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Plenary lectures

Experiment vs. Simulation: A False Dichotomy?

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Philosophical debates surrounding the epistemological status of computer simulations have typically focussed on comparisons between simulation and experiment, often favouring the "materiality" of experiment as a basis for epistemic superiority. My talk has two goals, one is epistemological and the other methodological. I argue that, given the pervasive role of simulation in experimental practice, the dichotomy between experiment and simulation is unhelpful if the aim is to evaluate the nature and status of simulation data. Indeed, in some contexts such as the discovery of the Higgs boson, the trustworthiness of experimental (signal) data is based on of the vast amount of simulation data that underscores them. Given the pervasiveness of computer simulation in scientific investigation a more productive approach is to move away from an outdated empiricist picture of experimental practice and focus instead on the various methodologies used for assessing simulated data, how these are incorporated in experimental practice, and how uncertainty quantification is implemented in the evaluation of simulated data. I briefly discuss some of these approaches and how they might benefit from philosophical investigation.

"So … Who is *your Audience?"*

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To whom, if anyone, are the writings of philosophers of science relevant? There are three potential groups of people: Philosophers, Scientists, and Interested Citizens, within and beyond the academy. I shall argue that our discipline is potentially relevant to all three, but I shall particularly press the claims of the Interested Citizens.

My lecture will be in dialogue with a characteristically insightful lecture given thirty years ago by Arthur Fine. Addressing the *Philosophy of Science Association* as its president, Fine argued that general philosophy of science was dead, and that all the action lay in the philosophy of the special sciences. I'll try to identify what was correct about Fine's diagnosis, while supplementing his message by describing fruitful projects that have since emerged. I also hope to share his subversive spirit.

Corporate Agency, Integrated Information Theory, and Military Command and Control: Emergent Intelligence?

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A standard question about agency is how does group action supervene on individuals' actions? From clubs and committees to government and military command and control, how is joint agency conceived and what are the conditions under which it may be construed as purposive? This paper employs a new way of appraising collective action (Tononi 2015) from the perspective of integrated information theory (IIT). Instead of focusing on the composition of a group's members and individuals' performative roles in achieving joint action, IIT offers a means to evaluate the level of systemic integration and complexity that could measure a system's degree integrated agency and possibly even level of phenomenal consciousness. Christian List uses IIT heuristically to assess the level of systemic integration, and hence the level of phenomenal consciousness, of group agents (2015). List concludes that groups only have derivative status as moral agents because what phenomenal consciousness they exhibit is concentrated in individual human agents.

Instead of considering corporate actors comprised of human members, I contemplate hybrid actors encompassing human agents and artificially intelligent networks which characterize advanced civilization such as the United States, and also military command and control structures. I argue that unlike corporate actors comprised of only human individuals, these complex bodies evince a high level of integrated information processing capacity. This means that if roughly half of their component parts, which could include all constituents of artificial intelligence, are reduced to randomized patterns of action, that the overall system would fail to continue its former function. This consideration is particularly relevant to the military command and control networks designed to maintain national sovereignty and agency during a nuclear war. I examine the normative implications of this analysis.

List, Christian. 2015. "What is it Like to be a Group Agent."

Tononi, G. 2015. "Integrated Information Theory." *Scholarpedia* 10:1.

Women's Caucus Lecture

"Women in philosophy of science: where are we, where do we want to be, and how do we get there?"

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As everyone knows, women are hugely underrepresented in professional philosophy in general, and in the philosophy of science in particular. (Is the situation worse in the philosophy of science? That's a question I'll address in the course of my talk.) How did this happen, and what can we do about it? In this talk, I present some data and some pertinent results from social psychology, and make some concrete suggestions for things all of us can do — often pretty small things — that might, if we're lucky, make a difference.

Symposia

The Science and Philosophy of Institutions

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Institutions have played a central role in social ontology over the last two decades. Rational choice theorists conceive of them as equilibria of strategic games. This approach however has been criticized by philosophers for being unable to account for the intrinsic normativity of institutions, and because it overlooks the collective intentions that, they argue, are necessary to create and sustain institutions.

After more than two decades, the divide between scientific and philosophical approaches remains as deep as ever. This situation raises a number of pressing questions: do these approaches offer mutually incompatible accounts of the ontology of institutions? If they do, which one is correct? If they don't, are the accounts complementary, and in which way? This symposium will address these questions, and explore the implications of different theories of institutions regarding some classic issues in the philosophy of (social) science - such as explanation, unification, and realism.

Interpreting Physical Theories

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A central question in philosophy of science is how we might best interpret scientific theories. The standard accounts of interpretation that have emerged are most often formulated in terms of correspondence principles and possible worlds. In recent years, however, these accounts have been questioned as they come in tension with our modern physical theories. The aim of this symposium is to critically discuss the methods of interpreting physical theories that are currently on the table, and (insofar as these methods are deemed unsatisfactory) to ask what method of interpretation we should adopt instead.

Philosophy of Molecular Medicine

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The philosophy of medicine and the philosophy of molecular biology are two steadily growing areas of inquiry. Yet, despite its prominence in scientific research, molecular medicine has not received sufficient attention by the philosophical community. The aim of this symposium is to present and discuss some developments of the field, in the aftermath of a recently published edited collection of articles—*Philosophy of Molecular Medicine: Foundational Issues in Theory and Practice*— which aims at a systematic investigation of a number of foundational issues in the field of molecular medicine. All speakers will present and discuss their work relevant to the field, and there will be plenty of time for discussion, both among participants, and with the audience.

Philosophical Challenges for the Institutional and Methodological Implementation of Interdisciplinarity

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We explore connections between Philosophy of Science and Science Policy, by highlighting the importance of normative philosophical thought in the institutional organisation – and reorganisation – of science. We take an empirically informed, rather practice-centric approach to our subject.

Inter- and transdisciplinarity are promoted as way to solve practical problems, even though open epistemological issues remain. We may not even have a clear understanding of how scientific knowledge and research is applied in problem- solving. Cognitive difficulties constrain and even block collaborative interdisciplinary problem-solving, and it is not clear how success is to be measured.

We ask how inter- and transdisciplinarity can be implemented in a way that ensures the reliability of the produced knowledge. Due to our focus on the practical implementation of interdisciplinary ideals, we are able to identify shortcomings in the existing philosophical literature on inter- and transdisciplinarity.

Mathematics and Ethics

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Empiricism has trouble with two things: mathematics and ethics. This familiar feature of mathematics and ethics has often been noted, but the similarity has seldom been explored at length. We will focus on two features of mathematics and ethics. One is methodological: What are the legitimate sources of evidence for each? The second is the possible use of thick concepts in mathematics. In ethics thick concepts are simultaneously factual and evaluative, such as: courage. Are some mathematical concepts, eg, acceleration, simultaneously physical (increasingly faster motion through space) and mathematical (the second derivative)?

The symposium participants will be arguing for various similarities and differences between ethics and mathematics and will attempt to carry over some methods of ethics into the realm of mathematics with an eye to tackling outstanding mathematical problems.

The General and the Particular: Understanding a Fundamental Relation

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The tension between the general and the particular appears to be inherent to science. The occurrence of error and specifically experimental error as well as the difference between abstract principles and their concrete implementation are good illustrations of this tension. We seek to clarify and characterize in detail this tension, both historically and philosophically, in several contexts. Thus, the symposium will focus in part on the discrepancy between theory and practice and will seek to characterize errors that undermine the correspondence between a theory (generality) and its instantiations (the particular). Discrepancy, however, is just one aspect of this fundamental tension. In fact, we witness today the emancipation of the particular from the general in many practice-driven fields of research. Such endeavors show how intricate and shaky the way is that leads from the principles to the details of experience which allegedly provide, in turn, the ground for the universal.

The Simulationist Turn in Social Epistemology: finding new directions & challenging received wisdom.

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Social epistemology has taken a 'simulationist turn', promising fruitful new research directions, and forging connections between philosophy, social scientific perspectives on knowledge production, and to applied policy contexts. The papers collected here further this by both challenging received ideas in the developing field, and opening territory for exploration.

New Directions for Studying Success and Failure in Science

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Philosophers of science perennially aim to understand how science succeeds and what it means for a science to succeed. But despite that interest, the issue, which resists simple interpretation, remains ripe for further analyses. Traditionally, philosophers have studied success by focusing on general theories and on relations of (dis)confirmation in relation to evidence (Hempel 1965; Howson and Urbach 2006). More recently, philosophers have begun to look at the success of scientific practices (Ankeny and Leonelli 2016; Waters 2016). The recent trend indicates that there are many more routes by which we might better understand successful and unsuccessful science. We propose a symposium of three talks that focus on identifying kinds of success and failure in different contexts of scientific practice. Our plan also includes an extended commentary on those talks that will place them in the broader philosophical context and highlight how they can inform our understanding of science.

Epistemic Strategies for the Integration of Big Data

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How can data produced from different sources and techniques be integrated and visualized, what role does technology play in such efforts, and how do data integration strategies affect the development and content of knowledge claims? This symposium brings together philosophical reflections on these questions grounded on the examination of large-scale data integration practices in biomedicine, environmental science and biochemistry. We discuss the challenges involved in assembling datasets pertaining to different phenomena, target systems and research environments, and collected by diverse scientific communities. We examine the methods of inference, modelling and processing employed for data integration, their impact on whether and how data are triangulated, reproduced, reused and validated, and the epistemic implications of integration efforts, particularly the potential to cluster data in the absence of unifying theories and related opportunities to bridge across research perspectives.

