The Reasoner

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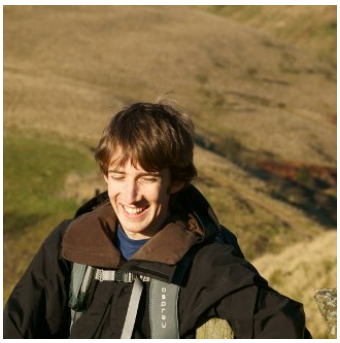
Guest Editorial

What makes the Reasoner such an interesting venue is that the topic – "reasoning"– is one that crosses traditional disciplinary boundaries. People interested in reasoning might find themselves in university departments ranging from psychology to economics to statistics to philosophy and beyond. This is, I think, a blessing and a curse. A blessing, because it means that in theory we have at our disposal a very broad range of tools with which to investigate the topic. A curse, because there is a real danger of reasoning researchers in different departments not talking to each other, or talking past one another.



Our interviewee this month is someone who has spent his career moving around across those disciplinary boundaries, trying to bridge the gaps. Greg and I first met in the spiritual home of the Reasoner – the University of Kent – at a conference about a topic of central interest to many readers of the Reasoner: the foundations of statistics. Several years later we shared an office in Munich for a while. It was a pleasure to interview Greg, and to learn about his views on a topic that will, I predict, become more and more relevant to those of us interested in reasoning in the coming years: machine learning.

Seamus Bradley
Philosophy, University of Tilburg

Features

Interview with Gregory Wheeler

Seamus Bradley: Hi Greg, thanks for agreeing to be interviewed.

Gregory Wheeler: My pleasure, Seamus. It is always good to talk to you.

SB: Let's start with a little background. If I remember correctly, you worked in engineering in some capacity before turning to philosophy?

GW: That's right. I worked for I.B.M. and a spin-off called StorageTek as a mechanical vibration test engineer. My job was to simulate earthquakes and military planes landing on remote dirt strips to see whether the hardware we were designing would survive, But I also diagnosed vibration problems that we brought on ourselves. My days were spent breaking expensive prototypes and figuring out why they broke.

SB: And you did your PhD under Henry Kyburg; what was he like?

GW: Kyburg was a lapsed engineer, too. Chemical. And a cattle farmer on the side. He and his wife, Sarah, bought a farm

in the late 60s, then kept buying adjoining farms, adding cows, and dogs to steer them around from one pasture to another, until they had the largest black angus cattle farm in upstate New York by the 1990s. An unexpected life for a fellow raised in an aristocratic family in New York City and educated at Yale and Columbia. Then again, there is a Kyburg castle in Zurich, dating from the 11th century. "Kyburg", it turns out, means "cow-fort".

Kyburg's early critiques of probabilism are rooted in his positive theory of evidential probability, which interestingly took de Finetti's lamentation to not mistake mathematical convenience for a normative standard to heart. But whereas de Finetti started with qualitative comparative judgements, Kyburg started with empirical classifications and counting members of the class. The result was a radically non-subjectivist theory of probability, even more radical than the late LMU statistician Kurt Weichselberger's theory, and also more radical than Terry Fine's program, who was just down the road from Kyburg at Cornell. Isaac Levi, Kyburg's lifelong friend, and Peter Walley, who was Terry Fine's student, are two others who took de Finetti's maxim seriously, although they stuck with assessments of coherent judgments but dropped precision as a normative requirement. Teddy Seidenfeld, who was a student of Henry's in the late 60s and Isaac in the early 70s, invariably put his finger exactly on where these proposals broke-down and why, which made perfect sense to me. Through Henry I met Gert de Cooman and the ISIPTA community, where I got the idea that Europe might be the place for me.

SB: You've had something of an interdisciplinary career, working in a computer science department in Portugal, and now in a business school in Frankfurt. What has that experience been like?

