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# THE REASONER

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VOLUME 13, NUMBER 1

JANUARY 2019

[thereasoner.org](http://thereasoner.org)

ISSN 1757-0522

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to how the mind works. He has been working on the development of this theory with an interdisciplinary approach, joining efforts with collaborators from diverse backgrounds, including linguistics, psychology, and philosophy. The erotetic theory aims to explain both failures and successes of reasoning. There are various proposals to explain failures of reasoning such as our tendency to pick the wrong cards when we face the Wason selection task, or the phenomenon of so-called illusory inferences. Less attention has been paid to explaining how we can get classically sound reasoning, in this context. The erotetic theory developed by Professor Koralus and his collaborators aims to explain both of these aspects of reasoning through the role questions play in our thinking.

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Maimonides Centre for Advanced Studies

## FEATURES

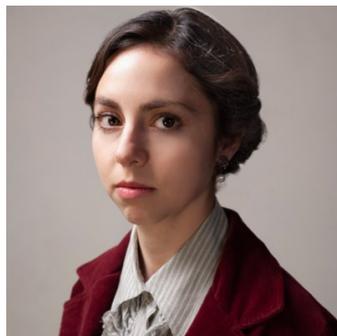
### Interview with Philipp Koralus

**Nancy Abigail Nuñez Hernández** Could you start by telling us a little bit about your background, who you are, and how you got into philosophy?

**Philipp Koralus** When I was very young, I remember my mother walked me past a university building and explained what it was, though she did not have the opportunity to attend. I was immediately attracted by the notion that there is a business called academia in which it is people's job to come up with ideas nobody has thought before, and where some of those ideas might turn out to be worthwhile. Growing up, I was drawn to both the sciences and the humanities, the former for its clarity and rigor and the latter for its air of complete freedom. My first serious academic interest was artificial intelligence, as a kind of vehicle to study thought itself. However, I soon realized that I wanted to study the mind in a way that has a place

## GUEST EDITORIAL

I am delighted to be serving as the Guest Editor for this issue of *The Reasoner*, and to share with you an interview with Philipp Koralus, Fulford Clarendon Associate Professor in Philosophy of Mind and Cognitive Science at the University of Oxford, where he is also the Director of the Laboratory for the Philosophy and Psychology of Rationality and Decision (LPPRD). His main line of work is on the erotetic theory. According to this theory, the aim of resolving questions is central



to how the mind works. He has been working on the development of this theory with an interdisciplinary approach, joining efforts with collaborators from diverse backgrounds, including linguistics, psychology, and philosophy. The erotetic theory aims to explain both failures and successes of reasoning. There are various proposals to explain failures of reasoning such as our tendency to pick the wrong cards when we face the Wason selection task, or the phenomenon of so-called illusory inferences. Less attention has been paid to explaining how we can get classically sound reasoning, in this context. The erotetic theory developed by Professor Koralus and his collaborators aims to explain both of these aspects of reasoning through the role questions play in our thinking.

for the human first-person perspective. At the time, I was lucky to be able to leave behind some troubled schools and become a boarder at Brockwood Park. This school values meditative introspection and treats exams as secondary. Browsing the library and bookshops, I came across both Kant's *Critique* and Chomsky's *Minimalist Program*, as well as an anthology with papers by Fodor. Of course, most of it didn't make sense to me at the time, but some of the questions that were raised stayed with me.

**NN** So did you get into philosophy right away when you went to University? **PK** Not at all. It took me a couple of years in college to figure out that various topics that interested me in the humanities, cognitive science, and social science were united in philosophy. I was very lucky to be at Pomona College, a liberal arts college, that permitted that kind of exploration. The final turning point into philosophy came in a literature translation tutorial, of all places. At one point, the Professor, who was a linguist, had enough of me spending more time talking about concepts than about the subtleties of French syntax. He got up and marched me down the hall to the office of one his colleagues in the Cognitive Science Program, Jay Atlas, who is a philosopher of language. You might say I was a difficult student. I was lucky that Jay took the trouble to have a series of long conversations with me about logic, language, and philosophy. That was when I realized that philosophy had been my subject all along, even though I had not yet taken a single philosophy course! I then doubled up on coursework so I could be ready to apply for graduate school a year-and-a-half or so later. Since I had unwittingly been sifting my previous courses for whatever philosophical content they had, making this jump was easier than it might sound. Also, clarity of objective can give you a remarkable kind of efficiency.