Human Diversity in Scientific Practice

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Similarities and differences between human populations are studied in many scientific disciplines from molecular genetics to cultural anthropology. The aim of this symposium is to engage with the epistemological, ontological, social, and political dimensions of human diversity in scientific practice. First, we discuss how concepts such as “race”, “ethnicity” and “human nature” enter scientific practices and what roles they play in explanatory practices. Second, we address how concepts of human diversity are justified and when conceptual revisions or eliminations should be endorsed. Third, we consider how scientific engagement with human diversity is entangled with social issues from medical practices to racial prejudices. For instance, how do normative considerations and social effects vary with the cultural contexts? Furthermore, what is the risk of misuse of concepts from “race” to “human nature”?

Towards a Methodology of Quantum Gravity

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In this symposium we will discuss various methodological issues involving research in quantum gravity. Various proposals such as string theory and loop quantum gravity have still not been empirically tested. It is very challenging to experimentally test predictions of these theories and it is challenging to extract sharp predictions. Thus work in the field tends to be purely theoretically motivated. The lack of connections between the theories and experiments raises questions of a methodological nature. Can theoretical considerations epistemically support a theory of quantum gravity in the absence of new empirical results? Or should we insist on the importance of a theory to provide us with new descriptions of phenomenological aspects of the world that we can experimentally observe and measure? What is the best way to make progress in quantum gravity research? Such questions are addressed in the four talks of this symposium.

Scientific Realism and Quantum Physics

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This symposium explores long-standing epistemological issues surrounding scientific (anti-)realism in relation to the nature and limits of our knowledge and understanding of quantum physics. The key questions are:

- What support is there for or against realism about quantum physics?

- How do we square the metaphysical and interpretational ambiguities alive in quantum physics with the epistemic optimism characteristic of scientific realism?

- Would it be better to adopt a pragmatist or a non-realist attitude towards quantum physics (as has been recently argued in various quarters)?

Our symposium aims to bring into productive dialogue recent research that has been done under this heading, exploring and bringing into broader attention different perspectives on the scientific realism debate adopted in the detailed context of quantum physics.

Promoting the field view of general relativity: New insights from spin-2, emergent gravity, and the dynamical approach

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Our symposium intends to re-open the debate on the nature of the g field. In particular, we address the issue whether it should be granted the status of spacetime per se, or rather be seen as one field among others. To do so, the dynamical approach to spacetime (Brown and Pooley) is presented as a philosopher's variant of the 'field only' view. Its explanatory strength will be worked out in the usual general relativistic context, as well as in a generalized algebraic setting. Furthermore, we aim at establishing how the dynamical approach is solidified by results in the context of modern approaches to a theory of Quantum Gravity that render gravity as an effective field theory. In particular, the quantum field theoretic perspective (the spin-2 view) and research programs in the context of emergent gravity are investigated. To challenge the obtained results, a critical voice against the 'field only' view is added which builds on the peculiar status of energy in the gravitational context.

The Computational Mind

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In recent years, the nature, purpose, and level of sophistication of computational explanations of the mind have undergone something of a revolution. The symposium brings together 5 world-class philosophers who work on this topic. The aim of the symposium is to examine how modern computational cognitive science raises new philosophical challenges and how it has reconfigured the way in which computation explains the mind. The symposium will be accessible to researchers not already working on this topic. The objectives of the symposium are to introduce the key developments in modern computational cognitive science, to examine rigorously the philosophical bearing of these new developments, and to stimulate further work in this fast-moving field. The symposium will consist of five short papers (15 minutes plus 5 minutes Q&A), the first of which will introduce the key developments; the symposium will end with a 20-minute roundtable Q&A session with all speakers.

Contributed papers

Inertial Trajectories in De Broglie-Bohn Quantum Theory: An Unexpected Problem

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A salient feature of de Broglie-Bohm quantum theory is that particles have determinate positions at all times and in all physical contexts. Hence, the trajectory of a quantum particle is a well-defined concept. One then may naturally expect that the closely related notion of inertial trajectory of a quantum particle is also well-defined. I show that this expectation is not met. I provide a framework that deploys six different ways in which de Broglie-Bohm theory can be interpreted, and I state that only in the canonical interpretation the concept of inertial trajectory is the customary one. The canonical interpretation is affected by serious difficulties, and the rest of the readings of the theory intend to avoid them. I state that in the alternative interpretations the concept at issue gets either drastically altered, or plainly undefined. I also show that further conceptual difficulties are associated to the redefinitions of inertial trajectories, or to the absence of the concept.

Visualisation as a Computational and as an Epistemological Practice

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Combining epistemological and computational perspectives on visualisation requires us to bridge the familiar gaps between syntax and semantics, and between epistemology and computation. The hypothesis entertained in this paper is that we can formulate an interface between these two perspectives by distinguishing two levels of descriptions of visualisations, and thinking of visualisation-processes as processes that negotiate the constraints and freedoms that arise from mismatches between these two levels of descriptions. This allows us to think of visualisation as a kind of reasoning between levels of abstraction, and use this as a common basis to reinterpret the theoretical frameworks that are used to theorise about visualisation in the sciences. Using this basis, we can reintroduce an epistemological reflection within the field of information-visualisation, and direct the philosophical attention to the technological basis of visualisation-practices.

The DSM-5 Definition of Mental Disorder: Some Points on the Harm Requirement

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The DSM-5 definition of mental disorder seems to identify it with a harmful dysfunction; however the harm requirement is taken to be merely usual, and not then necessary. To begin, we try to clarify what it means to say that it is not necessary for mental disorder, and evaluate what reasons can be advanced to maintain that. As a preliminary point, we trace a distinction between regarding mental disorder as a token or as a type. Then, we try to unpack the harm requirement clarifying by whom, how, and with respect to whom distress and disability should be judged and evaluated. We claim that the harm requirement can be interpreted in many different ways, making its current wording ambiguous. We finally conclude arguing that the general definition of mental disorder should not consider the harm requirement as a necessary one, but as long as it is still present amongst the diagnostic criteria of many mental disorders, it must be better explicated.

What Preferences Really Are

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Daniel M. Hausman's 2012 book *Preference, Value, Choice, and Welfare* defends the thesis (i) that preferences in economics are total subjective comparative evaluations – subjective judgments to the effect that something is better than something else all things told – and moreover (ii) that economists are right to employ this concept of preference. The present paper argues against both parts of Hausman's thesis: economists are not well understood as thinking of preferences in terms of total subjective comparative evaluations, and it would be a mistake for economists to adopt such a conception. At the end of the day, I suggest that we do not even need a philosophical account of preferences – at least not an account of the kind Hausman seeks – and explore various ways in which philosophers of economics are better employed.

Information-Theoretic Model Selection and Cosmology

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Contemporary cosmology is teeming with model underdetermination and cosmologists are searching for methods with which to relieve some of this underdetermination. One such method that has found its way into cosmology in recent years is the Akaike Information Criterion (AIC). The criterion is meant to select the model that loses the least amount of information in its approximation of the data. The principle aim of this paper is to investigate some of the weaknesses of AIC and to argue that there are three features of AIC that make its use in cosmology problematic. The features that will be discussed are i) asymptotic inconsistency, ii) the inability to deal with parameter degeneracies and iii) the inability to predict future constraints placed on degenerate parameters. It will also be argued that these features are problematic for the use of most information-theoretic model selection criteria in cosmology and hence alternative model selection methods should be preferred.

The Evolutionary Explanation of What? A Closer Look at Adaptationist Explanations of Risk Preferences

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The paper critically assesses evolutionary explanations of human attitudes towards risk found in the philosophical and psychological literature. Drawing on an analogy with existing critiques of evolutionary explanations of human mating preferences, the paper challenges the view that the fourfold pattern of risk preferences postulated by prospect theory is to be explained by an adaptationist account.

What is Representational Measurement Theory Truly About?

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My paper is about representational measurement theory (RTM; see e.g. Krantz et al., 1971). RTM is technically mature, but still poorly understood conceptually. My paper is concerned with clarifying the nature of RTM, and first with rebuking two frequent criticisms. According to a first criticism (surfacing e.g. in Michell, 1999), RTM amounts to a purportedly untenable non-realist view about quantities. Taking examples relevant to different sciences, I explain that RTM is committed neither to a non-realist, nor to a realist view about such matters. A second common criticism (see e.g. Frigerio et al., 2010) is that RTM is too far away from the actual measurement procedures followed in science. Arguing from uniqueness results and non-constructive proofs in RTM, I explain that RTM is in general not concerned with describing actual measurement procedures. Thus contrasting it from both an implicit metaphysics and a stylized metrology, I clarify in which sense RTM is a logic of measurement.

Non-Locality in Intrinsic Topologically Ordered Systems

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Recent work in condensed matter physics has sought to define the notion of "intrinsic topological order" (ITO). ITO systems are characterized by two types of non-locality. The first type is associated with non-local topological properties and the second type is associated with a particular kind of quantum entanglement. This essay considers the extent to which topological non-locality is different from quantum entanglement non-locality, and whether, as some authors have suggested, the topological non-locality of an ITO system entails its quantum entangled non-locality. This is important insofar as recent work in quantum information theory has sought to exploit these two types of non-locality in ITO systems as a way to "topologically protect" the information encoded in entangled qubits from decoherance due to local errors.

Levels and Layers

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Cognitive systems are complex systems with many overlapping interacting subsystems spanning an array of spatiotemporal scales. This diversity of scales challenges approaches that rely on levels, including mechanistic, compositional, and identity theories. Levels are sets of entities standing in a part-whole, ordered, transitive, and exclusive relation. I illustrate how neurocognitive systems violate these three properties using the diverse computational roles for dopamine responses in the brain. Instead of standing in levels relations, I propose that neurocognitive entities stand in layers relations. Layers are sets of entities standing in a part-whole relation, like levels, but also where the parts have subparts, the parts screen off the whole from the subparts, and the parts are interacting. I defend this approach against deflationary interpretations that yield flattened views of these systems, and highlight some potential payoffs of thinking in terms of layers instead of levels.