GW: I prefer life on the margins of philosophy. Who was it, George Pólya, who said that good ideas are hurt by uncritical acceptance but flourish under critical examination? Engineers and economists both have a low-tolerance for nonsense, but are often quick to jump on a good idea. Many topics that interest me can be recast as problems squarely in these neighboring fields, and I've found over the years that the effort to do philosophy in terms familiar to scientists and engineers repays handsomely. I am mystified by philosophers proclaiming the relevance of philosophy to the sciences on one day, only to turn their attention in the next to coining cute names to muddle standard terminology. The term "imprecise credences", for example, which has spread like kudzu, is an invasive cover for mushy thinking about imprecise probabilities.

SB: I'm struck by your suggestion that the barriers between philosophers and economists or engineers are just a matter of language. You don't think there are deeper conceptual or methodological differences?

GW: I would put the point this way. Scientists routinely run into problematic features of their models or conceptual muddles in their methodologies, and within each field both a lore and literature exists to try to address them. These fields already do philosophy, in other words, even if many of those authors wouldn't be comfortable calling it that. Now, a useful contribution might be to show the generality of a problem they have bumped into — a result that that reveals that the problem they see with the parameters in this model are connected to a problem over there with that other model. Sometimes insights of this kind will come from a philosopher. Other times such insights will come from a scientist or engineer who stumbled one too many times over this pair of problems and dove into the matter herself to sort it out. Whatever the source, both contributions belong to philosophy. But, I don't care whether the people who make these contributions are called philosophers or something else. My interest is philosophy rather than being a philosopher.

Philosophers are sensitive to the sting of criticism from scientists. So, let me be clear that my remarks are not to be understood as a brief for scientism. (Given the times, perhaps a moratorium on silly debates sparked by generic quantification is in order.) Rather, my point is that it is very difficult to make a contribution to scientific methodology without knowing something about science. So, if someone takes himself to be making a deep conceptual point about scientific methodology but is repeatedly met by derision from scientists, I would suggest that he reassess his project instead of seeking solace from others who have suffered the same brusque treatment.

SB: I've heard you say that you think research in AI and machine learning is going to have a big impact on topics like epistemology and theories of reasoning in general. What makes you think that?

GW: Artificial Intelligence has a history of over-promising, and when I started it was a mildly disreputable but deeply fascinating discipline. There were good-old fashioned logical methods, which emphasized symbolic representation and reasoning, and there were optimization methods that dispensed with interpretable representations altogether for "black-box" optimization and signal detection techniques. And none of it really worked. There were hybrid systems in various labs which kluged together symbolic representations of this and perhaps the optimization of an objective function for that, or vice versa, and those messy hacked-together systems were scaled up to industrial size by the likes of Google, Microsoft, and Amazon in the early 2000s. But these were basically gigantic versions of projects that were in university labs and a few industry labs. It was a major engineering feat to scale up these systems, but they were fragile and performance improvements came mostly from brute-force scale, very roughly speaking.

That all changed in the last 5 years. What happened is that the kluged-together symbolic and non-symbolic systems of the past have been rapidly giving way to kluged-together optimization techniques (aka "Deep Learning"), which are breaking through previous ceilings on performance, are less fragile, and are easier to maintain. Image classification is the primary example. But there are a range of successful applications that may not immediately appear to be amenable to the same techniques, such as natural language translation. Microsoft recently announced a speech-to-text translation system that achieves a 5.1% error rate, which matches the best human performance in transcribing spoken language to written text. Skype, which is owned by Microsoft, may soon have real-time language translation capabilities, allowing two people to hold a conversation in their native tongues. So, we have a pretty good working technology for artificial perception — which is amazing. At

the same time, this is only one part of AI.

Returning to your question about epistemology. Nobody — setting aside the singularity fringe — thinks that these recent advances in machine learning will yield up the judgment and common-sense reasoning that is currently missing from these systems. That said, the variety of problems that can be reduced to a perception problem is staggering, where correct classification is enough to achieve desirable goal. I expect that we will continue to be surprised by the range of problems that will be cracked by these methods. Correct classification is another name for finding the truth or making a reliable judgment. What is surprising is the every-growing domain of problems where truths can be learned and reliable judgments be made without much understanding at all. The link between prediction and explanation, which underpins data models in inferential statistics and Bayesian statistics alike, and pervades epistemology, has been cut. So much for evidentialism.