**NN** Did this way of getting into philosophy influence how you see the discipline? **PK** Mainly, I try to keep my office door open for promising students regardless of their degree specialty. For example, Vincent Wang walked into my office as a mathematics and computer science undergraduate at St. Catherine's College, Oxford. A few years later, we are now writing a paper together.

**NN** When you were at Princeton, you ended up doing a joint degree in Philosophy and Neuroscience for your Ph. D. How did that come about?

**PK** The most systematic theories of cognitive capacities seemed to me to be found in linguistics and in the cognitive neuroscience of vision. I had already read quite a lot of linguistics and psychology, and it seemed like I ought to learn more about the brain. I was able to petition the university to allow for a combination of philosophy and neuroscience. After doing some work on the neural correlates of moral judgment, with Walter Sinnott-Armstrong, Thalia Wheatley, and others, I gravitated back toward more "first person perspective" topics that were complementing my dissertation work on philosophy of language, particularly once I came across Phil Johnson-Laird's



work, who eventually became a co-advisor along with Gideon Rosen and Gil Harman.

**NN** What is the main focus of your work now?

**PK** Reasoning and decision-making (I'll just say "reasoning" for short). Reasoning is one of the hardest and one of the most promising things we could study. Just think how many kinds of human activities, both practical and theoretical, ultimately revolve around what people conclude or decide.

**NN** Could you briefly explain the erotetic theory?

**PK** As I see it, if we want to understand the human capacity for reasoning, we need to understand both how this capacity allows for systematically correct reasoning and how this capacity engenders fallacies. The erotetic, or question-based, theory is an attempt to do both. Once we look at the mathematical formulation of the theory, things get complicated, but the underlying idea is quite simple. Reasoning always begins with an issue or a question. I say "issue" here to avoid any suggestion that thought is limited to natural language. Once we have an issue on board, we try to treat further inputs as answers to this issue, even in cases in which those inputs cannot settle it from a logical or probabilistic point of view. You might ask where those issues come from.

**NN** Let's say I asked.

**PK** A growing number of linguists have been arguing that various unexpected parts of language give voice to issues. For example, on this view, if we interpret the statement "there is an ace and a queen in the hand, or there is a king and a jack," that gives rise to the issue of whether we are in an ace-and-queen situation or in a king-and-jack situation. Let's imagine that we have a large hand of cards and are trying to decide what we may conclude about them. The erotetic theory holds that if we are now given the further information, "there is an ace in the hand," we will tend to treat this information as a strong answer to our issue – and we will end up concluding "there is an ace and a queen." But this is what Clare Walsh and Phil Johnson-Laird dubbed an illusory inference. Almost everyone makes this inference on a first look, but it is a fallacy.

**NN** How does correct reasoning come into the picture?

**PK** On the erotetic theory, if we had raised enough further questions to alert us to the possibility of there being an ace but no queen, before taking on board something as an answer, we could have avoided the fallacy we just discussed. The erotic theory holds that the same systems that produce fallacies also allow us to reason correctly – we just have to be more inquisitive. Beyond the toy example we just discussed, systematically correct reasoning and decision-making as well as a very large catalogue of seemingly unrelated reasoning and decision-making errors can be explained through similar question/answer patterns. Once we look at the mathematical representation of the theory, we can see that we can get classically sound reasoning and rational choice as special cases.

**NN** How does this relate to the cognitive psychology of reasoning?

**PK** Phil Johnson-Laird generously suggested in a previous issue of *The Reasoner* that I am making mental models compatible with logic. From the vantage point of cognitive psychology, a useful perspective on the erotetic theory would be to say that I am on board with the view that inference is a matter of the dynamics of updating mental models. I would then add that the nature of this update process, both in reasoning success and in reasoning failure, is explained by the relationship between questions and answers, and that we should make mental

models and their dynamics mathematically precise.

**NN** How did you come up with the erotetic theory? **PK** The core of it emerged as a collaborative effort with Salvador Mascarenhas. My own starting point was becoming convinced that we interpret sentences relative to a question we seek to answer, and that this question has psychological reality as a mental model. I took some tentative steps toward formalizing mental model theory to articulate this view while I was at the Institute for Advanced Study at the University of Notre Dame. Around the same time, Salvador, whom I had met at the now legendary 2005 LSA meeting at MIT [celebrating 50 years of Chomsky's *Logical Structure of Linguistic Theory*], was working on the logic of questions and its application to semantics. When I later moved to the Philosophy-Neuroscience-and-Psychology Program at Washington University in St. Louis, I invited Salvador to give a guest lecture in a seminar, and it became clear to us over dinner afterwards that what we had individually done could add up to a theory of reasoning. Kit Fine provided some useful suggestions as well. It then only took about three or four months to write a draft of the first formally complete erotetic theory for propositional reasoning. During chunks of that time, Salvador and I were basically occupying a common room in the NYU Linguistics Department, yelling at each other and laughing in equal measure in front of a white board. We'd occasionally take breaks to eat take-out and watch episodes of *Game of Thrones* to keep symbol fatigue at bay.

