THE REASONER

CONTENTS

EDITORIAL

Dear Reasoners,

welcome to the October 2019 is-
sue of The Reasoner. In it you'll
read about the progress made by
the Logic of Conceivability project
in Amsterdam. You'll also realise
what you missed by not participat-
ing at the "Bayes by the sea" Sum-
mer School and Workshop. And
as usual you'll read what's hot in
a number of areas. This month
with a new column on What's hot
in Science Policy. And owing to
the great work of our news edi-
tor, you'll also have a chance to see reasoning-related courses,
events and openings.

We hope you'll enjoy the issue, and if you do, why not con-
tribute to future ones?

HYKEL HOSNI
University of Milan

FEATURES

DISSEMINATION CORNER

The Logic of Conceivability

The Logic of Conceivability (LoC) project studies the logic of
propositional intentional states (believing that Obama is tall,
imagining that there will be a disorderly Brexit, knowing that
one is not a brain in a vat): given that one Xs, i.e., thinks (be-
lieves, imagines, knows, etc.) that φ, what further ψ's must one
X, as a matter of logic? Articles in *The Reasoner* by LoC re-
searchers Peter and Aybüke have highlighted how theories of
topic or *subject matter* will be important to answer that ques-
tion. LoC is working towards a general modal framework in
this ballpark: the *theory of Topic-Sensitive Intentional Modals*
(TSIMs). Let me unpack.

Since Hintikka, we usually interpret X as a quantifier over
possible worlds, restricted from the standpoint of a given world
(and, agent) by an accessibility relation R: '$X\varphi$' ('one Xs that
φ') is true at w just in case φ is true at a bunch of worlds ac-
cessible from w via R. Then, one Xs all classical logical con-
sequences of what one Xs. This gives very idealized agents
(the problem of 'logical omniscience'). But the debate on epis-
temic closure shows that it's controversial whether X should be
unrestrictedly closed even for logically astute, computationally
unbounded agents: such closure seem to leave us with little
knowledge in the face, e.g., of Cartesian skepticism. Addition-
ally, the standard Hintikkan framework is *monotonic*: it doesn't

straightforwardly model the plausible phenomenon whereby more information can reduce knowledge, or make us lose beliefs.

One can easily destroy any closure property, e.g., by resorting to a purely syntactic approach whereby one's body of information/knowledge/beliefs is represented as a set of formulas with no logical closure properties. However, once we filter out the computational limitations of agents, some forms of closure seem intuitive even for anarchic mental states like imagination, for instance, Conjunction Commutation (try to imagine that Obama is tall and thin without imagining that Obama is thin and tall), and Conjunction Elimination (try to imagine that Obama is tall and thin without imagining that he's tall). Others seem disputable, although they involve elementary logical inferences (Disjunction Introduction: when you imagine that Obama is tall, do you thereby imagine that either Obama is tall, or there's water on Kepler-452b?), and even for more disciplined states like knowledge (You know you have hands, and there's no way you can have hands while being a bodiless brain in a vat; are you thereby in a position to know you're not a brain in a vat?).

The three main ways in which TSIM theory differs from the Hintikkan mainsteam are:

(1) The Hintikkan operators are one-place modals. The TSIMs are two-place modals: things of the form '$X^\varphi \psi$', to be generically read as 'Given φ, the agent Xs that ψ'. (One can recover some paradigmatically unary-sounding modals such as 'one believes that ψ' by trivializing the φ in $X^\varphi \psi$.)

(2) The $X^\varphi \psi$'s are *variably strict* modals. Variability represents the (contextual) selection of information imported into the Xed content on the basis of ϕ. The operators turn out to be non-monotonic: one may X that ψ given φ, not X that ψ given $\varphi \wedge \chi$. Doxastic/epistemic logic, in TSIM clothing, becomes a kind of non-monotonic, conditional logic.