Now, to be sure, there are good reasons to restore this connection between prediction and explanation: if you are turned down for a loan, it is fair to ask for a reason why. Indeed, the European General Data Protection Regulations (GDPR) that will go into effect next year requires that such an explanation be made available to algorithmic decisions involving EU citizens. But, the point is that the connection between explanation and accurate prediction is strictly unnecessary. We have models that make effective predictions but which are incapable of yielding an explanation.

SB: Do you think advances in machine learning are going to change the debate about philosophy of mind?

GW: The steam-engine. Telephone switching centers. The intuitive statistician. The mainframe computer. All of these technologies were used as metaphors in psychology. So, perhaps it is inevitable that as machine learning techniques spread across society and the sciences, we will see those ideas influence how we understand ourselves or the world around us. I saw a conference paper earlier this year that presented a model and evidence for how neurons in our brains performs back propagation! What was once a knock-down argument against artificial neural networks (ANNs) having anything to do with brain science— ANNs rely on back-propagation; brains don't— is now a subject of inquiry in brain science.

There is some very interesting work by Facebook's AI group in creating object masks for images, all built on a convolutional neural network architecture. This system can pick out occluded or partial objects from a photo and accurately identify them. So, a photo with a ball, the back of a person's head, part of a TV screen, et cetera, can be picked out as individual objects, masked by a border, and correctly labeled. This is a big leap beyond classifying an entire photo as one that includes a ball, a person, a TV, et cetera, which was the state of the art a few years ago. Yet this capability is precisely the sort of achievement that a layman may well see and say, "so what?". A child could take a marker, trace around objects in a photo, and write down a correct label. Because people are so good at this task, it is understandable why we do not realize how difficult it is for a machine to do this. And that this has been done on top of an R-CNN architecture is incredible. This is a small step toward the missing "reasoning" and "representation" that motivates logical approaches to AI, but these capabilities are from a "bottom-up" fashion. From the point of view of analytical philosophy, particularly those branches that remain steeped in logic and language, the details of this algorithm will appear completely backwards.

Here is one implication for the philosophy of mind, in broad strokes. It is not uncommon for philosophers of mind to view behavior in terms of agency, and to understand agency in terms of language in general, and ideas about languages from the philosophy of language in particular. Let's face it, analytic philosophy is rooted in language. But the advent of systems that begin with effective behavior and work backwards to proto-representations reverse the implications, throwing into doubt chains of reasoning that ascribe agency to robots or passive systems on the basis of purportedly intensional behavior and misguided ideas of what is mentally necessary to realize such behavior. Similar to the break between explanation and prediction, the role of language and representation in effective behavior will call for reevaluation. Here again there are good reasons to tie together language and action. But the presumption there are intimate and necessary links between language and practical action, which is a legacy of 20th century analytic philosophy, is challenged by the performance of these systems, and in any event the last century's obsession with language will not suit philosophy for the current century. The reign of language is over.

News

Logic in the Wild, 9–10 November

The workshop *Logic in the Wild* was held on November 9th and 10th in Ghent, Belgium. It was the sixth workshop in the *Logic, Reasoning and Rationality* series supported by the Research Foundation Flanders (FWO) through the scientific research network on *Logical and Methodological Analysis of Scientific Reasoning Processes*. The network brings together research groups from nine European universities carrying out research on relevant topics: Adam Mickiewicz University Pozna?, Free University of Brussels, Ghent University, Ruhr-University Bochum, Tilburg University, University College London, University of Antwerp, Utrecht University and VU University Amsterdam. For the duration of the project, from 2015 till 2019, there are two workshops organized per year, one in spring and one in autumn.

