'do' philosophy of science in practice. In contrast to philosophical environments that thrive on competition and aggressive challenge, we strongly believe in collegiality, reciprocal encouragement (particularly of our more junior members) and the need to explore diverse ideas. Scientific practice is just too complex and varied to be investigated by isolated individuals or monolithic frameworks.

FR: You recently took part in the 5th Workshop in the Philosophy of Information. How do see the relation between these two fields—philosophy of information and philosophy of science in practice?

SL: I find it puzzling that these fields have developed into largely unrelated branches of philosophy in the first place. I was particularly pleased to learn that many philosophers of information, such as Luciano Floridi, champion an approach that is very open and related to the notions of evidence, data and information debated within the philosophy of science. Information is clearly a key term in contemporary society, and while it is of course crucial to recognize the role of Shannon's interpretation, exploring the diversity of ideas, objects and processes captured by this term constitutes a new frontier for philosophers today. A renewed dialogue between philosophers of science, philosophers of technology and philosophers of information, such as that encouraged by the Society for the Philosophy of Information as well as by SPSP, can be extremely productive in this respect.

More on Fitch

I gave a solution to Fitch's Paradox before (2012: "The Problem with Fitch", *The Reasoner* 6.10, pp. 157–8), but it has been put to me (by Julien Murzi, in conversation) that it might face some of the same problems Timothy Williamson posed for Dorothy Edgington's solution. I will show here that my solution surmounts these problems.

Fitch's Paradox is that a plausible chain of reasoning ends by concluding that if whatever is true can be known to be true $((\forall p)(p \supset \diamond Kp))$ then whatever is true is known to be true $((\forall p)(p \supset Kp))$. The proof proceeds by considering a case 'q & ¬Kq' which when substituted into the antecedent yields:

$$(q \,\&\, \neg Kq) \supset \diamond K(q \,\&\, \neg Kq),$$

and $\diamond K(q \,\&\, \neg Kq)$ entails that in some possible world Kq & K¬Kq, and so Kq & ¬Kq, which is contradictory, seemingly showing that there can be no cases like 'q & ¬Kq'.

Edgington's solution has only one relevant similarity with my own solution. It comes out for instance when she considers (1985: The Paradox of Knowability, *Mind* 94, p. 567):

> (∀s1)('p' is true in s1 ⊃ (∃s2)(it is known in s2 that 'p' is true in s1)).

Thus the plain 'K' above is indexed so that one can talk about 'K2' as opposed to 'K1', for instance. My own replacement for the antecedent above involves a similar indexing, but has worlds instead of situations such as s1, and s2, and also 'that'-clauses rather than quoted sentences:

$$(\forall p)(p \supset (\exists i)Kip).$$

Then, if one substitutes 'q, but it is not known that q in the actual world' (q & ¬Kaq) for 'p' one does not get a contradiction, merely

$$(\exists i)Ki(q \,\&\, \neg Kaq).$$

Certainly 'Ka(q & ¬Kaq)' is contradictory, but 'i' need not be 'a'.

Williamson has several arguments against Edgington, but only two bear on this alternative solution. One argument relies on the lack of any causal connection between possible worlds; the other relates to how the actual world might be identified. Thus Williamson says (2000: *Knowledge and its Limits*, O.U.P., p. 293):

> ways of referring at one time to another are not analogous to ways of referring in one possible world to another possible world. Future reference to today on the basis of a memory demonstrative depends on remembering today, and therefore on a causal connection with today's events; there is no such connection from one possible world to another.

Williamson elsewhere, however, is quite happy with knowledge of what is true in other possible worlds being just a matter of stipulation. Thus he says (p. 19):

> We specify merely possible worlds by description; in w* we can describe a world as one in which p is true, and thereby know that p is true in such a world.

But there are no restrictions on 'p', so the same holds with 'q & ¬Kaq' in place of 'p'. We may simply stipulate that some possible world, i, is one in which q & ¬Kaq is true, and thereby know that q & ¬Kaq is true there (Ti(q & ¬Kaq)). Of course that merely means that we, the tellers of the story in this world, know that q & ¬Kaq is true in the other world, whereas what is wanted with 'Ki(q & ¬Kaq)' is that, in some way, someone in the other world knows that q & ¬Kaq. This is where a second of Williamson's arguments might be thought to come in, for a question might seem to arise about how such an inhabitant could identify the actual world (p. 294):

> The obvious means of reference to a possible world w in a world other than w is descriptive: one specifies w by specifying what is true at w. Let c be a long conjunction which can be expressed in a counterfactual world x, and is true at this actual world and at no other world. Then perhaps knowers in x could grasp and know Ap by grasping and knowing [necessarily](c ⊃ p).