(3) The $X^\varphi \psi$'s encompass a *topicality* or *aboutness* constraint, capturing their *intentional* features: their being about certain contents or topics towards which the mind is directed (and, most importantly, *not* about other contents, to which it's not directed).

Work on aboutness has been burgeoning thanks, among others, to Humberstone, Fine, Yablo. Aboutness is 'the relation that meaningful items bear to whatever it is that they are *on* or *of* or that they *address* or *concern*' (Yablo, *Aboutness*, Princeton UP 2014, p. 1). This is their *subject matter*, or *topic*. In various forms of subject matter semantics, necessarily equivalent sentences φ and ψ can differ in their propositional content when they are about different things. The content of a sentence (in context) is not specified (just) by the set of worlds in which it is true, but (also) by what it's about. Subject matter semantics is, thus, in general *hyperintensional*: '2 + 2 = 4' and 'Either St Andrews is in Scotland, or not' differ in content in spite of being true at the same worlds, for they say different things: only one is about numbers.

Mental states can bear aboutness, too. A core twofold insight behind TSIM theory is that:

(i) The aboutness of an intentional state, Xing that φ, is in line with that of the proposition, P, which makes for the content of φ;

(ii) P should not be understood just as a set of possible worlds, but also in terms of what φ is about: its topic, or subject matter.

In the basic semantics, a generic TSIM '$X^\varphi \psi$' gets a two-component meaning: it is true at world w just in case

(1) (*Truth-conditional component*:) ψ is true at a set of worlds, selected by a *set-selection function* paired to φ, f_φ. Think of $f_\varphi(w)$ as outputting the set of worlds which are, in some sense, cognitively accessible for the agent located at w, given input φ (specific readings depend on imposing conditions on the f_φ's – more on this later);

(2) (*Topicality component*:) ψ is fully on-topic with respect to φ. That is, what (the proposition expressed by) ψ is about is included in what (ditto) φ is about.

(1) makes of the TSIMs non-monotonic, variably strict modals. (2) makes them topic-sensitive. Topic-inclusion is captured via a simple mereology of topics, determining the behaviour of the logical vocabulary. The Boolean operators are *topic-transparent*: they add no subject matter of their own. The topic of $\neg\varphi$ it the same as that of φ ('Obama is not tall' is exactly about what 'Obama is tall' is about – say, *Obama's height*); conjunction and disjunction merge topics ('Obama is tall and handsome' and 'Obama is tall or handsome' are both about the same topic: *the height and looks of Obama's*). This seems right for the corresponding intentional states, too: when you think that Obama is not tall, you are thinking about *Obama's height*, and that's exactly what you are thinking about when you think that Obama *is* tall. When you think that Obama is tall and handsome, you think about *Obama's height and looks*, so in particular, you do think about Obama's height: that's just part of what you are thinking about. But when you think that Obama is tall, you don't seem to thereby be automatically thinking that he's tall or handsome, for you may not be thinking about *Obama's looks* at all.

This setting delivers a number of closure properties for X, e.g., where ⊨ is logical consequence (defined the usual way, as truth preservation at all worlds of all models):

(CE) Conjunction Elimination: $X^\varphi(\psi \wedge \chi) \vDash X^\varphi \psi$.

(CC) Conjunction Commutation: $X^\varphi(\psi \wedge \chi) \vDash X^\varphi(\chi \wedge \psi)$.

(CI) Conjunction Introduction: $X^\varphi \psi, X^\varphi \chi \vDash X^\varphi(\psi \wedge \chi)$.

Once one factors out forms of non-omniscience due only to limitations in people's computing capacities, these seem plausible for a number of states: (given some φ) one cannot know that Lisa is rich and happy without knowing that she's rich, or imagine that John is tall and thin without imagining that he is thin and tall, or believe that Mary is funny and that Mary is happy without believing that she's funny and happy.