The Emergence of Public Meaning from a Generalized-Evolutionary and Game-Theoretical Perspective

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The generalized theory of evolution (GTE) suggests that an evolutionary algorithm (Variation, Selection, Reproduction) can be applied to biological and cultural processes alike (Schurz 2011). Accepting this basic assumption provides us with a powerful and profound background theory for our investigation: explaining the emergence and proliferation of semantic forms that become conventional within cultural populations. It has been suggested, that the emergence of conventional meaning or “public” meaning, as we shall call it can be formalized with game-theoretical tools esp. in the framework of signaling games (Lewis 1969, Skyrms 1996, Harms 2004, Huttegger 2008). In a nutshell: If the emergence of public meaning can be satisfyingly explained on the background of GTE and in terms of signaling games, then the cultural evolutionary dynamics will serve as a adequate model to describe their proliferation.

Explaining the Modal Force of Natural Laws

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I will defend the thesis that fundamental natural laws are neither distinguished by metaphysical necessity (cf. Bird 2007) nor by contingent necessitation (cf. Armstrong 1983). The only sort of modal force that distinguishes laws from accidental generalizations, I will argue, arises from the peculiar property of independence of elementary processes exemplifying the laws. The independence of elementary processes means that the fundamental forces governing them do not depend in any way on which other fundamental forces obtain. Thus, there is nothing to resist elementary processes. An example is the emission of photons by accelerated electrons. Because of its independence this elementary process possesses modal force and confers it on the corresponding law, the Lagrangian L_QED. Since Symmetry Principles represent invariance requirements incorporated into natural laws, but do not describe natural processes per se, they have no modal force and are thus different from natural laws.

Resisting the Reductionist Retreat

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The reductionist retreat claims that reductive research strategies are always appropriate to adopt because even when they fail, they are productive and instructive in their failure. The retreat creates an asymmetry between reductive and non-reductive research strategies such that whereas the former is universally applicable, the latter becomes applicable only in situations in which the former has failed. In this paper I argue that there are good reasons to resist the reductionist retreat and these reasons are to be found precisely by playing close attention to the current practice of scientists investigating certain kinds of phenomena in certain contexts. My argument attempts to remove the asymmetry between these types of research strategy and establish a continuum between the two based on contextual features of the inquiry being undertaken.

Laws of Nature, Governing, and Truthmaking

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I defend a specific version of the governing conception of laws by responding to an argument advanced by Mumford. Mumford's argument is a dilemma: (i) If laws are internal to the properties they govern, then properties have their causal profiles essentially, and there is no need for laws in an ontology over and above powerful properties. (ii) If laws are external to the properties they govern, then we need a plausible account of explaining how things external to properties can govern them, and there is no such account. By favouring an external conception of the governing relation, I propose that laws can be seen as contingent facts about properties and their causal profiles, and they govern properties by making certain causal, dispositional, and counterfactual statements, and perhaps some law statements true. I argue that truthmaking of this sort is metaphysically substantial enough to underwrite the relevant notion of governing.

A Qualitative Model for Ampliative Scientific Inference

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A qualitative model is presented which combines various types of ampliative inferences. The function of this model is to explicate how new knowledge can be attained non-deductively from a given set of data. The model works in three steps. Starting off with a set of singular data and, possibly, a number of background generalizations, it is shown how we can use logic to infer predictive regularities via inductive generalization (step 1). Of these regularities, those that have a `lawlike' character can be strengthened into laws via the process of nomological generalization (step 2). In turn, laws can be used to infer explanations via abductive inference (step 3). The model is implemented in first-order modal logic within the adaptive logics framework. Despite its simplicity, it is argued that its application is valuable in a number of lively philosophical discussions.

Newtonian Induction and Hume's Critique of Inductive Inferences

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This paper considers a recent reading of Newton's Rule III for the Study of Natural Philosophy. Rule III argues that qualities that are observed in all bodies and cannot be intended or remitted are universal qualities. According to this reading, the rule provides criteria for isolating the primary qualities of atomic parts. The rule underwrites an inference composed of two steps. First, there is a transductive inference from the properties of observed composite bodies to the properties of their atomic parts. Second, there is an inference from all atomic parts of observable bodies to all atomic parts (universal induction). The paper argues that both of these inferential steps are immune to the central reasons that make Hume skeptical about the inductive inference. Neither the problem of the circular justification of induction nor the worry about hidden structures that give rise to sensible properties are relevant for evaluating the strength of Newtonian induction.

Is the Modern evolutionary synthesis actually a synthesis? Fisher's Fundamental Theorem of Natural Selection and the structure of evolutionary theory

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Modern evolutionary biology is based on the synthesis of two research traditions: that of the systematists-naturalists, founded on Darwin's principle of natural selection, and that of Mendelian genetics. Population genetics was instrumental in providing such a synthesis with a formal structure connecting both traditions. This structure, however, only shows that Mendelian genetics and Darwin's theory are consistent, not that one entails the other. This paper aims to prove that R. A. Fisher's "Genetical Theory of Natural Selection" should be regarded as an alternative framework for the Modern synthesis, aiming to fully bridge the gap between Darwin's and Mendel's theories. To do so, this paper shows that Fisher's Fundamental Theorem of Natural Selection, the cornerstone of his theory, is both a theorem and fundamental, by comparing it to the first and the second Fundamental Theorems of Welfare Economics, which play a very similar role in the theoretical framework of modern economics.

Is Increased Scientific Interaction Epistemically Beneficial? An Argumentative Agent-Based Model Approach

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In this paper we present an agent-based model (ABM) of scientific inquiry as a tool for investigating how different social networks impact the efficiency of scientists in acquiring knowledge. In contrast to other ABMs of science, our model aims to represent the argumentative dynamics that underlies scientific practice. To this end we employ abstract argumentation theory as the core design feature of the model. This helps to avoid a number of problematic idealizations which are present in other ABMs and which impede their relevance for actual scientific practice. Moreover, we examine the efficiency of scientists from two perspectives: a monist and a pluralist one. Our results suggest that, given the constrains of our model, more connected networks perform more efficiently than the less connected ones. While our ABM is still too idealized to warrant recommendations to policy makers, we show that it represents a step further in this direction in comparison to previous models of this kind.

Why Surgeries Require Surgeons: A Defense of the Agency Theory of Causation

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In this paper, I argue in favour of an 'agency-based' over an 'interventionist' interpretation of manipulationist theories of causation. I examine the debate between interventionist James Woodward and agency theorists Huw Price and Peter Menzies, focusing on Woodward's objection that Price and Menzies' agency theory is implausibly subjective. After distinguishing between the different notions of subjectivity at play in the agency/interventionist debate, I argue that Woodward's objection of implausibility fails on the grounds that it misidentifies the kind of subjectivity inherent in the agency theory. Furthermore, I argue that the subjectivity of the agency theory actually provides it with two important explanatory advantages over the more objective interventionist theory.

Predicting Under Structural Uncertainty: Why Not All Hawkmoths are Ugly

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Model-based predictions are often affected by severe uncertainty. While there are established methods for handling initial condition and parameter error, structural uncertainty allegedly poses a more severe challenge. In a series of articles, Roman Frigg et al. have explored the epistemic consequences of structural model error. They claim that if a model has only a small structural error, its ability to produce decision-relevant probabilities is lost entirely.

We argue that SME does not debilitate our capacity to make informative predictions to the extent that Frigg et al. claim. Normal modelling practices can help to identify structural error, and well-established statistical methods allow scientists to take steps against the impact of model uncertainty. We discuss one example of such a method. While Frigg et al.'s abstract claims about the structural instability of nonlinear systems might be adequate, the epistemic conclusions they draw from their analysis are heavily exaggerated.

Evidence and Styles of Scientific Reasoning

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Styles of reasoning are descriptive tools to accommodate salient features of scientific practice; in particular, they provide conceptual devices to represent continuity despite significant theoretical and conceptual changes throughout the history of the sciences (Crombie [1994], Hacking [2002] and [2012], and Bueno [2012]). But can they also provide normative standards for the evaluation of scientific endeavors? In this paper, I argue that they can. After providing a characterization of styles of scientific reasoning, I argue that a crucial role within such styles is played by evidence and how it is gathered, employed, and assessed. Despite the variety of conceptions of evidence available, there is a crucial core that remains constant, in terms of ruling out possibilities that would undermine the hypothesis under consideration, and this is enough to support the normative traits that styles of reasoning exhibit.

The Semantic-Pragmatic Side of Framing Effects

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Framing effects are commonly understood as variations in how subjects respond to different but objectively equivalent descriptions of the same issue. As empirical phenomena they have been established to a very high degree of reliability and robustness. On the theoretical side, however, they are highly controversial since they challenge a common assumption in economic methodology known as the “principle of extensionality or invariance principle”. This principle says that individuals’ preferences should not be affected by variations in the description of a problem. Despite the influential studies by A. Tversky and D. Kahneman (1981, 1991), the underlying semantic-pragmatic side of this problem has not yet received enough attention in the standard literature on the subject. This paper explains valence framing effects in terms of pragmatic presuppositions. It is argued that different frames generate different inferential contexts connected to well-established linguistic practices.

The vice of virtues — Virtue-based research ethics and the organizational features of scientific institutions

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Whereas responsible conduct of research is usually explained in terms of principles, virtue-based approaches focus exclusively on behavioral dispositions of scientists (Macfarlane, 2009) which presumably ensure undisturbed research processes. The problem of moral luck (Williams, 1982) poses a challenge for virtue-based accounts and their handling of demanding requirements such as the obligation to report supposed cases of scientific misconduct. Virtuous behavior often depends on favorable institutional conditions, a manifestation of moral luck. I will show that virtue-based approaches cannot account for this fact and discuss whether extending the domain of virtues to organizational features of scientific institutions is a viable solution.