Here Williamson is speaking of Edgington's 'Actually p', which I do not employ. So Williamson's remarks do not directly apply. But the point might perhaps be taken to extend to '¬Kaq' as well as 'Ap', because of the mention of the actual world. However there is no problem with 'Ki¬Kaq' on my account. The starting point of my account is that, unlike in ordinary Modal Logic, worlds contain true or false propositions about other worlds. Thus, as I pointed out before, someone might say that the hatter was not mad in the world of Alice in Wonderland (Ti¬TwMh). Likewise someone might be not just dreaming about another world, but deluded about this world, thinking, for instance, that it is actually known that p (TiKap) when in fact it is not (¬Kap), and that it is actually true that p (TiTap) when in fact it is not (¬Tap). So 'TiKap' does not entail 'TaKap', and likewise 'TiTap' does not entail that TaTap (≡Tap, ≡p). Centrally it must be remembered that 'Tap ≡ p' is only contingently true, otherwise 'TiTap' would entail 'Tip'.

But if we specify merely possible worlds 'by description' then not only can we produce statements of the form 'Ti(q &¬Kaq)' by stipulation: by means of another such stipulation we can produce the statement that Ki(q &¬Kaq). But 'Kip' does not entail 'Tap'. Similarly, 'Ki¬Kaq' only entails

'Ti¬Kaq', not 'Ta¬Kaq'. And to get that Ki(q & ¬Kaq) someone only needs to imagine how q & ¬Kaq could have been known to be true, when it cannot actually be known to be true (since, as before, it is impossible that Ka(q & ¬Kaq)). I did this with respect to knowing the parity of the number of hairs on Williamson's head in my original paper. And what must be noted then, formally, is that since 'Ki¬Kaq' does not entail 'Ta¬Kaq', if they both hold then there is no trans-world knowledge of the kind that Williamson considered, since it is merely a co-incidence.

Hartley Slater
Philosophy, UWA

This sentence does not contain the symbol X

In order to formalize the Liar's Paradox, one approach is as follows. Work in the language of Peano arithmetic extended by a unary predicate symbol T, and use Gödel's diagonal lemma to produce a sentence λ such that Peano arithmetic proves $\lambda \leftrightarrow \neg T(\ulcorner \lambda \urcorner)$. One then refers to λ as a liar sentence, glossing it as "This sentence is not true."

A suprise may occur if we use a similar strategy to formalize

This sentence does not contain the symbol X.

Work in the language $\mathscr{L}$ of Peano arithmetic extended by a new symbol X (for example, X can be a constant symbol, this is unimportant). Let $\phi \mapsto \ulcorner \phi \urcorner$ be an effective Gödel numbering of the $\mathscr{L}$-formulas, such that (for convenience) every $n \in \mathbb{N}$ is a Gödel number of some $\mathscr{L}$-formula. By the Church-Turing thesis, there is a total computable function $h : \mathbb{N} \to \mathbb{N}$ such that for every $\mathscr{L}$-formula ϕ, $h(\ulcorner \phi \urcorner) = 1$ if and only if X occurs in ϕ. It follows that there is a formula ψ with one free variable x, in the language of Peano arithmetic without X, such that $\mathbb{N} \models \psi(\ulcorner \phi \urcorner)$ precisely when X occurs in ϕ. By Gödel's diagonal lemma, there is a sentence λ, not containing X, such that Peano arithmetic proves $\lambda \leftrightarrow \neg\psi(\ulcorner \lambda \urcorner)$. Following the liar's precedent, we feel tempted to gloss λ as "This sentence does not contain the symbol X." The main difference is that unlike the liar's sentence, the sentence we've just constructed is entirely syntactical, not depending on the semantics of X.

The surprise is that this λ we have constructed is, in fact, true (at least if Peano arithmetic is true). This is surprising because the English sentence, "This sentence does not contain the symbol X," certainly does appear to contain the symbol X.

Samuel A. Alexander
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News

Necessity, Analyticity, and the A priori, 10–11 June

Stewart Shapiro kicked this Oslo workshop off with an Aristotelian theory of the continuum, where points and actual infinities are eschewed. By framing the theory in a gunky mereology on line segments, he showed that we can avoid points; and with some modifications, he showed that appeals to unrestricted composition on infinite pluralities can also be avoided. A sketch was given as to how a modal language could be employed to avoid quantification over the totality of all line segments.