**NN** Tell us more about your lab at Oxford.

**PK** I started the laboratory for the philosophy and psychology of rationality and decision (LPPRD) to continue doing interdisciplinary work. Generous support from the Laces Trust and St. Catherine's College allowed me to bring Salvador to Oxford before he founded his own group at the École Normale Supérieure in Paris. More recently, I have collaborated with Vincent Wang and Sean Moss, two mathematicians, and Beau Mount, a philosopher, on increasing the expressive power of the erotetic theory to quantification. I have also collaborated with Mark Alfano to apply the erotetic theory to moral judgment, and with Jens Madsen, Ernesto Carrella, and Richard Bailey (respectively in psychology, computational economics, and geography), to use the erotetic theory in a computer model of decision making for natural resource management. We've also got some projects in the works with Sunny Khemlani.

**NN** What do you think about interdisciplinary collaborations in light of that experience?

**PK** Interdisciplinary collaborations happen naturally if one is dealing with questions that belong to multiple disciplines. I largely forget people's home discipline once work gets under way. Beyond a commitment to rational inquiry, you just need enough slack in the system for informal interactions in which researchers might discover shared interests. Institutions that provide food and drink without some immediate agenda have a natural advantage. **NN** What do you think about experimental philosophy?

**PK** Empirical work conducted by philosophers is often excellent when the questions being asked are of the kind that can be settled by empirical work. In that case, results are often very robust since they tend to involve effects that are strong enough to be *almost* available by introspection. It can be good psychology unhampered by professional pressure to be methodologically clever for its own sake.

**NN** What do you enjoy the most about being a member of Oxford's Faculty of Philosophy?

**PK** What I like the most about Oxford is the overall sense of intellectual freedom. This seems to me to be closely connected to the fact that the center of gravity of the University is made up of over 30 colleges that have a considerable degree of administrative and financial independence and that are largely governed by the consensus of their Fellows. The element of decentralization may be part of what explains the resilience of the institution through history. People have been teaching philosophical texts here since at least 1096. Perhaps surprisingly, Oxford is less hierarchical than many other universities. The fact that we sometimes wear gowns is often misunderstood from a distance. I see the unusual amount of ceremony as another strength of the institution. It is a way of collectively bearing witness to the intrinsic value and dignity of the scholarly enterprise, which includes students, academics, and staff. You might say that all sounds like a bit much, but I think we should not be afraid to celebrate these things.

**NN** What do you feel passion for besides philosophy?

**PK** I would like to say culture in most of its forms, both "high" and "low". There usually end up being feedback loops into work. Behind me where I sit in my office is a print that resulted from a collaboration between the artist Geraldine van Heemstra and the Thai-British composer Prach Boondiskulchok, who is a good friend, visualizing one of his piano pieces. I am not musical but I find it resonates with my thought processes, so I enjoy seeing it when I get to my desk.

**NN** What is the first thing you would advise someone interested in the erotetic theory to read?

**PK** A good starting point would be the following:

Koralus, P., & Mascarenhas, S. (2018). Illusory inferences in a question-based theory of reasoning. [https://doi.org/10.1163/9789004365445\\_011](https://doi.org/10.1163/9789004365445_011)

Koralus, P., & Alfano, M. (2017). Reasons-based moral judgment and the erotetic theory. <http://psycnet.apa.org/record/2017-16691-004>

If that looks sufficiently interesting, you could keep an eye out for my book *Reason and Inquiry*, which I am in the process of completing for Oxford University Press. There, I present the erotetic theory as a more general mathematical approach to problems in reasoning and decision making.

## NEWS

### **Scientific Reasoning in Action—From the Early Modern Period to 1900, 10–12 October**

The workshop *Scientific Reasoning in Action—From the Early Modern Period to 1900* was held from October 10 till 12 in Ghent, Belgium. It was the eighth 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 Poznań, 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 2016 till 2020, two workshops are organized every per year (one in spring and one in autumn). The eighth workshop was organized by the

Centre for Logic and Philosophy of Science of Ghent University, which coordinates the activities of the network, and the Centre for Logic and Philosophy of Science of the Free University of Brussels (VUB).