This setting also gives a number of invalidities, e.g., where $\Rightarrow$ is a strict conditional, i.e., '$\psi \Rightarrow \chi$' says that there's no world where ψ is true but χ is false:

(CSC) (Failure of) Closure under Strict Conditional: $X^\varphi\psi, \psi \Rightarrow \chi \nVdash X^\varphi\chi$.

This also seems right for various states – take a salient one: knowledge. Given empirical evidence φ, you are in a position to know that ψ: you have hands. There's no way you can be a handless brain in a vat if you have hands ($\psi \Rightarrow \chi$). But that empirical evidence may not put you in a position to know you're no brain in a vat. What makes CSC fail is that the implication from ϕ to ψ, albeit necessary, can take you off-topic: your evidence does not address the topic of far-fetched, skeptical scenarios.

By imposing conditions on the f_φ's, one gets more specific TSIM operators, expressing, e.g., knowability relative to information, mental simulation, and conditional belief and validating specific inferences. More sophisticated TSIM-frameworks to be delivered soon by LoC, so stay tuned!

Franz Berto

University of St Andrews and University of Amsterdam

News

Bayes By the Sea Summer School and Conference, 25th August to 1st September

The second Bayes By the Sea event took place this summer at Univpm, Ancona, Italy. It was funded by the European Research Council (ERC). The event combined a summer school with a conference. Our aims were (1) to advance the interdisciplinary study of Bayesianism and related topics; (2) to aid the investigation of strategic behaviour in science. To our delight, these goals were fully achieved.

In the summer school component, the subjects taught were probability theory (Philip Dawid and Serena Doria) epistemology (William Peden) philosophy of science (Stephan Hartmann and Jan Sprenger) and statistics (Teddy Seidenfeld and Momme von Sydow) all from a Bayesian perspective. There were also classes on epistemic game theory (AndrÈs Perea and Mantas Radzvilas). The summer school consisted of lectures, tutorials, exercises/group work, and social events.

The opening lecture was by Stephan Hartmann (LMU). It outlined some cutting-edge Bayesian philosophy. Hartmann began by discussing Bayesianismís proven potential as a theory of reasoning. He noted some contemporary challenges, such as how to model discoveries of causal relations or how to incorporate the learning of conditionals into Bayesian updating. Hartmann described the ìdistance-basedî approach, whereby one tries to minimise the difference between the prior probabilities and the posterior probabilities according to some measure of distance, as a supplement to standard conditionalisation in such circumstances.

In addition to his three lectures within the summer school, AndrÈs Perea (Maastricht University) gave a lecture in the conference. The first talk discussed the implications of common belief in rationality for static games with unawareness. Common belief in rationality occurs when all players in a game believe that every other player is rational. Static games with unawareness are those in which some of the choices made by other players are hidden from a given player. Perea formulated a model for such games and a formal procedure for identifying dominant strategies in them.

Teddy Seidenfeld (Carnegie Mellon University) started his lecture by noting that the requirement of finite additivity is often considered to be a weakness of Bruno De Finettiís theory of probability. In contrast, Seidenfeld considered some of the advantages of this requirement. He showed how assuming finite additivity enables the proof of some powerful theorems in decision theory. In short, as Seidenfeld put it, he took the ìlemonî of De Finettiís finite additivity axiom and used it to make ìlemonadeî.

The short talks brought together researchers from all over the world and across a variety of disciplines. In decision theory, Jimin Kwon (UCSD) examined cautious decision-making and risk-weighted expected utility theory with imprecise probabilities. Stefano Bonzio (Univpm) offered an algebraic and geometrical characterization of De Finettiís celebrated theorem regarding coherent gambling. Serena Doria (UniCH) investigated the applications of Hausdorff outer measures for defining parts of an interval-valued imprecise credence function.