The question how such a modal language should be understood in the case of set theory was addressed by Øystein Linnebo. A metaphysical interpretation was discussed and rejected—in order to keep the plausible principle that any things possibly form a set, we need to give up either the necessary existence of mathematical objects or the modal axiom B, neither of which are appealing for metaphysical modality. An interpretational way of understanding this kind of modality was proposed and some of its virtues outlined.

In my talk I looked at the kind of second-order resources which are available to people who think that any things possibly form a set—call them *potentialists*. After briefly presenting some reasons for a potentialist to want some kind of conceptual second-order quantification with a certain amount of comprehension, I gave an argument that such resources lead to incompatible demands on the potentialist's space of possible worlds.

Geoffrey Hellman provided a classification of various types of mathematical statements on their modal structural (MS) interpretation into the categories of necessity, analyticity, and the a priori. It was argued that the axioms of various branches of mathematics have analytic MS translations, that MS principles stating the possible existence of various structures are necessary but neither analytic nor a priori, and that statements independent ZFC are neither analytic nor a priori, and perhaps not even necessary on the ms interpretation.

Two talks focused on a dilemma posed in Timothy Williamson's new book *Modal Logic as Metaphysics*—either the contingentist can't avail themselves of second-order comprehension strong enough for various important applications, or they have to deny the plausible claim that in many possible worlds if the property of being x exists, then x exists.

Bruno Jacinto granted that in many possible worlds the existence of the property of being x implies the existence of x, but claimed that nonetheless the contingentist can avail themselves of a sufficiently strong comprehension principle. He argued that there is a contingentistically acceptable second-order logic that can be used for the various applications Williamson highlights. Jon Litland, on the other hand, granted that there is *some* sense of property on which the property of being x implies the existence of x in many possible worlds, but argued that there is another sense where it does not. A model theory for this other notion of property was developed, was shown to be sufficient for the applications Williamson highlights, and was shown to entail that the modal axioms B and 4 fail.

Laura Celani discussed a number of principles, proposed by John MacFarlane and Greg Restall, which attempt to spell out the way in which logical consequence norms belief. By appealing to the Preface and Lottery paradoxes, it was argued that since these principles lead to implausible norms, they should be rejected.

Three talks focused on the epistemology of logic and mathematics. Gillian Russell outlined two broad ways in which the epistemology of logic has been approached. On one, we come to know logical truths via our knowledge of the meaning of the logical connectives. On the other, we come to know logical truths via their involvement in a web of belief which is confirmed as a whole. A kind of synthesis of these views was proposed on which logical truths are analytic but not a priori.

Agustin Rayo posed the following challenge: if the truth conditions of mathematical or logical statements are trivial, cognitive accomplishment with respect to them cannot be explained in terms of ruling out ways for the world to be; so, how

should it be modelled? An account was proposed in terms of information-transfer abilities. What happens when John learns that 2 + 2 = 4, for instance, is that certain information concerning the meanings of '2', '+', etc becomes available for answering the question "Is 2+2 = 4?".

Carrie Jenkins revisited the account of arithmetical knowledge developed in her *Grounding Concepts: An Empirical Basis for Arithmetical Knowledge*. Recent claims by Laurence BonJour that Jenkins' account doesn't differ substantially from the rationalist account which he favours were resisted, and the differences spelled out. It was then argued that these differences give us reason to prefer Jenkins' account over BonJour's.

Finally, Aaron Cotnoir argued that weak supplementation for parthood is neither analytic nor necessary. In particular, he argued that non-extensional mereologies are at least possibly true, and showed that on the best way of axiomatizing these mereologies, weak supplementation is false. So weak supplementation possibly fails, and is neither necessary nor analytic. In contrast, strong supplementation, which can fail to imply weak supplementation in non-extensional mereologies, was argued to be a good candidate for an analytic and necessary truth.

Sam Roberts
Philosophy, Birkbeck

The Philosophy of Clark Glymour, 13–15 June

The symposium took place as a part of Clark Glymour's fellowship at the Duesseldorf Center for Logic and Philosophy of Science (DCLPS). Its aim was to critically discuss parts of Clark's philosophical work. Clark held a keynote lecture on June 13 and gave short responses to the talks on June 14 and 15. Videos of the talks are available on the symposium's web page.