The workshop was organized by the Centre for Logic and Philosophy of Science (Ghent University), which coordinates the activities of the network, and the Department of Logic and Cognitive Science (Adam Mickiewicz University, Poznań, Poland). Its title, *Logic in the Wild*, stemmed from Keith Stenning and Michiel van Lambalgen's seminal book *Human Reasoning and Cognitive Science* (MIT Press, 2008) in which the authors both advocate for and exemplify the productivity of the paradigm called a 'practical', or cognitive turn in logical research. The approach draws on enormous achievements of a legion of formal and mathematical logicians, but focuses on the Wild: actual human processes of reasoning and argumentation. Moreover, high standards of inquiry that we owe to formal logicians offer a new quality in research on reasoning and argumentation. In terms of John Corcoran?s distinction between logic as formal ontology and logic as formal epistemology, the aim of the practical turn is to make formal epistemology even more epistemically oriented. This is not to say that this ?practically turned? (or cognitively oriented) logic becomes just a part of psychology. This is to say that this logic aquires a new

task of "systematically keeping track of changing representations of information", as Johan van Benthem puts it, and that it contests the claim that the distinction between descriptive and normative accounts of reasoning is disjoint and exhaustive. From a different than purely psychological perspective logic becomes—again—interested in answering Dewey's question about the Wild: how do we think? This is the new alluring face of psychologism, or cognitivism, in logic, as opposed to the old one, which Frege and Husserl fought against. And this was the area of research to which this workshop was devoted.

The workshop brought together 23 participants who presented talks on applications of logic to analyses of natural language and everyday reasoning phenomena. The keynotes were delivered by Iris van Rooij (Radboud University), Keith Stenning (University of Edinburgh) and Christian Strasser (Ruhr University Bochum).

In her talk 'Cognition in the wild: logic and complexity' Iris van Rooij addressed the issue of computational intractability of models of cognition. Van Rooij's proposal proposal is that cognitive science should recognize tractability as a fundamental constraint on cognition in the wild. She explained how the tractability constraint can serve as a formal guide in theory development and furthermore illustrated how logic-based approaches may especially benefit from this approach as it may enlarge their recognized scope and relevance for cognitive science.

Keith Stenning started his talk, 'Memory is the organ of nonmonotonic reasoning' with a question: Nothing is wilder than the human mind? He outlined a program of research which uses Logic Programming (in a particular flavour) as a model of human semantic memory, in the service of nonmonotonic reasoning to an interpretation. He claimed that applying LP to memory will serve as an example of a relation between logic and the mind, and hopefully motivate some researchers of a logical bent to collaborate with the kind of empirical work which needs to go on. Stenning warned that there is a great danger, on both sides of the cognitive/logical fence, of underestimating the density of the problems which live down this crack. The psychologist who denies the relevance of logic?s 'normative' systems is as numerous as the logician who thinks that his (usually but not always 'his') newly invented logic is straightforwardly a contribution to how human reasoning works.

Christian Strasser's talk 'Reasoning by cases (RbC) in the nonmonotonic wilderness' was concerned with is an inference scheme especially apt for situations in which we deal with incomplete information. He discussed some challenges for defeasible accounts of RbC, highlighted shortcomings of approaches to RbC from the literature on non-monotonic logic, and presented a new account of a defeasible variant of RbC based on formal argumentation.

Rafal Urbaniak
Erik Weber
Ghent University
Mariusz Urbański
Adam Mickiewicz University Poznań

Calls for Papers

Disagreement: Perspectives from Argumentation Theory and Epistemology: special issue of *Topoi*, deadline 31 January.
Decision Theory and the Future of Artificial Intelligence: special issue of *Synthese*, deadline 15 February.
Defeasible and Ampliative Reasoning: special issue of *International Journal of Approximate Reasoning*, deadline 15 February.
Non-Classical Modal and Predicate Logics: special issue of *Logic Journal of the IGPL*, deadline 30 April.

What's Hot in ...

Mathematical Philosophy

Reviving the present column is a good resolution for 2018. The plan is that members and friends of the Munich Center for Mathematical Philosophy (MCMP) will take turns to write it.

To kickstart this, I'd like to share some thoughts about one decision-theoretic issue that has been bugging me recently. The issue arises in Savage's framework. At first, it looks like a terminological puzzle of sorts. But it proves to be more substantial than that.