In formal epistemology, Brett Topey (University of Salzburg) argued the ìplanning frameworkî approach suggested by philosophers like Miriam Schoenfield will not do the work they intend it to do. Momme von Sydow (LMU) applied second-order probabilities to the challenging task of modelling beliefs via probabilities. Silvia Milano (University of Oxford) discussed updating by a rule called ìur-prior conditionalizationî. Miriam Bowen (University of Leeds) developed an answer to the Probabilistic Liar Paradox using suspended judgement, a type of imprecise belief. Richard Lohse (University of Konstanz) criticised Richard Pettigrew's accuracy argument for probabilism. Tamaz Tokhadze (University of Sussex) argued that Timothy Williamsonís E=K thesis is either mistaken or commits us to radical scepticism about induction. William Peden (Univpm/Durham) proposed a solution to the Paradox of the Ravens, via distinguishing ìconfirmation simpliciterî and ìpredictive confirmationî. Barbara Osimani (Univpm) explained an approach to evidence in terms of strategic signalling, and applied it to the weighting of (1) evidence from a variety of sources versus (2) otherwise comparable evidence from the same source.

There were also talks in social epistemology, economics, and game theory. Liam Kofi Bright (LSE) argued that it is possible for a veritist (who believes that only acquiring true/avoid false beliefs matters for evaluating epistemic practices) to prohibit fraud universally, even though fraud might sometimes be conducive towards true beliefs. Michele Crescenzi (University of Helsinki) expanded models of rational consensus by relaxing the standard assumption that the state space of agreement/disagreement is either a probability space or finite. Giacomo Sillari (Luiss Guido Carli University) investigated how agents can successfully coordinate when there are multiple ways to coordinate action. Oliver Braganza (University of Bonn) examined the economics of proxy measures for outcomes across a wide range of domains. Pavel Janda (Gdaʔsk University) explored rational strategies for game players with imperfect recall. Mantas Radzvilas (LMU) used a sender-receiver game-theoretic framework to inquire into optimal lying, and how the incentives for lying can be modified in areas such as pharmaceutical regulation. Nicola Matteucci (Univpm) discussed Italian gambling policy in relation to regulatory capture.

Several common themes emerged across the talks. Many researchers were interested in accuracy-based arguments for

Bayesianism. Additionally, the work of Italyís own De Finetti continued to stimulate research: the formal investigation of issues raised by his work is still a reliable source of fresh ideas.

We eagerly look forward to the third Bayes By the Sea in 2020. For more information on our past events, see `http://www.bayesbythesea.com/`. This news report was supported by the ERC, on the project Philosophy of Pharmacology: Safety, Statistical standards and Evidence Amalgamation (Grant Agreement ID 639276). For more information on this project, see `http://philpharmblog.wordpress.com/`

WILLIAM PEDEN
Philosophy, Univpm/Durham

Calls for Papers

IMPRECISE PROBABILITIES, LOGIC AND RATIONALITY: special issue of *International Journal of Approximate Reasoning*, deadline 1 October.

NANCY CARTWRIGHT'S PHILOSOPHY OF SCIENCE: special issue of *Theoria*, deadline 1 November.

IDEALIZATION, REPRESENTATION, EXPLANATION ACROSS THE SCIENCES: special issue of *Studies in History and Philosophy of Science Part A*, deadline 15 January.

WHAT'S HOT IN . . .

Medieval Reasoning

[. . . continuing]