The aim of the workshop was to scrutinize scientific reasoning processes in actual scientific practice (induction, transduction, abduction, analogical and statistical reasoning, and, in general, reasoning from observational and experimental information, and collecting experientia and observation), ranging from the early modern period to 1900. Contributions on all scientific disciplines were allowed, provided that they approached scientific reasoning processes from an integrated history and philosophy of science (&HPS) perspective. This means that the speakers integrated historical and philosophical perspectives in their analyses.

The workshop brought together 13 participants who presented talks on a variety of scientists, including Ludwig Boltzmann, Galileo Galilei, Christiaan Huygens, Johannes Kepler, James Lind, Ernst Mach, and Isaac Newton. A variety of philosophical topics were covered, with an emphasis on processes of discovery and justification. In this vein, abduction and analogy emerged as important themes. Further topics included criteria of intelligibility, the relationship between metaphysics and scientific practice, the historical development of science as problem solving, and forms of experimental inquiry. Throughout, discussants were attentive to the ways in which history of science and philosophy of science have traditionally been blended, and to the question of how they can remain mutually beneficial given recent evolutions.

The keynote talks delivered by Maarten Van Dyck (Ghent), Marij van Strien (Wuppertal) and Charles Wolfe (Ghent). We give a brief summary of each keynote.

Maarten Van Dyck's talk was on *Physics as a Problem Solving Activity*. His starting point was that the scientific revolution is often linked with the idea of "mathematization". To properly analyze the contribution of mathematics to the new sciences, he argued, it is important to start from sixteenth-century mathematics, especially mixed mathematical practices like astronomy. Van Dyck suggested that these practices can be characterized as means for the organization and manipulation of information about nature. In other words, mathematical instruments and tables (essential to key sixteenth-century activities like navigating, surveying and time keeping) functioned as ways to network observations into useful results. Van Dyck suggested that it was this use of mathematics as a discreet problem-solving practice that offered new ideals of knowledge, which would profoundly change the nature of physics.

The contribution of Marij van Strien was entitled *Reasoning from Metaphysical Principles in Nineteenth-Century Physics*. She examined what an ideal theory looked like according to classical mechanics and how this view shifted in the late nineteenth century. Physics being the most fundamental of the natural sciences, it is often expected to give an ultimate description of nature; the ontology put forward in physics is then the basic ontology of the natural world. But in the late nineteenth century, many physicists, including Mach and Poincaré, explicitly restricted themselves to giving mere descriptions of phenomena, while being agnostic about ontology. Marij van Strien examined the background of this shift in light of the aims and problems of physics in the period, and showed how this shift both reflected and influenced scientific practice.

Finally, Charles Wolfe presented a paper entitled *The Idea*

of "*Philosophy of Biology before Biology*". He focused on the theoretical 'world' or 'context' out of which the science ultimately called 'biology' emerged. Wolfe's approach to biology's genesis is neither an internalist study of biological doctrines, nor a reconstruction of the role philosophical concepts might have played in the constitution of biology as science; it looks more at the interplay between metaphysical and empirical issues, and considers that both are constrained and affected by 'historical' context features. This 'philosophy of biology before biology' has implications for understanding the relations between philosophy and biology in the mid- to late eighteenth century, but also affects our present understanding of philosophy of biology.

ERIK WEBER

Ghent University

JONATHAN REGIER

Ghent University

STEFFEN DUCHEYNE

Free University of Brussels

## Causation vs Constitution—Loosening the Friction, 3–4 December

[Causation vs Constitution—Loosening the Friction](#) organized by Michael Baumgartner (Bergen), Lorenzo Casini (Geneva), and Veli-Pekka Parkkinen (Bergen), took place at the University of Bergen, Norway, on 3–4 December. The aim of the meeting was to bring together scholars working on the interplay between causation and constitution in explanation, discovery, and modeling.

The meeting commenced on Monday December 3rd, and Bert Leuridan (University of Antwerp) kicked things off with a talk that focused on mechanistic explanations, and in particular the consequences of moving from a leveled view of mechanisms (as in e.g., Craver's early work) to a "flat" view of mechanisms as causal chains that mediate between inputs and outputs (as is presumably the view Craver is moving towards).

With the distinction between leveled vs. flat view of mechanisms set up by Bert, Maria Serban (Technische Universität Berlin) followed by arguing that in cognitive neuroscience, the "top-down" experiments that the leveled view has trouble characterising are better understood as reconstruction experiments attempting to establish the construct validity of various theoretical concepts, or as standard causal experiments attempting to establish that some variable is a causal intermediary between other variables.