In Savage's framework, the options between which the decision-maker chooses are acts, i.e., functions from a set of states to a set of payoffs (a.k.a. consequences). Assume that the name of the game is the following. You're supposed to observe the decision-maker's choices between Savagian acts and, based on that information, to identify her beliefs about the likelihood of the states and her preferences between the payoffs. As is well known, in Savage's own take on this identification exercise, the decision-maker's beliefs are quantified by a subjective probability function, her preferences, by a utility function, and her observed choices conform to the rule of maximizing subjective expected utility. As is equally well known, there are many troublesome cases, which Savage's work was instrumental in identifying, where such a model is not applicable.

One such troublesome case seems to be indifferently referred to as "act-state dependence" or "moral hazard" in most of the literature. The intuition is as follows. In some cases, the decision-maker's beliefs about the likelihood of the states will, somehow, depend on the Savagian act under consideration—whence "act-state dependence"—and this, in turn, is best understood with reference to the "moral hazard" cases studied in economics—i.e., essentially, cases where the decision-maker's choices can, somehow, influence the likelihood of the events of interest. Now, here comes the question to which I want to draw your attention: Are "act-state dependence" and "moral hazard" synonyms in decision theory? I'm not denying that there are conditions under which they can be treated as such. I'm asking whether there are not also cases where they cannot.

It turns out that there are, indeed, cases where act-state dependence and moral hazard come apart. Let me start with the simplest of the two stories which I need to tell, namely, that of act-state dependence without moral hazard. In fact, you

could here take as an example many non-expected utility models—provided you look at them from the right angle. Consider, say, Gilboa and Schmeidler's familiar max-min expected utility model. It is usually presented as a multi-prior model in which the decision-maker maximizes, over the set of priors, minimum expected utility. But this means that, equivalently, you can think of the model as attributing to each Savagian act one act-dependent prior. Thus, sticking to the standard (cutting a long story short: epistemic) interpretation of the set of priors we started from, you will have act-state dependence without moral hazard.

Let me now turn to the other story to be told, i.e., that of moral hazard without act-state dependence. The situation is somewhat more subtle. But the literature on moral hazard in economics provides inspiration. The most fundamental issue is, after all, whether the decision-maker can exert some influence on the likelihood of the states, more than how she might exert it, or whether it will always be in ways that are observable to us. Accordingly, assume that there are some unobservable side actions—crucially, do not confuse these side actions with the Savagian acts!—by which the decision-maker can, if she so wishes, influence the likelihood of the states. Otherwise, keep your favorite interpretation of the Savage game unchanged. (Or, if it helps you get a grip on the twist which I'm proposing, think of each Savagian act simply as a bet on the likelihood of the states, with payoffs such as banknotes, teddy bears, or cotton candies—whatever will cure you from the unnecessary philosophical assumptions restricting many interpretations of the Savage framework.) Thus, in general, you will have moral hazard without act-state dependence.

I conclude that, in general, neither act-state dependence nor moral hazard implies the other. Therefore, in general, act-state dependence and moral hazard should not be used interchangeably in decision theory. I cannot elaborate here on the implications of this simple observation. I can only say that they are non-trivial and, arguably, significant.