June 13, evening: Clark (CMU, Pittsburgh) gave his keynote lecture, which focused on the problem of how to reliably infer causal connections between certain brain regions from fMRI data and discussed the viability of different causal discovery algorithms in that context.

June 14, morning session: Gerhard Schurz and Alexander Gebharter (DCLPS, Duesseldorf) showed that causality, as described by the theory of causal nets, satisfies accepted standards for theoretical concepts: it explains otherwise unexplainable statistical phenomena. The theory has empirical content if further assumptions are added to the causal Markov and the minimality condition. Frederick Eberhardt (CMU, Pittsburgh) argued that the present methods used in causal discovery, as described by Clark, Peter Spirtes, and others, depend heavily on getting the causal variables right and that the individuation of causal variables still remains poorly understood. Vera Hoffmann-Kolss (University of Cologne) gave arguments against approaches to actual causation that do not give a (possibly exception-ridden) definition of actual causation but only provide a partial axiomatic characterization, the latter of which is advocated by Clark. Vera argued that the notion of actual causation is inherently vague and thus might not allow for the kind of axiomatic characterization standardly used in causal modeling accounts.

June 14, afternoon session: Matthias Unterhuber (DCLPS, Duesseldorf) discussed the relationship of laws of nature and Clark's notion of ceteris paribus hypothesis with formal learning theory, as developed by Clark and Kevin Kelly, among others. Matthias argued that we should also model the epistemology of (perfectly) natural properties (and laws of nature) in a relativistic formal learning theory approach, as suggested by Clark and Kevin. Sylvia Wenmackers (University of Groningen) described the problem of old evidence and logical omniscience as discussed by Clark. Then, Sylvia presented her and Jan-Willem Romeijn's proposal for expansions of the hypothesis space, as for example given by the advent of general relativity theory.

June 15, morning session: Paul Näger (University of Bremen) discussed the causal Markov condition in the context of quantum experiments based on a paper by Clark. Paul argued that EPR experiments may satisfy the causal Markov condition if the faithfulness assumption is violated. Paul suggested a new explanation of unfaithfulness in that context. York Hagmayer (University of Goettingen) discussed the role of causal Bayes nets in the psychology of causal learning and thereby addressed empirical psychological work by Clark and Alison Gopnik. York focused among other things on the question whether subjects violate the causal Markov condition and whether they assume that causes of common effects are themselves independent. Conor Mayo-Wilson (LMU Munich) described the problem of how to align causal discovery results from the macro level with the micro level, as advocated by Clark and others. He argued that when we partially know the nature of the relation of macro level variables with micro levels, as for example, for GDP and its underlying micro level variables, a causal analysis of the macro level puts reasonable constraints on the causal relations among the micro level variables.

We acknowledge financial support by DFG (German Research Association), research unit: "Causation — Laws — Dispositions — Explanation".

Matthias Unterhuber
Alexander Gebharter
Philosophy, DCLPS

Theory and Application of Formal Argumentation, 3–4 August

Since the 1980s, considerable effort has been devoted to the formalisation of logics accounting for the common-sense capacity for dealing with conflict and uncertainty. The last ten years has witnessed a rapid growth in interest in formal theories of argumentation; theories that accommodate the aforementioned logics, while adhering more closely to intuitive principles of reasoning and debate as conducted by human reasoners. It is this bridging between formal logics and human reasoning that accounts for the success of the argumentation paradigm, as evidenced by the fact that between 2007 and 2012, five of the top cited articles in the prestigious journal of *Artificial Intelligence*, were on the topic of argumentation.

TAFA'13, co-located with the premier international conference on Artificial Intelligence—IJCAI'2013—is the latest of a series of argumentation based conferences and workshops to have been inaugurated in the last decade, and is a successor to the first edition of the workshop—TAFA'11—collocated with IJCAI'2011. The workshop aims to disseminate research into computational and logic-based models of argumentation and their application in diverse sub-fields of artificial intelligence.

TAFA'13 was held on the 3rd and 4th of August in Beijing China, and included 15 presentations (acceptance rate 65%),

delivered by authors from Europe, Japan and China.