References

Macfarlane, B., 2009. *Researching with Integrity*, New York: Routledge

Williams, B., 1981. *Moral Luck*, Cambridge: Cambridge University Press

The Structure and Epistemological Implications of Multiple Determination in Empirical Science

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Multiple determination (MD) is the epistemic strategy of establishing the same result by multiple independent procedures. Not much analysis has been provided regarding the specific grounds on which the epistemic virtues of MD rest, besides a very blunt rationale; namely, that it would be an improbable coincidence for independent procedures to establish the same result and yet for the result to be incorrect.

In my presentation, I develop a general conceptual framework for dealing with the structure an epistemic import of MD in empirical science. I do this by distinguishing between the various structural dimensions of MD. These are the structural elements of the MD that give rise to the no coincidence argument expressed by the blunt rationale. Assessing how much these structural elements, as exemplified in a concrete case of MD, differ from the ideal epistemic situation expressed by the blunt rationale, helps in evaluating the force of the no coincidence argument for each concrete case.

Measurement and the Operationalization of Species

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This paper investigates the problem of researchers' bias in species delimitation by drawing a parallel with similar problems in the measurement of physical quantities. Briefly summarized, the paper consists of two parts. The first part shows that there are significant similarities between problems concerning species delimitation and problems concerning the measurement of physical quantities. The second part of the paper discusses the model-based approach to measurement, and shows how a similar view can provide an account of the reliability and accuracy of species delimitation despite the problems of arbitrariness and researchers' bias. I illustrate these points with the case of integrative taxonomy.

Demythifying Scientific Realism

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I consider the selective realist approach and its perceived shortcomings and then focus on one set of complaints to the effect that the nuances and allowances that selectivist criteria incorporate deprive the theories they pick of features that —according to critics (and some realists)—no worth-while realist interpretation can fail to offer (semantic wholeness, universal applicability, correct description for the most part, referring central terms, converging epistemic progress, and full intelligibility of the intended domain). I consider the requirements imposed by these features and find them both grounded on myth and irrelevant to the current debate on realism. Both realists and antirealists should therefore reject the features in question as adequacy conditions for realism.

Personal identity and Science: the genetic approach regarding the case of the children appropriated during the Argentinean dictatorship 1976-1983

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The philosophical problem of personal identity, usually understood as the problem of finding the necessary and sufficient conditions for a past or future being to be certain present being, has been treated in English-language philosophy by analytical metaphysics mostly. In this framework, plenty of references to thought experiments can be found, but they exhibit no connection to practical problems and scientific outcomes. Our purpose is to involve the philosophy of science and to include some scientific outcomes in the debates about personal identity, since it is usually considered that contemporary scientific knowledge supports a genetic approach regarding identity. In order to do this, we will focus on the Argentinean case of the approximately 500 children who were appropriated during the most recent dictatorship (1976-1983). The appropriations deprived them, precisely, of their identities, but some of them managed to be recovered thanks to Abuelas de Plaza de Mayo and genetics.

OSR and the Question of Fundamentalism

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From the recent concerns with fundamentalism raised notably by Schaffer (2003, 2010), Markosian (2005), Cameron (2008), McKenzie (2012, 2013, 2014, 2015), Tahko (forthcoming) (see also Ricki Bliss & Graham Priest (eds.) forthcoming), I will in first place show how nowadays forms of OSR are committed with Fundamentalism. Then, I will try to argue that from both mereological and supervenience relations OSR has severe difficulties to sustain the fundamentalist thesis. Then, I will try to show that there are different non-fundamentalist accounts that can work within R-OSR, and that M-OSR in combination with Primitive Ontology has not to be committed to fundamentalism either. And finally, I will argue that non-fundamentalism is not only compatible with the nowadays forms of OSR, but is also coherent with OSR's initial motivations.

Natural Kinds as Natural Patterns

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Whilst it is universally acknowledged that classifications are useful, some scientific classifications (e.g. chemical elements) are held to higher epistemic standards than folk classifications (e.g. bugs). Scientific classifications in terms of ''natural kinds'' are considered to be more reliable and successful because they are highly projectible and support law-like and inductive generalisations. What counts as a natural kind is, however, controversial. I argue that monist realist accounts of natural kinds are ill suited for portraying how natural kinds are used in actual and past scientific practice. I believe that the notion of natural kinds is best understood based on the concept of 'natural patterns'. Natural patterns are stable real patterns (i.e robust), picked up through repeated observations over time (i.e. they are amenable to precise measurements) that deliver compressed information about some aspect of the world (i.e. they are projectible).

Non-Empirical Confirmation in Modern Cosmology

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The talk will apply the concept of non-empirical confirmation to the context of modern cosmology. In cosmology, significant no-empirical confirmation tends to arise in conjunction with non-conclusive empirical confirmation. Understanding the role of non-empirical confirmation in this context thus must rely on understanding the way empirical and non-empirical evidence interact. I will analyze this based on three specific examples: the empirical evidence that supports a cosmological constant, the case for inflationary cosmology and the status of multiverse scenarios.

Metaphors as tools for understanding: a comparative analysis of expert and public understanding of science

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This paper investigates similarities and differences between expert and public understanding of science, focusing on the role of metaphors as tools for conveying understanding of abstract concepts. We analyze popular and expert articles in the field of epigenetics, the study of heritable changes in gene expression that do not alter the underlying DNA sequence. In particular, we compare the frequency, conceptual reference, and function of the metaphors employed in expert and popular articles. While expert and popularizing publications use similar analogical conceptual mappings at roughly similar rates, the employed metaphors function in different ways: the figurative aspect of metaphors is essential for public understanding but is absent in expert scientific papers, where understanding is presupposed. We outline the implications of these results for current philosophical debates on scientific understanding and public understanding of science.

Heather Douglas's Account of Values and Evidential Judgments in Toxicological Practice

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Heather Douglas' fundamental principle—that values are permitted only through inductive risks—does not capture some important ways through which non-epistemic considerations may play a role in scientific practice. A close examination of how values actually contribute to updating of evidence-appraisals reveals that there is another salient way through which values permeate into scientists' decision-making: context-driven changes in background assumptions regarding what objects are relevant for their investigations. I argue that it is unclear whether 'contextual value permeations' are illegitimate according to Douglas' normative principle unless her account endorses a theory of evidence that accounts for the contextual value-permeations. Furthermore, an adequate account of evidence, such as Helen Longino's evidential contextualism, cannot readily be reconciled with Douglas' framework. This hinders the applicability of Douglas's account to scientific practice.

The significance of non-linearity in interacting Quantum Field Theories: Adopting an 'engineering' perspective in the contexts of scientific realism and naturalized metaphysics

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I explore the significance of the distinction between conventional linear (i.e., free or non-interacting) quantum field theories (QFTs) and non-linear (interacting) QFTs. I claim that a failure to appreciate this distinction has led to various conceptual and metaphysical confusions in QFT. I show how these can be clarified by attending to the distinction. Such clarification gives rise to new questions that are especially challenging for the status of interacting QFTs in the contexts of scientific realism and naturalized metaphysics. I consider how the adoption of an 'engineering' perspective with regard to QFT in terms of the use of good approximations and idealizations might allow a modest form of realism towards QFT along with a relatedly 'quietist' metaphysical stance.

Correcting incoherent sets of credences

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Subjective Bayesianism is a normative theory: it argues that our credences should be probabilities. But there seems to be a missing step in the literature: suppose we hold incoherent credences; how are we to correct them? This paper explores answers to this questions, starting from the simple case of a pair of credences. It is argued that the corrective method we adopt should preserve some functional relation existing between the incoherent initial credences we hold. While it seems that the best corrective method must be decided on a case-by-case basis, some general normative points can be made. Swapping incoherent credences for credences that strictly accuracy-dominate them will delete different kinds of information the original incoherent set contained. On the other hand, preserving the ratio between the original incoherent credences can be shown to alter as little as possible the amount of information the set of credences contains.

Re-examining the Value of Qualitative Predictions for Problem-based Science

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The traditional philosophy of science approach to prediction leaves little room for appreciating the value and potential of qualitative (generic) predictions. At best, they are considered a stepping stone to more precise predictions, while at worse they are viewed as detracting from the scientific quality of a discipline. The aim of this paper is to show that qualitative predictions are undervalued in philosophy of science. I will start by providing the conceptual space for qualitative predictions, within the context of problem-based and policy-oriented science. I will argue that successful qualitative predictions embody one of Levins's three strategies of model building, as they maximize realism and generality over precision. I will then turn to the empirical support for qualitative predictions in problem- and policy-oriented science, focusing on an ecological model of community dynamics that predicts the effects of predators on the endangered kokako bird.

A response to anti-naturalism in the phenomenology of medicine

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Phenomenology of medicine is a popular trend in the philosophy of medicine (Toombs 2001a; 2001b; Carel 2008; 2016; Svenaeus 2013; 2014). This paper focuses on one particular aspect of this literature: its critique of naturalism. Phenomenologists argue that the naturalistic biomedical model reduces illness and disease to a biological dysfunction, to the detriment of other psychological aspects. By contrast, they hold phenomenology to be especially well suited to accommodate the illness experience. Criticizing naturalism is thus one important justification for introducing phenomenology in the philosophy of medicine. However, this paper argues that the critique of naturalism is unsatisfactory on multiple levels: it is at once ambiguous, unfair and ineffective. Worse, the critique prove to backfire and display how its proponents' views about illness are in fact similar to that of their opponents.

Stopping Rules as Experimental Design

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A "stopping rule" in a sequential experiment is a rule or procedure for deciding when the experiment should end. Accordingly, the "stopping rule principle" (SRP) in statistical inference states that, in a sequential experiment, the evidential relationship between the final data and a hypothesis under test does not depend on the stopping rule. In general, Bayesian statistical methods satisfy the SRP while classical statistical methods (whether Fisherian or Neyman-Pearsonian) do not. I consider a variety of arguments advanced in both the statistical and philosophical literature in favor of the SRP in light of viewing a stopping rule as an integral part of a sequential experiment's design. Doing so reveals that many of these arguments are unsound, or only weigh inconclusively on the SRP. But, by conceiving of stopping rules as a part of an experiment's design, one can clarify which aspects of that design are evidentially relevant for hypotheses tested by those experiments.