Jean Baccelli
Ludwig-Maximilians-Universität München

Medieval Reasoning

For readers accustomed to the mathematical symbolism of contemporary logic's formal apparatus, one of the most peculiar yet interesting features of medieval logic is its use of an extremely regimented version of medieval Latin as a logical language, along with the lack of a clear-cut distinction between object-language and meta-language. A few weeks ago, trying to introduce regimentation to the students in my class on Buridan and 14th century nominalism, I asked them: "What is a formal language?". One of the answers surprised me: "It is a language in its higher form as it is codified by an Academy or a similar cultural institution – as the Académie française or the Oxford English Dictionary". What that student had in mind was the sociolinguistic notion of a formal register for what is commonly (however misleadingly) called "natural language". However unexpected, it was certainly an interesting answer, because that sense of "formal" still carries the idea of a kind of speech/writing employing a specific vocabulary and structured rigorously, according to officially sanctioned grammatical, syntactical and semantic rules. While the vocabulary, the rules, and those who do the sanctioning are vastly different, if we take a formal language to be defined as a collection of strings on a fixed alphabet with explicitly stated formation rules, then the sense in which my student intended a language to be formal is not too far removed from the one in which a logical language is formal. Certainly, formal logical languages have a degree of abstraction, symbolisation and de-semantification that sets them apart from natural languages; but it is not obvious at all that symbolisation and de-semantification are sufficient or even necessary conditions to make a language formal. Beyond restating Montargue's and formal linguistics' thesis that natural languages can be treated as formal languages, one could put forth the stronger claim that there is a sense in which formality is not an exclusive property of logical languages, but one that is shared by non-symbolised, non-de-semantified and non-highly-abstracted languages too. If so, then there isn't such a big difference between formalisation and regimentation, or between symbolically formalised languages and regimented languages such as Medieval Logical Latin – or even the formal register of an ordinary language sanctioned by an authoritative Academy. The difference that is there looks like a difference of degree, but not a qualitative one. To explore it, Medieval Logical Latin appears to be the best suited case study: it is as highly artificial as a a "natural" language can get; it has several rules extending, reforming and improving the ordinary grammatical and syntactical rules of Latin and regimenting its semantics; and, last but not least, it was actually used as a logical language. TBC

Curious? Stay tuned till next episode!

Graziana Ciola
Philosophy, Scuola Normale Superiore, Pisa

Philosophy and Economics

As you read this, a New Year will have begun for you. As I *write* this, however, I am just starting to say Goodbye to the old one. You see, what separates us is a crucial timespan of just a few days and weeks in which the old year is essentially done, and the New Year has not yet begun. Most universities and academic matters in the Western hemisphere slow down to their eventual seasonal halt at the end of the year. And we get to take a step back and muse over things future and past. We thus spend some time in a period that does not belong to any particular year, as the German expression "*zwischen den Jahren*" has it. We find ourselves liberated from getting things done in the old year – whether you have given up, simply stopped, or accomplished what there was to accomplish does not matter – but we do not yet have hit the ground running in the New Year. It is your time *between* the years.

Now that I have you in a reflective mood, I would like to invite you to take a note of some Reasoner-related philosophers and economists that we lost in 2017, read up on some of their obituaries, and make sure their work stays with us in the years to come. I am limiting myself to mentioning two philosophers and two economists.

The two philosophers are Derek Parfit and Delia Graff

Fara. Parfit passed away on the first day of 2017. The blog Daily Nous has a very long list of remembrances and obituaries, many of which are truly fascinating. Fara passed away at a still young age, but her work in the philosophy of language, both on names and descriptions and on vagueness was already – and will probably continue to be – very influential. Here is her Princeton obituary and an entry in the blog Daily Nous which contains another obituary.

The two economists are Tony Atkinson and Kenneth Arrow. Arrow might need less of an introduction to this particular Reasoner-crowd, and you can find many of his works on his Stanford page. Atkinson, who also passed away on the very first day of 2017, is most famous for his work on poverty and inequality. There is a website dedicated to his work, with a well-maintained bibliography. Philosopher-economists will be familiar with his 2001 article 'The strange disappearance of welfare economics' (Kyklos 54:193-206), but there is also a 2009 article 'Economics as a moral science" (Economica 76:791-804), that argues in a similar direction: economics should be understood as studying the assumptions of normative statements. The 2009 article is not only updated, but frames the argument more broadly than its 2001 cousin, and discusses the relationship between welfare economics and the capability approach. Many of Atkinson's articles contain methodological reflections, but this one will be the most pronounced.

I have been happily browsing and reading on the work and obituaries of all the aforementioned. Books and papers, and projects related to the work of these four philosophers and economists, are all candidates for going on my todo-list for 2018. Unlike you, I have the advantage of the period between the years still ahead to figure this out. But I hope some of the pointers you find here give you the opportunity to read something you haven't yet, for a slower pace of your start into the New Year.