Was Latin back then more egalitarian than English is today? Most people could not even read or write in their own national language, and education (especially of women) was often close to nonexistent, which overall, by today standards, doesn't seem very egalitarian at all. However, on the one hand, people could have some degree of access to education across social classes often by joining a religious order – this was especially true for women (*Get thee to a nunnery, go!*). On the other hand, those who did learn how to read and write, often managed to learn Latin too, sometimes very well at a very young age. For example, William Fitztephen (writing around 1170) describes a group of twelve to fourteen years old boys in a London churchyard disputing... some in demonstrative rhetoric, others in dialectic. Some 'hurtle enthymemes', others with greater skill employ perfect syllogisms. Boys of different schools strive against one another in verse, or contend concerning the principles of grammar, or the rules concerning past and future. There are others who employ the old art of crossroads in epigrams, rhymes and metre. Was Medieval Latin philosophy as insular as contemporary Anglophone philosophy? In some sense, Medieval philosophy in Latin sometimes shared a few of the shortcomings of Anglophone philosophy – e.g. making general claims about the nature or deep structures of Language itself, despite those claims being dependent of very specific languages and hardly generalisables. As much as English dominates the academic scene nowadays, during the Middle Ages in order to join the philosophical community one had to use Latin – and not doing so would immediately mark someone as an amateur. Moreover, for a very long time, the average Latin Medieval author was almost as ignorant of other languages as the average native Anglophone philosopher is: only a few were fluent Arabic or Hebrew, and even fewer knew Greek. But there are at least two major differences in the way Medieval Latin philosophy and contemporary Anglophone philosophy relate to other linguistic traditions. First, at some point in the central to later Middle Ages, the Latins produced an enormous wave of translations of ancient classics and "modern" Arabic philosophy, first from Arabic and then from Ancient Greek as well. Second, as far as we know at the moment, there was not an enormous and disproportionate influence of Latin philosophy on other linguistic philosophical traditions, quite the contrary. Overall, then, Latin Medieval philosophy was neither as insular as Anglophone philosophy nor as "imperialistic", so to speak, or unbalanced in favour of a group of speakers. Its language was more artificial and highly regimented, which constituted a loss in style and elegance, but it was also a gain in precision. . . . While I am not remotely suggesting to go back to doing philosophy in zombie Latin, it seems to be the case that the undead lingua franca of our predecessors worked quite a bit better for them than English is working for us. Besides,*quidquid latine dictum sit, altum videtur*! And who can deny that?

GRAZIANA CIOLA
Durham University

Science Policy

The supervision of PhD research is a special form of education that is focused on the individual work with an expert. It is envisioned as intensive and beneficial for the student. It has been argued that while the traditional supervision system involved a strict authoritarian relationship these strings nowadays loosen, Torralba, J. M. (2019: "10 ingredients for a successful supervisor/PhD student relationship". Elsevier Connect.) Still, is the new system radically different from the traditional one?

The relationship student-supervisor is both fragile and intensive. It is governed by two types of dependencies. The first one is the epistemic dependence that is mirrored in the knowledge that the supervisor has and the student has not yet acquired. The other dependence is the existential dependence of the student, both with respect to the current job contract and future job opportunities. Systematic solutions regulating the exclusive teaching relationship are lacking and it seems that everything that remains is the trust that two adults will find mutual respect. However, there is no evidence that in the situation of a semi-regulated power position we should expect that this power will never be abused. Frequently in communication with early-career researchers one can hear complains that the demands of their supervisors are too strict, extensive and sometimes cross the professional borders.

These experiences many of us had. We can learn about them from friends during conference breaks, and even overhear from the conversations of complete strangers. During qualitative interviews with early-career biologist working abroad, our group in Belgrade learned that an additional problematic dimension comes from hiring people from different countries. Early-career researchers coming from poorer countries often feel stronger pressure to preserve their job and the supervisor is perceived as the only one who can provide the desired possi-

bility of remaining in a foreign country and receiving a higher salary. This can increase their existential dependency on the supervisor who is often aware of it. Female participants even reported pressure coming from the supervisor on their family planning. "We knew it: you can do everything, just do not stay pregnant" reported a participant.

Early-career scholars are not a commodity. They are talented, educated and highly motivated people determined to invest substantial time into their research and often teaching. Their work is hard and demanding. Their role is dual: both to acquire and disseminate the knowledge. Many bachelor students gain their knowledge from PhD students. Moreover, even the traditional supervision is ideally bi-directional: both the supervisor and the student should learn from each other.

Early-career researchers should be treated with respect and care. The existential dependency on the supervisor needs to be removed from the mentoring system. PhD students should be given job contracts for the whole duration of their studies, decent salaries and should not be dependent on a single person. The myth that the supervisor-student relationship is forever and that it marks the whole professional life of a student needs to be actively dismissed. This is a strictly professional relationship and it is not forever. In the current circumstance, already making students to feel free to change their supervisors, research topics and institutions would be a huge improvement.