Exposing and analysing the causality implicit in scientific formulae

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This presentation comprises a discussion of evident asymmetries in the employment of scientific formulae in explanation. I provide a truth-preserving translation of example formulae into causally explicit structural equations showing how such translations explain the asymmetries and provides some further illumination of the formulas' practical features. Finally I propose a probabilistic method of causal analysis of the structural equations in terms of variables' changes in experimental contexts.

On the Causal Presuppositions of (Nearly) All Current Theories of Causation

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Contemporary philosophers defend a wide variety of theories of causation. But however great their differences may be, nearly all of these theories have something in common: their basic structure is that of a decision procedure for the extension of the "is a cause of" relation. This approach requires that it is possible to give a full description of the world – both of the events in the world and of the probabilities and counterfactuals (or whatever the theory in question requires) applying to those events – that is itself independent of the concept of causation. I will argue that, far from being obvious, this presupposition implies detailed and controversial philosophical claims about properties, worldhood, space and time. It is therefore necessary to rethink our entire approach to theories of causation.

'Physics is a Kind of Metaphysics.' On Émile Meyerson's Influence on Einstein's late Metaphysical Realism

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The question whether Einstein was a realist has received considerable scholarly attention. Einstein often seems to regard 'realism' as a nebulous philosophical concept; however he undoubtedly opposed a form of 'realism' to quantum mechanics. This paper suggests that Einstein's correspondence with Émile Meyerson (1926-1927) might be a neglected source to solve what might appear as a conundrum. In Meyerson's work, Einstein found the possibility to combine to apparently contradictory statements: (1) the belief in the existence of physical reality independently of observation (2) the conviction that physical reality so conceived is, for the most part, a speculative-abstract construction. The question whether such a model of reality corresponds to what the world 'really is' is empty. Einstein could present his search for unified field theory as a metaphysical-realistic program opposed to the positivistic-operationalist spirit of quantum mechanics.

Implementing Indiscernibility in Qunatum Mechanics

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Paraparticles have received surprisingly little attention from philosophers. However, the mere possibility of paraparticles challenges the foundations of Quantum Mechanics, insofar as their observation would make the Symmetrization Postulate invalid. As a result, many physicists have tried to provide "no-go" theorems for paraparticles. In this talk, my aim is to distinguish the problem arising with the indiscernibility of quantum particles from the problem of the possible existence of paraparticles. I argue that several strategies allegedly addressing the former fail in reaching their goal because of the confusion between the two problems. I further show that we have to address the problem of indiscernibililty to determine whether or not paraparticles are a problem to begin with. Finally, I conclude by evaluating the current research programs regarding indiscerniblity and paraparticles on the basis of their ability to distinguish between these two problems and to address both of them.

Scientific metaphysics and the theory/practice dichotomy

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It has recently been proposed that in order to do scientific metaphysics philosophers not only have to consider scientific theories but also scientific practice (Love and Nathan 2015; Waters 2017). The aim of my talk is to critically analyse this proposal and to further develop it. In the first part I will discuss the above accounts in more detail and in particular focus on the role(s) they envision for an analysis of scientific practice in scientific metaphysics: what function does the analysis of scientific practice fulfil and why does it have such a central importance for scientific metaphysics? In the second part I will use a case study from protein biology, namely the recent research on intrinsically disordered proteins, to address some of the issues that the analysis in the first part brings to the fore. The case study will in particular suggest that we have to re-think the very dichotomy between scientific practice and theory that is at the heart of the two accounts.

Two Challenges for a Boolean Approach to Constitutive Inference

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This talk discusses two challenges for a Boolean method for establishing constitutive regularity statements which, according to the regularity theory of mechanistic constitution, form the core of any mechanistic explanation in neuroscience. After presenting the regularity definition for the constitution relation and a methodology for constitutive inference, the talk discusses the problem of full variation of tested mechanistic factors and the problem of fat-handed interventions. A solution is offered for each problem. The first requires some adjustments to the original theory by introducing the technical notion of a ``mechanism slice''. The second one is resolved by demonstrating that the fathandedness problem is based on a confusion that does not challenge the theory at all. It is concluded that the methodology of constitutive inference is consistent and plausible with respect to actual practice in neuroscience.

How are standard and ecological rationality related?

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I investigate what the difference between standard rationality and ecological rationality is and how they are related. They might differ along two dimensions. The first is the justifications of norms of rationality; the second is the scope of these norms. Ecological rationality is associated with a pragmatic account of justification and the standard account with a priori justification. Concerning the scope of norms, standard rationality proposes general norms, while ecological rationality advocates situation-specific norms. I argue against this view that the standard account of rationality is not necessarily associated with a prior justification but can also be justified pragmatically. When one accepts that both accounts of rationality employ the same account of justification the question about the scope of norms becomes an empirical one. The two accounts might be complementary in the sense that given certain goals both global and situation-specific norms can be justified.

Natural kind terms: challenging the new-wave anti-essentialism and descriptivism

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In a forthcoming paper in BJPS, Haggqvist and Wikforss (H&W) attempt to bury once and for all the long-dominant externalist/essentialist account of natural kind terms that is widely known as 'the Kripke-Putnam [KP] view'. They also suggest that it is time to return to some sort of cluster-based descriptivist semantics for natural kind terms. In our paper we want to challenge both parts of H&W's project. We will argue that the anti-essentialist considerations and arguments they raise against the KP view are far from compelling in some cases, and certainly not decisive against a reasonable form of the KP view. On the other side, although H&W give few details about what a viable cluster-based descriptivist theory should look like, we will argue that we can already see the approach to be a non-starter. Ignorance and error arguments of the kinds provided by Kripke and Putnam continue to be decisive objections to any descriptivist cluster theory of the semantics of natural kind terms.

How human and nature shake hands: the role of no-conspiracy in physical theories

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No-conspiracy is the requirement that measurement settings should be probabilistically independent of the elements of reality responsible for the measurement outcomes. In this paper we investigate what role no-conspiracy generally plays in a physical theory; how it influences the semantical role of the event types of the theory; and how it relates to such other concepts as separability, compatibility, causality, locality and contextuality.

What We (Should) Talk About When We Talk About Fruitfulness

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What are the relevant values to assess scientific theories and research programs? This question remains hotly debated. Thomas Kuhn (1977) suggested a list of five values that scientists take into account in theory choice: accuracy, consistency, scope, simplicity, and fruitfulness. Since then, several philosophers have proposed many lists and discussed the meaning and role of these values. Surprisingly, little attention has been paid to fruitfulness. In this paper, I suggest a new approach to assess fruitfulness. Such an approach is focused on the assessment of research questions, heuristics and tests used by a research program to formulate and validate predictions. Moreover, I make use of a specific case study, i.e., the Adaptationist Programme in Evolutionary Psychology, to show how this new approach improves the understanding and assessment of fruitfulness.

Observing the Invisible

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While dark matter is believed to ring all luminous galaxies, this only accounts for a fraction of dark matter in the universe. Our collaboration between astronomers and philosophers attempts to search for some of this missing dark matter, investigating the hypothesis that some of it resides in dark matter galaxies. In this talk, I focus on a set of philosophical questions connected by an overarching theme of epistemic warrant: how do astrophysicists blend observation, simulation, and theorizing to warrant inferences about such objects? By focusing on the role computer simulations play in astrophysical inferences, I provide an argument for how complex chains of epistemic warrant work, and how computer simulations contribute to evidence in our dark galaxy hunt. This astrophysics case provides insight into understanding how computer simulations of complex phenomena add to observations themselves, as well as justify conclusions about the nature and behavior of the objects in our theories.

Reactivity: What kind of confound?

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The upsurge in social science experimentation of the last two decades is based on the idea that experiments have a privileged access to causal identification and inference. In the case of laboratory experiments with humans, though, a pervasive potential threat to the intelligibility of results for inferential purposes comes in the form reactivity, defined as the phenomenon by which subjects tend to modify their behavior in virtue of their being studied upon. While reactivity is often cited as one of the main difficulties for social science experimenters, the notion has been defined only vaguely. This paper offers a conceptual framework for reactivity that draws on an interventionist approach to causality. The approach allows us to offer an unambiguous definition of reactivity. Further, it allows us to distinguish between benign and malign forms of the phenomenon, depending on whether reactivity constitutes a danger to the validity of the causal inferences drawn from experimental data.

On contested science and the ideals of good evidence - The case of nutrition research

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This paper explores the epistemic landscape of nutrition research and nutrition advice. The trustworthiness of evidence that forms the basis for official, population-based dietary guidelines (e.g., The Dietary Guidelines for Americans, The Nordic Nutrition Recommendations) is contested. According to the critics, a major part of the problem is the lack of randomized controlled trials and the dependence on observational studies. I shall argue that, first, the criticism is based on certain ideals of evidence that originate from the so-called drug trial paradigm (Satija et al. 2015). Second, I argue that accusing nutrition science of not satisfying these ideals is problematic. The used standards of evidence need to be adjusted by taking the intended practical applications of research into consideration.

ENCODE and the Parthood Question

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Under which conditions is a molecule, such as a particular DNA sequence, a real part of the human genome? Does the human genome have joints of nature that allow for a unique partitioning into parts? In this talk, I provide an answer to these questions by analyzing the scientific practices of individuating genomic parts and by critically reconstructing the metaphysical assumptions that underlie these practices. My analysis focusses on the ENCODE (ENCyclopedia Of DNA Elements) project which was planned as a follow-up to the Human Genome Project and which aims at interpreting the DNA sequence of the human genome by identifying all of its functional parts. For a metaphysician who tries to understand part-whole relations in the biological realm, the ENCODE Project constitutes an instructive case study because it is among the few cases in which biologists explicitly seek to individuate part-whole relations.