Conrad Heilmann
Erasmus Institute for Philosophy and Economics (EIPE)
Erasmus University Rotterdam

Events

January

ASET: 6th World Conference on Applied Science, Engineering and Technology, India, 2–3 January.
SEaC: The View from Above: Structure, Emergence and Causation, University of Oxford, 11–12 January.
PhiloMaLogi: Cambridge Graduate Conference on the Philosophy of Mathematics and Logic, University of Cambridge, 20–21 January.
BigDat: 4th International Winter School on Big Data, Romania, 22–26 January.
TaD: New Perspectives on Truth and Deflationism, University of Salzburg, 26–27 January.

February

AppMath&ComSci: International Conference on Applied Mathematics and Theoretical Computer Science, India, 1–3 February.
PresDat: Presenting Data, London, 6 February.
BDAAI&CL: Big Data, Analytics, AI and Machine Learning, Ontario, Canada, 7 February.
MathStatCompSci: International Conference on Advances in Mathematics, Statistics and Computer Science, Dubai, 9–10 February.
A-SRSI: Agent-Specificities and Relationships in Social Interactions, Cologne, Germany, 15–16 February.
OnBlf: Interdisciplinary Workshop on Belief, New York, 15–16 February.
CM&Eval: Causal Modelling and Evaluation, Kings College London, 19–23 February.
MiN-CLogic: Doing Metaphysics in Non-Classical Logic, Lisbon, 22-23 February.

Courses and Programmes

Courses

SIPTA: 8th School on Imprecise Probabilities, Oviedo, 24–28 July.

Computer Simulation Methods: Summer School, High Performance Computing Center Stuttgart (HLRS), 25–29 September.

Programmes

APhil: MA/PhD in Analytic Philosophy, University of Barcelona.
Master Programme: MA in Pure and Applied Logic, University of Barcelona.
Doctoral Programme in Philosophy: Language, Mind and Practice, Department of Philosophy, University of Zurich, Switzerland.
Doctoral Programme in Philosophy: Department of Philosophy, University of Milan, Italy.
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 and 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.
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, Science and Society: TiLPS, 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 Methods and Practices of Philosophical Research: Northern Institute of Philosophy, University of Aberdeen.
MSc in Applied Statistics: Department of Economics, Mathematics and Statistics, Birkbeck, University of London.
MSc in Applied Statistics and Datamining: School of Mathematics and Statistics, University of St Andrews.
MSc in Artificial Intelligence: Faculty of Engineering, University of Leeds.

MSc in Cognitive & Decision Sciences: Psychology, University College London.
MSc in Cognitive Systems: Language, Learning, and Reasoning, University of Potsdam.
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 Mind, Language & Embodied Cognition: School of Philosophy, Psychology and Language Sciences, University of Edinburgh.
MSc in Philosophy of Science, Technology and Society: University of Twente, The Netherlands.
MRes in Cognitive Science and Humanities: Language, Communication and Organization: Institute for Logic, Cognition, Language, and Information, University of the Basque Country (Donostia San Sebastián).
Open Mind: International School of Advanced Studies in Cognitive Sciences, University of Bucharest.
Research Master in Philosophy and Economics: Erasmus University Rotterdam, The Netherlands.

Jobs and Studentships

Jobs

Temporary Lecturer: in Logic and Philosophy of Mathematics, University of Amsterdam, deadline 8 January.
Associate Professor (two): in Statistics, University of Warwick, deadline 10 January.
Professorship: in Theoretical Philosophy, University of Greifswald, Germany, deadline 10 January.
Lecturer: in Medical Statistics, University of Leicester, deadline 11 January.
Lectureship: in Statistics, Lancaster University, deadline 15 January.
Lecturer: in Statistics, University of Otago, deadline 26 January.

Studentships

PhD: in Machine Learning, University of Edinburgh, deadline 5 January.
PhD: in Statistics, University of Oslo, deadline 31 January.
PhD: in Neurophilosophy, LMU Munich, deadline 15 February.

Particle physics has come a long way since the 1700s.