Further expanding on the theme of leveled vs flat mechanisms, Peter Fazekas (University of Antwerp and Aarhus University) presented his account of mechanisms and constitution that completely does away with the idea of levels. Instead, he argued that mechanisms are best understood as collections of entities with more robust causal connections among them, than they have with entities residing outside the mechanism. What is normally considered the system, or higher "level", is simply the input-output relations between the mechanism and its environment, as determined by the causal organization of the constituent entities.

After a lunch break, Markus Eronen (University of Groningen) considered the prospects of an interventionist account of constitution in psychology and neuroscience. Markus argued that the typical experimental interventions in these fields are

soft and fat-handed, thus falling considerably short of the interventionist regulative ideal. In fact, it is often difficult to estimate what the intervention actually did. This is likely to hinder the applicability of an interventionist account of constitution in psychology and neuroscience.

Beate Krickel (Ruhr University Bochum) considered the question of whether constitution really is a synchronous relation, as is often assumed, or whether constitution involves a delay in time. For both alternatives, it is possible to come up with examples that summon the right intuitions. She then presented plausible accounts of constitution of both sorts, and considered whether these can be fruitfully combined.

In the final talk of the day, Daniel Malinsky considered whether we can have well-defined answers considering interventions on the functional forms that describe causal relations between variables in structural equation models (SEMs). Building on his earlier work on the topic, Daniel presented statistical techniques for estimating an intervention distribution on the variables of a SEM when the functional forms of the equations, rather than the variables themselves, are intervened on.

The first talk of the second day was delivered by Alexander Gebharter (University of Groningen) and Jens Harbecke (Witten/Herdecke University). Alexander and Jens focused on non-interventionist methods for constitutive discovery. Specifically, they presented two methods—one Bayesian and one Boolean—and considered how these can be combined to yield a method that would be applicable to contexts where carrying out interventions is not a viable option, and to avoid the theoretical problems of intervention-based accounts of constitution.

Following up on the theme of Boolean constitutive discovery, Mark Couch (Seton Hall University) presented his account of constitutive relevance based on INUS conditions. Specifically, on Mark's approach, an entity is a component of a mechanism just in case it is an INUS-condition for the mechanism's explanandum. He then further elaborated how causation and constitution can be separated even when both relations are characterized in terms of INUS-conditions, when one considers the modal dimensions along which the relevant notions of necessity and sufficiency are interpreted in each case.

In the next talk, Jiji Zhang (Lingnan University) considered the possibility of representing both causal and constitutive relations with structural equation models. He presented a framework based on Pearl's notion of modifiable structural equation models, and argued that this framework can indeed be extended to allow representation and inference about constitutive relations. This, he argued, would yield plausible constraints on the construction of macro variables, and could shed light on many philosophical problems such as supervenient causation and the problem of ambiguous causal effects.

In the talk that followed, Frederick Eberhardt expanded on the themes of macro variable construction and ambiguous effects. In real-life research settings, one often encounters situations where the measurements in one's data are in some sense on a different level than the causal relations about which one wishes to make inferences. This can lead to, for instance, causal variables that have ambiguous intervention effects. Frederick presented recent work on a framework for identifying causal variables that ensures that the variables thus constructed have well-defined intervention distributions.

After a coffee break, David Kinney (London School of Economics) presented a procedure for building macrolevel causal variables from more fine-grained microlevel variables such that

the causal relations that hold between the microlevel variables are preserved in the coarsening process. The procedure also has built-in features for explicitly incorporating one's (explanatory, ethical) interests in the coarsening process, via decision-theoretic methods.

In the final talk of the conference, Alessio Moneta (Scuola Superiore Sant'Anna) presented joint work with Lorenzo Casini (University of Geneva) on a method for identifying constitutive relations from data. More specifically, he proposed a number of sufficient and necessary conditions, under which an independent component (IC) representation of the data (as may be recovered by independent component analysis) suffices to distinguish constitutive dependencies from causal dependencies.

The meeting was purposively very tightly focused on a specific topic. This proved to be a reasonable choice, as the talks clearly demonstrated that there are many ways one can approach the relationship between causation and constitution in a theoretically fruitful manner. All the talks provided many new ideas for the audience to digest, and overall there was plenty of very high level discussion. Many thanks to all the speakers!