The interplay between experiment, simulation and theory at the Large Hadron Collider

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I examine what specific functions simulation models serve at different stages of the ATLAS experiment at CERN as well as how they relate to non-simulation models involved in the same experiment. I argue that simulation and non-simulation models are used in complementary ways at different stages of the ATLAS experiment to carry out various experimental procedures. Based on this discussion, I point out that the relationships that exist among simulation and non-simulation models involved in the ATLAS experiment are so intricate and multi-faceted that they cannot be accommodated within a linear hierarchical structure as suggested by the hierarchy of models account of scientific experimentation (Suppes 1962;Mayo 1996). Rather, I argue that the various relationships existing among simulation and non-simulation models form a network-like structure, through which one can keep track of the interplay among experimentation, simulation and theorizing in the context of the ATLAS experiment.

On the Structure and Function of Scientific Perspectivism in Modern Physics: A Realist-Perspectivist View

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The view of scientific perspectivism, presented prominently in the work of Ronald Giere, is re-evaluated and extended to a comprehensive perspectivist methodology and 'mediated' realistic epistemology, especially, with reference to contemporary physics. In the present study, this is realized by representing categorically the global structure of a quantum algebra of events in terms of structured multitudes of interrelated local Boolean frames, realized as suitable perspectives or contexts for measurement of physical quantities. The philosophical meaning of the proposed approach implies that the quantum world can be approached and comprehended through a multi-level structure of locally variable perspectives, which interlock, in a category-theoretical environment, to form a coherent picture of the whole. Thus, in contrast to a panoptical view from nowhere of the classical paradigm, quantum theory acknowledges in an essential way a perspectival/contextual character of scientific knowledge.

Inference, Explanation, and the Improbable in Experimental Economics

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The objection from improbable explananda (OIE) runs as follows: (P1) Some explanandum P and some explanans Q are such that P r(P |Q) is low (say below 0.5); (P2) For all propositions x and y, if P r(x|y) is low, then x cannot be inferred from y; (P3) If all explanations are inferences, then the explanandum must be inferred from the explanans; so (C) Some explanations are not inferences. To use the most famous of examples, although only 25% of syphilitics exhibit paresis, syphilis causes (and thereby explains) paresis. Using examples in experimental economics in which participants' social identities explain their preferences, we offer two rebuttals to OIE. First, it conflates theoretical explanations with statistical models used to confirm those explanations. Second, even if the statistical models were explanatory, they would not support OIE.

Getting Serious about Shared Features

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Michael Weisberg offers a similarity-based account of the model-world relation, i.e. the relation in virtue of which successful models are successful. Weisberg's main idea is that models are similar to targets in virtue of sharing features. I argue that Weisberg fails to give a successful analysis of similarity because he does not offer an adequate account of shared features. I consider three construals of shared features, as identical, quantitatively sufficiently close, and sufficiently similar features, arguing that each of these construals creates undesirable consequences for Weisberg's account. I then consider a second challenge for Weisberg. Teller argues that there can be no general account of the model-world relation as only the details of the specific modeling context can tell us what it means that models and targets are similar. I expand on how Weisberg may respond to these challenges by offering a pluralistic revision of his account.

Theoretical physics in the 1950s: particles, physicists, and field theories

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Technical problems arising in quantum field theory (QFT) in "the fifties" led to a variety of concerns with its conceptual foundations. In particular, there was doubt as to whether QFT could successfully describe the strong and weak nuclear forces. In response to these concerns, theoretical particle physics "fractured" into three camps. This paper tracks the fracturing of axiomatic QFT and S-matrix theory from QFT proper, as well as their subsequent reabsorption. I draw philosophical lessons about the evolution and solidification of the conceptual core of QFT during this period. Though each program responded in different ways to the crises, both revisionary programs still retained much of the content of QFT. Much of value from axiomatic QFT and S-matrix theory was embraced as standard QFT matured into the empirically successful foundation of modern particle physics. I conclude by discussing the effect that this fracturing had on the conceptual core of QFT.

On the Alethic Foundations of Imprecise Bayesianism: A Defense of IP Scoring Rules

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Konek (2016) makes headway in providing an accuracy-centered justification of imprecise Bayesian methods. But his project faces serious challenges. Various authors provide impossibility results which show that there simply are no IP scoring rules that satisfy a few seemingly innocuous constraints. The purpose of this talk is to respond to these challenges. These authors place unreasonable demands on IP scoring rules. Their demands appear innocuous due to a misunderstanding of the theoretical role of IP scoring rules. In a nutshell: they assume that any single IP scoring rule must be suitable for rationalising all IP distributions. But just as different cardinal utility functions encode different practical values, and hence help to rationalise different coherent preference orderings, so to do different IP scoring rules encode different epistemic values, and hence help to rationalise different IP distributions.

Epistemic success and societal impact in extra-academic collaboration

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Collaboration with extra-academic agents is nowadays fairly common in science. In science policy such collaborations are seen as a means of increasing the societal impact of science.

Philosophers, historians and sociologists of science have examined cases of successful collaborations in order to understand how such success is achieved. This literature usually presupposes that success in extra-academic collaboration in science depends on whether the collaboration succeeds epistemically. In science policy, however, success in extra-academic collaboration is often taken to mean success in creating societal impact.

The implicit assumption seems to be that a collaboration that fails from an epistemic point of view cannot succeed in creating beneficial societal impact. I question the assumption, illustrate my argument with a case study, and argue that certain types of societal impact are more closely linked to epistemic success than others.

Multiple Realizability as a Design Hypothesis in Biological Engineering

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Contemporary critics of the Multiple Realizability Thesis (MRT) tend to concern themselves solely with actual here-and-now realizations when evaluating the plausibility of the thesis. The possibility of alternative, but non-actualized, realizations is regarded as uninteresting because it is taken to be an unverifiable scenario of science fiction. This view overlooks the role of MRT as a design hypothesis in biological engineering. Given the pursuit of synthetic biology to redesign the evolutionary realizations of biological functions, or even constructing artificial surrogates in the laboratory, I argue that the field provides a novel perspective to test the empirical-cum-hypothetical dimension of MRT. By changing the focus from actual to potential biological systems, my paper will also shed new light on the complicated relationship between multiple realizability and evolution that has troubled many philosophers of biology.

Explanation and Prediction in Econophysics

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According to Hempel explanations and predictions have the same structure: An explanation of a past event shows why it was to be expected. Examples such as Darwin's theory of evolution and evidence based medicine demonstrate that Hempel's general thesis is untenable: One can have explanations that do not yield predictions and predictions without explanatory grounding. Econophysics is another candidate for this asymmetry. Apparently, econophysics rates poorly with respect to prediction but well in the business of explanation. I investigate to which extent this asymmetry actually obtains. In conclusion, I will argue that although econophysics does in fact display an asymmetry in its fruitfulness for explanation and prediction, it is not as pronounced as it first seems. The main predictive power of econophysics consists in what call "structural predictions", i.e. prediction about the role of structural background conditions, usable e.g. for policy advice in regulating financial markets.

Mechanistic evidence and a new argument from inductive risk

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I present a novel account of mechanistic evidence and show how the contrastive nature of such evidence leads to a new argument from inductive risk. First, evidential relevance of a finding is analyzed as constraining the set of possible mechanisms potentially realizing the investigated phenomenon. Second, evidence is efficient if it strongly favours a mechanistic hypothesis over a set of plausible alternative mechanistic hypotheses. This means that evidence has an effect not only on a particular mechanism hypothesis H, but on the whole probability distribution over the alternative hypotheses. A natural way of analyzing the incremental impact of new evidence on a set of alternative hypotheses is in terms of uncertainty or 'entropy' reduction. Third, there is no unique single measure of uncertainty/entropy and, consequently, no single unique measure of uncertainty reduction. I then argue that the 'right' measure of uncertainty reduction depends on the pragmatic context.

Metaphysics of Laws and Causation in Dynamical Spacetime

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This contribution aims to update and enrich the two main families of metaphysical conceptions---reductive and non-reductive ones---about laws of nature and causation with imputs from fundamental (in particular, general relativistic) physics on space and time. One of the crucial implications of the dynamical nature of general relativistic spacetime is that the global spacetime topology can be non-trivial in a way that may be at odds with the temporal (and 'production') component of non-reductive accounts. We will work out the details and discuss the status of the global topological constraints that need to be imposed on the spacetime structure for a consistent reformulation of primitivism and dispositional essentialism about laws in the general relativistic context. We will contrast this situation with the reductive accounts, where these global considerations can be naturally encoded in a Humean ontology.

Variety of Evidence

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The Variety of Evidence Thesis is taken to state that varied evidence speaking in favor of a hypothesis confirms it more strongly than less varied evidence, ceteris paribus. This epistemological thesis enjoys widespread intuitive support. Its evidential character makes it highly amenable to a Bayesian analysis. I here give such an analysis. I thus put forward Bayesian models of inquiry in which I explicate the notion of varied evidence. Subsequently, I show that this explication of the notion of varied evidence entails that a Variety of Evidence Thesis holds in all these models. The models also pronounce on disconfirmatory and discordant evidence. I are argue that these models pronounce rightly and that the case for the Variety of Evidence Thesis emerges strengthened.

How do model-based explanations depend on their respective models?