Argumentation theory centres around the idea that arguments authored by human users or constituted as premises entailing some conclusion in a given logic, can be organised into directed graphs such that the directed links represent relations of attack and support etc. Such graphs can then be processed so as to evaluate the winning arguments. TAFA 2013 included papers identifying how properties of these graphs can impact on the computational complexity of evaluating the winning arguments, as well as specific computational techniques for evaluating graphs. A distinguishing feature of a number of the workshop's papers was the development of formal models based on empirical observations of human dialogue and debate—for example, in social networks in which humans exchange and vote on opinions and assess the extent to which any given opinion is a valid counter to (attack on) another. New insights into how computational models can inform and indeed enhance the rationality of discourse and debate among humans was also presented. A key feature of argumentation is its wide range of applicability in sub-areas of AI, and a number of papers reported on advances in these areas. For example, preliminary work on correspondences between argumentative and decision theoretic principles were introduced, and research on the use of argumentation to resolve conflicts among conflicting norms was presented. Other papers reported on the use of arguments to augment and improve the performance of learning algorithms, and on the evaluation and categorisation of arguments exchanged in dialogues observed between human experts.

Interested readers might like to consult the TAFA 2013 online proceedings, available here. Post-proceedings will be made available as part of the Springer LNAI series.

Sanjay Modgil
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Calls for Papers

The Life and Work of Leon Henkin: Mara Manzano, Ildiko Sain and Enrique Alonso eds, deadline 1 September.
Infinite Regress: special issue of *Synthese*, deadline 1 October.
Belief Change and Argumentation Theory: special issue of *Annals of Mathematics and Artificial Intelligence*, deadline 15 November.

What's Hot in ...

Uncertain Reasoning

What is the role of subjective probability in reasoning about mathematical statements? Some might think the question is ill-posed because there is no room for uncertainty in the paradise of mathematical truths. Others disagree. Among them is Bruno de Finetti who makes, in his two volume monograph on the *Theory of Probability* (1974), the following remark:

> Even in the field of tautology (i.e. of what is true or false by mere definition, independently of any contingent circumstances) we always find ourselves in a state of uncertainty. In fact, even a single verification of a tautological truth (for instance, of what is the seventh, or billionth, decimal place of π, or of what are the necessary or sufficient conditions for a given assertion) can turn out to be, at a given moment, to a greater or lesser extent accessible or affected with error, or to be just a doubtful memory. (p.24)

De Finetti's point is that an individual's "state of uncertainty"—what subjective probability is called to quantify—aggregates multiple sources of uncertainty. Two that can easily be isolated are our ignorance of (some) relevant facts and—as the above quotation makes clear—our cognitive limitations. Haim Gaifman (2004: "Reasoning with limited resources and assigning probabilities to arithmetical statements", *Synthese* 140:97–119) makes a very similar point and emphasises that the field of uncertain reasoning has been focussing almost exclusively on the former source of uncertainty (ignorance), disregarding systematically the latter (cognitive limitations). In Gaifman's view this is unsatisfactory, for he believes that limited deductive capabilities, "far from a mere nuisance factor [...] are constitutive of human cognition".

Whilst the focus of the paper is on the rigorous footing of the assessment of probability of mathematical, and in particular arithmetical, statements, I'd like to comment on the motivation behind the formal framework. For Gaifman's approach contrasts rather sharply with an important (logical) modelling tradition, which can be traced back at least to Turing's analysis of computation. According to this point of view, the agent's actual computational limitations should be abstracted away, because they are immaterial to the mathematical definition of, say computable functions. During the second half of the past century, logicians have, by and large, subscribed to this 'pure modelling' point of view. For a recent example in the field of uncertain reasoning see Paris and Vencovska (2013: *Pure Inductive Logic*, Cambridge University Press). Gaifman takes issue with 'pure modelling' and insists that if we take limited deductive capabilities out, we effectively model something other than rational belief.

The paper raises a set of very central questions in the general field of uncertain reasoning and I think it deserves careful scrutiny. Whilst Gaifman's claim that limited deductive capabilities are constitutive of human rationality is indisputable, it is less obvious that a model of rational belief which strips away such limitations as inessential—and therefore focusses exclusively on 'ignorance' as a source of the individual's state of uncertainty—would be irrelevant to our understanding and modelling of rational belief. Indeed, maximally idealised models of rational agents are crucial to identifying mistakes (or "incoherence", as the term is used in Bayesian theory) in actual reasoning, and whenever possible, to correcting them. This is acknowledged to be the primary role for normative theories, and it isn't clear whether the "local perspective" invoked by Gaifman can play such a role.