VELI-PEKKA PARKKINEN  
University of Bergen

## Abduction and Modelling in Metaphysics, Duesseldorf, 6–7 December

The workshop *Abduction and Modelling in Metaphysics*—held at the Heinrich-Heine University Duesseldorf, Germany, on December 6–7, 2018 with support from the German Research Foundation (DFG) and organized by the research unit Inductive Metaphysics (FOR 2495)—had the goal to establish how empirical sources and abductive forms of inference play a role in metaphysical research. The workshop was the final event in a series of events with Timothy Williamson, which included also a public evening talk (December 4) on *Morally Loaded Cases in Philosophy* and two reading groups, which took place on December 4–5. The series of events was organized by Christian J. Feldbacher-Escamilla, Siegfried Jaag, Markus Schrenk and Gerhard Schurz (University of Duesseldorf).

The workshop hosted eight invited talks by distinguished speakers, who discussed the difference between abductive, deductive and purely *a priori* reasoning in metaphysics, skepticism regarding metaphysics as an independent discipline, the fruitfulness of abduction in metaphysics and in science, and further methodological issues of doing metaphysics, in particular, the status of modelling in metaphysics. One of the recurring topics during the workshop was the status of truth in metaphysics and in science, e.g., is it truth that our best theories can hope to achieve, or is it something less fundamental, like an agreement of peers within the research community?

Stephen Biggs (Iowa State University) gave the first talk of the workshop, entitled *Towards an Abduction-based Epistemology of Metaphysics*. He argued that abduction is the ultimate arbiter of metaphysical disputes, because abduction can deliver a wider range of metaphysical knowledge than conceiving, and an abduction-based approach implies a more plausible account of metaphysical dispute than a conceiving-based approach does.

Ilkka Niiniluoto (University of Helsinki) gave a talk on *Abductive Arguments for Ontological Realism*. He argued that ab-

ductive reasoning provides the strongest support for the thesis of ontological realism. The inference from agreeing perceptions to the reality and mind-independence of ordinary three-dimensional physical objects is abductive, because it proceeds from effects to causes by help of the principle of the common cause, and it is the best way to answer the idealists' arguments against the existence of mind-independent objects.

Gerhard Schurz (University of Duesseldorf) spoke about *Abduction as a Method of Inductive Metaphysics*. He made a distinction between selective abduction that chooses, given some empirical facts, among a set of hypotheses the one which allows for the best explanation in terms of accuracy and simplicity, and creative abduction that explains empirical facts by introducing new concepts and theories. These concepts describe theoretical entities whose existence is assumed in order to explain the empirical phenomena described in the premises of the inference. Schurz argued that creative abduction is applicable in metaphysics, in particular, for justifying certain principles of causality.

Timothy Williamson (University of Oxford) gave the talk on *Abduction in Logic and Mathematics*, where he addressed the possibility of an abductive methodology for identifying and justifying first principles in logic and mathematics. Williamson argued that classical logic does very well by abductive criteria (simplicity, strength, etc.) and is consistent with evidence. However, abduction cannot distinguish between logics with the same logical truth, but different consequence relations. To solve the problem, Williamson proposed to consider logics as closure operators on sets of typically non-logical assumptions, and abductively evaluate the resultant theories. He also considered the problems of vagueness, the possibility of restricting quantifiers to purely mathematical objects and argued for ways of using logic as a tool for model building in metaphysics.

Tim Maudlin (NYU) gave a talk on *Metaphysics Renaturalized*. Maudlin argued that traditional metaphysics—going back to Aristotle—has always been thoroughly naturalized, and made no distinction between the methods of science and the methods of philosophy. It was Kant who insisted that metaphysics had to be an a priori discipline, in his own sense of *a priori* as not in any way based on empirical data. According to Maudlin, it is time to get rid of the Kantian influence, and to renaturalize metaphysics.

Helen Beebe (University of Manchester) spoke about *Abductive Skepticism and Theory-Acceptance in Metaphysics*. She argued that the fact of widespread peer disagreement in metaphysics leads inevitably to skepticism about many substantive metaphysical theses. This skepticism cannot be resolved by abduction or by any other method, because we will always have to choose between equally reasonable and incompatible metaphysical positions.

Meghan Sullivan (University of Notre Dame) gave a talk on *Modal Logic and the Methodology of Metaphysics*. She distinguished between the intuition-driven approach in metaphysics, whose proponents argue for their theories in a natural language, and the logic-driven approach, which aims at presenting a formally systematized theory. Sullivan considered two prominent methodological arguments for systematization—the instrument argument and the ideological argument—and concluded that there is no reason to think that the best metaphysical theory should resemble a modal logic.