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We can explain some phenomena based on idealizing models. Call these explanations model-based explanations. The explanatory success of idealizing models prompts questions. A central question is how devices which do not accurately represent their target objects can explain phenomena in view of the widely shared thesis that explanations are demanded to be factive. In my paper, I argue that the inaccurateness of idealizing models as well as the issue of whether models can be de-idealized has to be separated from evaluating the model-based explanations. Models provide us with the formulas or equations which are explanatorily fruitful, but the idealizations are no proper part of the explanations themselves. So, at most, model-based explanations are epistemically dependent on their respective idealizing models. They are not dependent on them from an explanatory point of view.

Against Fields

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Using the example of classical electrodynamics, I argue that the concept of fields as mediators of particle interactions is fundamentally flawed and reflects a misguided attempt to retrieve Newtonian concepts in relativistic theories. This leads to various physical and metaphysical problems that are discussed in detail. I will defend a formulation of classical electrodynamics in terms of a pure particle ontology and show that electromagnetic fields are best understood as book-keeping variables, summarizing the effects of retarded and/or advanced direct interactions to provide an efficient description of subsystems in terms of initial data.

Robustness arguments in meta-regression

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Some arguments diminish the force of 'inferential' robustness: If the functional form of an econometric model is correct, then it is not necessarily the case that the model should be robust with respect to various irrelevant variables in the specification. Including irrelevant variables may also introduce bias if they are, by chance, correlated with the regressors. Hoover thus (2006) posits that the true model need not be robust. Yet, conducting sensitivity analyses to check for the robustness of results is widespread in econometrics. Thus, the question is: When exactly does robustness of regression result provide us with epistemic assurance that the inferences do not depend on irrelevant modelling assumptions?

In this paper, I will look into meta-regression in order to study this question. When Stanley and Jarrell (1989) introduced meta-regression into economics, they took it to be providing a method of analyzing the problem of specification searches.

Ex Pluribus Unum: How Many Models Support One Hypothesis

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Complex phenomena often require complex explanations. In simple cases, a single model can explain a phenomenon by identifying its causes. But to fully explain a complex phenomenon, we may require systems of models. The question arises of how to compare models that differ from one another as a whole rather than for individual components.

In the literature, the notion of analogue simulation has been offered as a strategy to increase confirmation of results coming from different models that can be mapped to one another (Dardashti et al. 2015a,b).

The aim of the present paper is to generalise the approach of Dardashti et al. (2015 a,b) to situations where there is (a) no one-to-one mapping between the models and (b) the different models are still intended to be about the same phenomenon. Different kinds of relations will be considered so to analyse the conditions under which model frameworks can be compared and their results taken to corroborate the initial working hypothesis.

Roads to the past: how to go backward in time in quantum mechanics

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This presentation aims at arguing that a conceptual issue is threateningly lurking behind the orthodox way of approaching the arrow of time in non-relativistic quantum mechanics. I shall show that, at least, two kinds of time-reversal operators can be neatly defined in this context, though they lead to different situation as they aim at different purposes. Therefore, non-relativistic quantum mechanics turns out to be time-reversal or non-time-reversal invariant depending on what operator we come to conceive as appropriate. I shall point out pros and cons of those kinds of time-reversal operators and I shall draw up a desideratum regarding what a time-reversal operator should be like in order specifically to make sense of and to properly deal with the problem of the arrow of time in physics in general.

Perspectival modeling, pluralism, and the quest for realism

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The paper has two main goals. First, I review the charges of redundancy and metaphysical incoherence recently leveled against Giere's scientific perspectivism. I put forward a novel way of thinking about perspectival modeling, which is kosher to the sui generis representational task of perspectival models, and to the pluralism inherent in them. Second, I illustrate the heuristic function of perspectival modelling with three examples taken from a cutting-edge area in high energy physics, where the quest for realism is tantamount to the search for the right physics: i.e. Beyond the Standard Model (BSM) physics. I present three classes of what I call perspectival models in BSM: i.e., phenomenological pMSSM models; simplified models; and data-driven models in exotics searches. These examples illustrate how the sui generis nature of the representation afforded by perspectival models is still compatible with both pluralism and the quest for the right physics.

The role of philosophical theory in qualitative methods textbooks

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In this paper I discuss the role of philosophical theories (intended as coherent sets of philosophical claims) in social research methods textbooks, and in particular in qualitative methods textbooks. The theses that I defend in the paper are two:

(1) Qualitative methods textbooks typically contain the claim that philosophical theories determine research methods.

(2) The determination relationship between philosophical theories and research methods that is typically assumed in qualitative methods textbooks is potentially problematic.

In the first part of the paper I qualify and provide empirical evidence for (1). The empirical evidence consists of the analysis of a random sample of 90 qualitative methods textbooks.

In the second part of the paper I critically assess the determination claim contained in textbooks and argue that this claim is both philosophically and educationally problematic.

Interpretive Analogies Between Statistical and Quantum Mechanics

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This paper investigates interpretive analogies between statistical mechanics and quantum mechanics. Although such analogies have been occasionally noted before, there has been no systematic attempt at comparing the interpretive options between the two theories. This comparison yields some novel interpretive ideas which have been overlooked due to the independent development of interpretations for the two theories. It also shows that to a significant extent the interpretive choices in both theories depend essentially on how stochasticity is understood and implemented.

Biological Autonomy, Autopoiesis and the Process View of Life

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In recent years, theoretical biologists and philosophers of biology have made increasing efforts to defend organisms against reductionist tendencies by emphasising their autonomous and autopoietic character as self-organising systems.

In my paper, I shall investigate some of the ontological implications of this approach. The emphasis on autonomy, together with associated concepts of organisational closure, self and identity, might evoke the idea that organisms are to be categorised ontologically as substances: independent entities with well-defined determinate boundaries.

However, I shall argue that this is mistaken. Biological autonomy and autopoiesis, properly understood, require a rigorous commitment to a process ontological view of life. I shall defend this claim by looking at the particular ontological status of boundaries in living systems. This will also help clarify both the sense in which living systems are systems and how they differ as living systems from other systems.

Methodological artefacts in consciousness science

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Subjects have a type of access to their experiences that scientists do not have when they try to investigate the neural basis of consciousness. The subjective aspect of consciousness is what makes its scientific study so challenging. This leads researchers to rely on report-based experimental paradigms in order to discover neural correlates of consciousness (NCC). I argue that the requirement of reports has biased the research for NCC, thus creating what I call "methodological artefacts". I show that the main NCC discovered in the framework of the global neuronal workspace theory of consciousness are methodological artefacts. This paper has three main goals: first, describe and justify the existence of a measurement problem and methodological artefacts in consciousness science. Second, provide a critical assessment of the NCC put forward by the global neuronal workspace theory. Third, provide the means of dissociating genuine NCC from methodological artefacts.

Stranger in a strange land: a forecasting account of evolutionary mismatch

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In evolutionary medicine, researchers characterize some problems as evolutionary mismatch. Mismatch arises as the result of organisms living in environments to which they are poorly-adapted, typically as the result of some rapid environmental change. In development, some organisms respond to environmental cues which allow them to predict the sort of environment they will encounter and to modify aspects of their phenotypes for increased fitness. Sometimes, the organism will predict incorrectly. Incorrect predictions can have deleterious fitness consequences. The predicted environment and the actual environment are mismatched. I propose that this prediction of future environments be extended to mismatch generally. Even genetic traits are an evolutionary forecast of the environments an organism will encounter. Discordance between an organism's forecast and actual environments of sufficient significance to cause deleterious fitness effects is an evolutionary mismatch.

Generalizing the Causal Markov Condition for Interactive Common Causes

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The causal Markov condition, which is a generalisation of Reichenbach's principle of the common cause, is the central principle of causal explanation. In a non-technical way it says that every correlation has to be explained by a causal connection. While the principle seems to be well-founded in the deterministic macroscopic realm, van Fraassen (1982: Rational Belief and the Common Cause Principle) and Cartwright (1988: How to Tell a Common Cause) have argued that the principle fails for indeterministic quantum mechanics: there are common causes that do not screen off. This poses the dilemma that one either has to deny that the quantum world is causal (van Fraassen's horn) or one denies that the theory of causal Bayes nets adequately captures causal facts (Cartwright's horn). In this talk I shall re-investigate the alleged failure and discuss scenarios for a via media, which upholds basic ideas of the theory of causal Bayes nets AND understands the quantum world in a causal way.

Degrees of Scientific Understanding on the Inferential Theory

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A traditionally accepted view is that scientific understanding comes in degrees. However, until now no-one has provided a fully articulated account of how to measure degrees of scientific understanding. Using the Inferential Theory of Scientific Understanding I show how degrees of understanding can be measured by attending to the kind of inferences being made by a subject, and hence answer the question of how much scientific understanding a subject has developed.

Incompatible models of computation over the reals and their importance for scientific computing

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Although computing over the integers is a well-developed mathematical theory –thanks to the work of Turing and other logicians– when it comes to real numbers and functions, things are not so straightforward. There are different accounts specifying what it means for a real function to be computable; accounts which however turn out to be incompatible. In this paper, I examine two such accounts: one based on algebraic notions (the BSS model) and one based on recursive analysis. After explaining why this issue from mathematics is important for the philosophy of science, I make some comparisons between the two accounts with respect to their intended aim: both accounts are meant to provide a foundation for scientific computing. I conclude that the two models can in fact be seen as not rival but as accomplishing different things. Recursive analysis indeed provides a foundation for scientific computing, whereas the BSS model offers an explication of the notion of `algorithm over the reals'.

Regularity, Infinitesimal Probabilities, and Physical Isomorphism

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Recent papers by Howson and Benci, Horsten, and Wenmackers have tried to defend regular and hyperreal probabilities against critiques by Williamson, Parker, and others. But the defences miss the point. The critiques claim that certain events should have the same probability because they are isomorphic, but if regularity holds, they cannot (even with hyperreal probabilities). The defences claim that the critiques equivocate between sample spaces, and there is no isomorphism when the events are modelled in the same sample space. However, this is not true of Parker's example, and Williamson appeals to isomorphisms between real physical events, not "events" in a probability model. That intuitive appeal can be analysed into two principles: (1) the probability of an event is determined by the qualitative features of the event, physical laws, and local circumstances, and (2) the laws of physics are space-time invariant. The critiques show that, if regularity holds, one of these fails.