The other potentially destructive pattern is linking professor's success to the success of her students. This reasoning mistake can lead some supervisors to invest a lot of resources in the success, e.g., publications, and later placement of their students, while not understanding that the ambitions of the student might be very different, or that in such a way early-career researches from other communities get a disadvantage.

The process of writing a PhD thesis is difficult and demanding by itself. Overwork and stress in some cases even endanger mental health of early-career researchers (see "Being a PhD student shouldn't be bad for your health" (2019). Nature 569, 307.) This seems to be a too high price to pay for a diploma. Pressure on graduate students that comes from the unfavourable power position is hard to justify.

Allowing for cumulative theses or several supervisors can decrease the dependence of students. Having more than one supervisor allows student to seek help and guidance from different sources. A cumulative thesis can ideally guarantee completion of the studies given that the student published a sufficient number of scientific articles. This opens a window of opportunity for reforming the existing system.

Vlasta Sikimić
University of Belgrade

Events

October

EPoS: Experimental Philosophy of Science, Aarhus University, Denmark, 15–16 October.

RECSaC: Radical Enactive Cognitive Science and its Critics, Nova University of Lisbon, 16–17 October.

BIRDS: Bridging the Gap between Information Science, Information Retrieval and Data Science, Melbourne, Australia, 19 October.
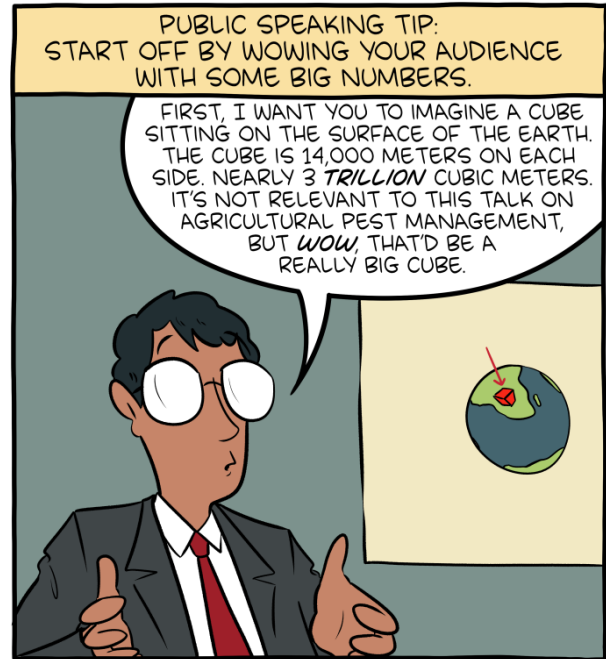
November

RaE: Reasoning About Evidence, University of Ghent, 4–6 November.

PT&O: Post-Truth and the Objectivity of Epistemic Norms, University of Sussex, 7–8 November.

December

CML: Causal Machine Learning, Vancouver, 13–14 December.

Courses and Programmes

Courses

SSA: Summer School on Argumentation: Computational and Linguistic Perspectives on Argumentation, Warsaw, Poland, 6–10 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.

LogiCS: Joint doctoral program on Logical Methods in Computer Science, TU Wien, TU Graz, and JKU Linz, Austria.

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

Postdoctoral Researcher: in Philosophy of Science, University of Turin, deadline 8 October.

Post-doc positions: in Robot Learning, Decision Making and Control, Alto University, deadline 15 October.

Bertrand Russell Professorship of Philosophy: in Theoretical Philosophy, University of Cambridge, deadline 18 October.

Lectureship/Associate Professor: in Philosophy of Science, University of Southampton, deadline 19 October.

Assistant/Associate Professor: in Statistics or Applied Probability, University of Nottingham, deadline 24 October.