Igor Douven (CNRS, Paris) gave a talk on *Putting Prototypes in Place*, where he used an empirical approach to the

concepts of colors represented by the cells of an optimally partitioned similarity space. Douven defined optimal partitioning in terms of rational design criteria, according to which prototypical concepts should be such that they are both similar to the items they represent (representative) and dissimilar to each other (contrastive). Then he presented the data of his empirical study indicating that color prototypes strike the best balance between being representative and being contrastive.

The talks were recorded on video and will soon be available [here](#).

MARIA SEKATSKAYA

Heinrich Heine University Duesseldorf

## Calls for Papers

**KNOWING THE UNKNOWN: PHILOSOPHICAL PERSPECTIVES ON IGNORANCE:** special issue of *Synthese*, deadline 20 February.

**HYBRID DATA AND KNOWLEDGE DRIVEN DECISION MAKING UNDER UNCERTAINTY:** special issue of *Information Sciences*, deadline 30 February.

**THOUGHT EXPERIMENTS IN THE HISTORY OF PHILOSOPHY OF SCIENCE:** special issue of *HOPOS*, deadline 31 March.

**FOLK PSYCHOLOGY: PLURALISTIC APPROACHES:** special issue of *Synthese*, deadline 15 May.

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

## WHAT'S HOT IN . . .

### Uncertain Reasoning

Last month I talked about the anniversary of Joyce's paper that kicked off a new trend: accuracy-first epistemology. This month, I'd like to take a look at a few recent contributions to this topic. In particular, I'd like to look at some recent papers that discuss scoring rules in the context of imprecise probabilities.



Remember that, in essence, a scoring rule is a measure of how good a probabilistic forecast is. One standard property that we want a scoring rule to have is that it expects itself to be the best forecast. This is a property known as "strict propriety": we say a scoring rule is "strictly proper" if it satisfies this property. When it comes to scoring an imprecise probability forecast – a forecast in terms of a set of probability functions, or an interval of probability values for example – then (given some other plausible properties of scoring rules) this property of strict propriety becomes impossible to satisfy. Various forms of this result appear in, for example Seidenfeld et al "Forecasting with imprecise probabilities" (2012 *International Journal of Approximate Reasoning*), Schoenfeld "The accuracy and rationality of imprecise credences" (2017 *Noûs*), and Mayo-Wilson and Wheeler "Scoring imprecise credences: a mildly immodest proposal" (2016 *Philosophy and Phenomenological Research*).

What are we to do? For those of us who like imprecise probabilities, a failure to provide them with a reasonable theory of what counts as a good imprecise forecast is a serious problem. Mayo-Wilson and Wheeler suggest that while strict propriety is unattainable – and indeed, in the imprecise context it is a very strong property – there is something weaker that we can achieve. Levinstein argues that interpreting imprecise credences as \*indeterminate\* rather than determinately imprecise sidesteps the problem (“Imprecise epistemic values and imprecise credences” forthcoming *Australasian Journal of Philosophy*). Konek offers another positive proposal for avoiding the problem (“Epistemic conservatism and imprecise credence” 2015 *Philosophy and Phenomenological Research*).

The problem, as I see it, really lies with the fact that an imprecise forecast is really trying to do two things: on the one hand, it is good if it gets close to the truth, and on the other hand it is good if it is a faithful characterisation of your state of evidence. That is, an argument often presented in favour of imprecise probabilities is that precise probability theory appears too precise in cases where there is severe uncertainty. And this “evidentialist” intuition drops out of the equation in discussions of accuracy-first epistemology: scoring rules are about closeness to the truth \*only\*, and have very little to do with adequate response to the evidence. So a theory of good imprecise forecasts is going to have to take into account the evidential as well as the alethic. And for that reason, accuracy-first epistemology is the wrong approach to scoring imprecise forecasts.

SEAMUS BRADLEY

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## Mathematical Philosophy

As is well known, mathematical philosophy concerns tons of different topics and is a growing field in academia. For this issue, I would like to tell you about some areas of the world where colleagues also work quite heavily on mathematical philosophy. Some parts are less close to daily business in European and US academia, mainly for geographical reasons. This however does not mean at all that their work is of lesser quality. I would like to mention and promote some awesome work that has been going on recently in Latin America.