Hykel Hosni
Marie Curie Fellow, CPNSS, London School of Economics

Events

September

ICSCCW: 7th International Conference on Soft Computing, Computing with Words and Perceptions in System Analysis, Decision and Control, Izmir, Turkey, 2–3 September.

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COUNTERFACTUALS: Thought Experiments, Modal Knowledge, and Counterfactuals, Humboldt University, Berlin, 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.
DUMMETT DAY: University of Leeds, 4–5 September.
MANY-VAL: Games, Decisions, and Rationality, Prague, Czech Republic, 4–6 September.
R&ARIP: Realism and Antirealism in Philosophy, Ca Foscari University, Venice, 5–6 September.
BLC: British Logic Colloquium, University of Leeds, 5–7 September.
WPMSIIP: 6th Workshop on Principles and Methods of Statistical Inference with Interval Probability, Switzerland, 5–10 September.
LADIMO: Laws of Nature, Dispositions and Natural Modality, Geneva, 9–10 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.
AIMS & NORMS: Oslo, 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.
MWM: Minds Without Magic, Bielefeld, 18–19 September.
DF& N: Doxastic Freedom and Normativity, University of Regensburg, Germany, 19–21 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.
SCALE: Scalable Decision Making: Uncertainty, Imperfection, Deliberation, Prague, Czech Republic, 23 September.
TbiLLC: 10th International Tbilisi Symposium on Language, Logic and Computation, Georgia, 23–27 September.
Type: Type Theory, Homotopy Theory and Univalent Foundations, Barcelona, 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.
Bayes: Workshop on Bayesian Spatio-Temporal Modelling, Edinburgh, 8–9 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.
Probabilistic Modeling: in Science and Philosophy, Bern, Switzerland, 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.
AAA: 1st International Workshop on Argument for Agreement and Assurance, 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.
Arché / CSMN: 7th Arché / CSMN Graduate Conference, University of St Andrews, 2–3 November.
Madrid IV: Inferentialism in Epistemology and Philosophy of Science, Madrid, 11–13 November.
Risk Day: Risk and Reliability Modelling for Energy Systems, Durham University, 13 November.
ACML: 5th Asian Conference on Machine Learning, Canberra, Australia, 13–15 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.
AICS: International Conference on Artificial Intelligence and Computer Science, Bayview Hotel, Langkawi, Malaysia, 25–26 November.

December

PRIMA: 16th International Conference on Principles and Practice of Multi-Agent Systems, Dunedin, New Zealand, 1–6 December.
AIC: International Workshop on Artificial Intelligence and Cognition, Turin, Italy, 3 December.
TPNC: 2nd International Conference on the Theory and Practice of Natural Computing, Cáceres, Spain, 3–5 December.
AJCAI: 26th Australasian Joint Conference on Artificial Intelligence, Dunedin, New Zealand, 3–6 December.
PhiloSci21: Challenges and Tasks, Lisbon, Portugal, 4–6 December.
ICDM: International Conference on Data Mining, Dallas, Texas, 8–11 December.
LPAR: Logic for Programming, Artificial Intelligence and Reasoning, Stellenbosch, South Africa, 14–19 December.
OBayes: International Workshop on Objective Bayes Methodology, Duke University, Durham, NC USA, 15–19 December.
DialDam: 17th Workshop on the Semantics and Pragmatics of Dialogue, ILLC, University of Amsterdam, 16–18 December.
IICAI: 6th Indian International Conference on Artificial Intelligence, Tumkur, India, 18–20 December.

Courses and Programmes

Courses

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.

MA in Reasoning

A programme at the University of Kent, Canterbury, UK. Gain the philosophical background required for a PhD in this area. Optional modules available from Psychology, Computing, Statistics, Social Policy, Law, Biosciences and History.

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

Jobs and Studentships

Jobs

Associate Professor: In Philosophy of Science, University of Geneva, until filled.
Post-doc Position: in Set Theory, Torino University, until filled.
Post-doc Position: on the project "Rational reasoning with conditionals and probabilities", MCMP, LMU Munich, until filled.
Post-doc Position: in Philosophy of Science, KU Leuven, deadline 30 September.
Professor: in Philosophy of Science, New York University Shanghai, deadline 1 October.

Studentships

Student Assistant: on the project "Rational reasoning with conditionals and probabilities", MCMP, LMU Munich, until filled.
PhD Position: in Foundations of Individual Choice, TiLPS, Tilburg University, deadline 15 September.
PhD Position: in Philosophy of Science, TiLPS, Tilburg University, deadline 15 September.