In Latin America, some branches of mathematical philosophy have a well-established tradition. For instance, at the Universidad Nacional Autónoma de México (UNAM), in Mexico City, several excellent logicians such as Atocha Aliseda, Mario Gomez-Torrente, Axel Barcelo or Raymundo Morado have been able to foster formal and mathematical philosophy in many ways. At the Instituto de Investigaciones Filosóficas at UNAM (IIF-UNAM), you will experience a fascinating research environment. Frequently, internationally influential professors such as Harry Field or Robert Stalnaker give talks there. At the IIF-UNAM, the main field of research is logic and the philosophy of language. In earlier days, when Ulises Moulines worked at IIF-UNAM, the general philosophy of sci-

ence had a big standing, too. Professor Leon Olive (who, sadly, passed away last year) also established a group of researchers in the philosophy of science, including Ana Rosa Perez Ransanz and many others. I myself had the honor of being invited to IIF-UNAM by Professor Ana Rosa Perez Ransanz (to whom I am grateful) back in 2013, where I gave a series of talks on the topics of my PhD, i.e., structuralist meta-theory, linguistics, and structural realism.

As regards structuralist meta-theory (also often called Sneed-Stegmueller-Structuralism), Professor Ulises Moulines has had huge success in promoting this approach within philosophy of science in Latin America. Some of his students (Pablo Lorenzano and Adolfo Garcia de la Sierra, amongst many others) now have their own research group. Many of these young researchers work on the philosophy of economics, the philosophy of biology, or the general philosophy of science. They apply the formal methods of set theory (among other tools) to reconstruct empirical theories and discuss topics such as theory change. They work in Argentina, Mexico, Peru, or Colombia. It is pleasant to see how the Sneed-Stegmueller-School has established itself, in Latin America and in Europe, as a bridge between formal philosophy and mathematical philosophy.

Besides the IIF-UNAM, Professor Adolfo Garcia de la Sierra, an outstanding Stanford graduate (back in the time of the great Pat Suppes), a philosopher of science and an economist, also does great work in mathematical philosophy, at the Universidad Veracruzana in Xalapa, Veracruz.

Recently, a fascinating event took place in Lima, Peru, a conference called “Las Logicas en la Ciencia” (The Logics in Science). Researchers from both Peru and abroad discussed mathematical philosophy topics in logic and the philosophy of science. Different topics were discussed by invited speakers such as Otavio Bueno (Miami), Raymundo Morado (IIF-UNAM), Jesus Jasso Mendez (IIF-UNAM), and Miguel Angel Leon Ontiveros (Universidad Nacional de San Marcos, Lima). This conference is just one example of how, during the last years, mathematical philosophy has been growing in Latin America. This is very promising and we hope that this process will continue, especially as political instabilities threaten the seriousness of day-to-day institutional scientific work in different regions of Latin America.

One further achievement by mathematical philosophers in Latin America is the publication of *An Architectonic for Science* (the Structuralist Bible) in Spanish, translated by Pablo Lorenzano and his team, back in 2014. This publication opens the program of the Sneed-Stegmueller-School to a whole new set of scholars who are not fluent in English.

One further impactful and fascinating group is the Buenos Aires Logic Group, known by many because of the outstanding work by people like Eduardo Barrio, Lavinia Picollo, Diego Tajer, or Eleonora Cresto, amongst many others. A couple of years ago, we had the pleasure to organize the Buenos Aires – MCMP workshop, bringing together several incredible researchers from both the MCMP and Argentina. The Buenos Aires Logic Group has delivered several highly impactful publications, especially in logic, theories of truth, and the philosophy of language.

To anyone interested in making mathematical philosophy even hotter in Mexico, I recommend you visit places such as Universidad Nacional de San Marcos in Lima, or the IIF-UNAM. Awesome places! To all people or places which I have not mentioned, I apologize beforehand. This column is to pro-



## 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

**ASSISTANT PROFESSOR:** in Epistemology, California State University at Sacramento, deadline: until filled.

**ASSISTANT PROFESSOR:** in Logic & Epistemology, University of North Carolina at Greensboro, deadline: until filled.

**ASSISTANT PROFESSOR:** in Philosophy of Medicine, University of North Carolina at Greensboro, deadline: until filled.

**ASSISTANT PROFESSOR:** in Philosophy of Science, University of Florida, deadline: until filled.

**LECTURER:** in Actuarial Science, University of California Santa Barbara, deadline: until filled.

**RESEARCH FELLOW:** in Data Science, University of Bristol, deadline 3 January.

**FELLOW:** in Philosophy of Logic, University of St Andrews, deadline 4 January.

**LECTURER:** in Statistical Science, University College London, deadline 9 February.