Descriptions of Mechanisms for Explanation versus Descriptions of Mechanisms for Prediction

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I examine the differences between descriptions of mechanisms used for explanations and those used for predictions. I show that what the new mechanistic philosophy says about the use of mechanistic explanation for predictions can be articulated by two claims: (i) descriptions of mechanisms are used both for explanation and prediction, which indicates a symmetry between mechanistic explanation and prediction, and (ii) predictions are necessary to develop explanations. I confront these claims with the explanatory practice of ecologists and argue that the latter supports the second claim. However, mechanistic explanations from ecology show that descriptions of mechanisms used for explanation and prediction are different and more complex compared to what the new mechanistic philosophy states. I show that different descriptions are used for explanation and prediction. I also examine the requirements for an accurate prediction when the underlying description is also used for explanation.

A model of constitutive psychological explanation

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In current debates about scientific explanation, mechanism-based accounts play an important role. Such accounts have successfully been applied to several subfields of psychology, for example cognitive psychology and biological psychology. Here, I focus on explanations from a different psychological subfield, namely clinical psychology. I argue that at least some constitutive explanations in clinical psychology can be understood mechanistically. I arrive at this result through an analysis of an explanatory model psychologists put forward to explain obsessive-compulsive disorder. This analysis shows that a modified mechanistic model can capture the central features of this explanation. Generalizing the results of this case study, I conclude that several instances of constitutive psychological explanation can plausibly be understood as mechanistic explanations.

Interactivist Biosemantics: Ramsey's Principle Naturalized

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Success Semantics (SS) derives from the work of F. Ramsey [1927] and developments by such authors as J. T. Whyte [e.g. 1993], and J. Dokic & P. Engel [e.g. 2005], who argued for its incompatibility with naturalist theories of representation such as that which can be derived from the application of the etiological theory of biofunctions (ETBF) [e.g. Millikan 1984, Papineau 1987]. In this talk we will argue that their critiques to the ETBF are surmountable by Interactivism (the theory of autonomy & biofunctions proposed by M. Bickhard [2009], C. A. Hooker [2009], and W. Christensen [2002]). We will proceed by: 1) exposing Ramsey's Principle (RP) (the founding principle of SS); 2) recapitulating the critiques to its naturalization; 3) introducing some tenets of Interactivism that show its complementarity with RP; 4) and conclude by considering how an "Interactivist Biosemantics" answers worries expressed by S. Blackburn [2005] and B. Nanay [2013] concerning the general viability of SS.

Confirmation by Analogy in Pharmacology

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Analogical arguments are ubiquitous vehicles of knowledge transfer in science and medicine. This talk builds on a Bayesian evidence-amalgamation framework for the purpose of formally exploring different analogy-based inference patterns with respect to their justification in pharmacological risk assessment. By relating formal explications of similarity, analogy, and analog simulation, three sources of confirmatory support for a causal hypothesis are distinguished in reconstruction: relevant studies, established causal knowledge, and computational models.

A plea for minimally biased philosophy

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Philosophers have been very interested in the ways in which cognition can be biased, and in the implications that this has for philosophical practice. Surprisingly, however, philosophers have overlooked the obvious and yet important fact that also literature search and review are likely to be affected by biases. This is worrying, as philosophers do not philosophize in a vacuum, and actually seem to rely on literature search and review in a number of ways and for several purposes. Notably, whilst philosophers have looked at methods and tools from the sciences to expand their methodological toolkit and offer philosophy better chances of accomplishing its goals, the tradition of systematic reviews of literature from scientific disciplines has been unduly neglected. Systematic reviews are important tools that minimize bias by allowing for reproducibility and transparency. By considering the case of bioethics, I also present how systematic reviews of arguments can be carried out.

From perception to concepts: Bayesian inference as an alternative to Voronoi categorisation in conceptual spaces

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In the philosophy of the cognitive sciences, it is an unsolved problem how representations of perceptual stimuli can be transformed into concepts, and how this transformation determines categorisation in early stages of development.

One answer to this problem is Gärdenfors' (2000) conceptual spaces theory. According to Gärdenfors (2000), concept learning and categorisation are best modelled via a mechanism called Voronoi categorisation (VC). The VC partitions a conceptual space into sets of mutually exclusive and exhaustive regions that correspond to different concepts.

Based on empirical evidence from developmental psychology, I argue that the VC cannot solve the problem of grounding concepts and categorisation in perception. I propose Xu and Tenenbaum's (2007) Bayesian hypotheses-testing approach to word learning as a better alternative, and illustrate how this approach can be modified to explain categorisation based on perceptual representations in early development.

Evaluating the Explanatory Power of Special Relativity: The Case of the Velocity-Dependence of Mass

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Recently, philosophy of physics has seen a debate emerge on special relativity's explanatory power. In this talk I will analyze and evaluate the way in which philosophers of physics have studied this explanatory power. In the first part, I will argue that the main participants in the debate have tried to answer this by focusing on the kind of theory that special relativity is. In the second part, I will then argue, via a particular case – the debates on the velocity-dependence of mass – that philosophers of physics have to extend their focus if they want to evaluate the theory's explanatory power. I will argue, more in particular, that the velocity-dependence of mass came to be seen as belonging to the domain of special relativity only because the development of the theory was accompanied by a shift in how scientists conceived of the relation between theory and phenomena. Hence, if we want to evaluate special relativity's explanatory power, we should look at more than merely theory.

Landing Zones: The Use of Quantum Mechanics in Chemistry

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This essay argues that the use of computation methods across traditional disciplinary lines is in need of an additional analysis through examination of a case study. The case study is on the historical development of the Quantum Theory of Atoms in Molecules (QTAIM), a model of the molecule that uses computational methods transferred from physics. I invent a new notion – landing zones – to augment philosophical discussion surrounding model transference. Landing zones afford philosophical analysis of model transference the ability to identify factors in the context of model construction that drive the use of these transferred computational methods. In the case analyzed, the landing zone furnishes the context of model construction with a type of object and a type of relation, providing explanatory promise to the transfer of computational tools. Analysis of QTAIM with the notion of landing zones indicates that cross-disciplinary model transfer has preparatory, constitutive requirements.

Causality, theory ladenness and reproducibility in experimental science

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In this paper, I put forward three basic philosophical claims concerning, or derived from, scientific experimentation. (1) The requirement of stable material realization implies that causation is an indispensable aspect of all empirical sciences; this conclusion refutes the empiricist claim that science can do without the notion of causality. (2) The required interpretation of the object-apparatus correlation entails the impossibility of a complete 'independence' of the different kinds of theories employed in experimentation; although this fact does not imply a vicious methodological circularity, it may entail significant problems for representational forms of realism. (3) Reproducibility proves to be a significant aspect of experimental practices, but the 'double hermeneutic' limits its role in disciplines like experimental psychology; this point is unjustly ignored in the current replicability debate.

A new proposal how to handle counterexamples to Markov causation à la Cartwright, or: Fixing the chemical factory

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Cartwright (1999a, 1999b) attacked the causal Markov condition by providing a counterexample in which a common cause does not screen off its effects: the prominent chemical factory. In this paper we suggest a new way to handle counterexamples to Markov causation such as the chemical factory. We argue that Cartwright's as well as similar scenarios (such as decay processes or EPR phenomena) feature non-causal dependencies of a certain kind. We then develop a representation of this specific kind of non-causal dependence that allows for modeling the problematic scenarios in such a way that the Markov condition is not violated anymore. Finally, we compare our solution to a recent proposal how to handle counterexamples to Markov causation à la Cartwright put forward by Schurz (in press).

Stars and steam engines: to what extent do statistical mechanics and thermodynamics apply to self-gravitating systems?

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In the foundations of thermal physics, there is a debate about whether the domain of thermodynamics and/or statistical mechanics can be extended to include gravitational systems. In this talk, I set aside black holes and consider the claim that thermal physics applies to Newtonian astrophysical contexts—in particular to self-gravitating systems such as elliptical galaxies and globular clusters. Whilst there is some success, notably the collisionless Boltzmann equation, there are many unusual features, such as negative heat capacity. Callender 2010 argues that in order to reconcile these two sides of the dispute we should take a broader, more liberal view of thermodynamics. I argue for an alternative position: if we are careful in distinguishing statistical mechanics and thermodynamics, then no reconciliation is required. Both sides can live in harmony because whilst statistical mechanics applies, thermodynamics does not.

Stein's paradox and group rationality

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This paper contributes to the lively literature on formal social epistemology. It presents a puzzle from the statistics literature, known as Stein's paradox, and explains this paradox by reference to a discussion on the aggregation of probabilistic expert judgments, as for example in climate science. The novelty of the paper resides in applying the lessons from Stein's paradox in the context of social epistemology. This delivers insights into the role of diversity in science.

Scientific Self-Correction: The Bayesian Way

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Replication is central to scientific self-correction, but many findings in the behavioral sciences don't replicate (Open Science Collaboration, 2015). We evaluate two competing hypotheses about how to make science more self-corrective. Social reformists hypothesize that changes in inference methods alone do not make science more self-corrective unless we change the social structure of science. On the other hand, methodological reformists hypothesize that scientific self-correction would be greatly improved by moving from significance tests (NHST) to Bayesian statistics. Using a computer simulation study, we evaluate whether self-correction depends on the chosen statistical framework. Based on this study, we articulate a middle ground between the social and methodological reforms. Scientific self-correction fails in several scenarios regardless of the statistical framework, but Bayesian analysis leads to less misleading effect size estimates and credible/confidence intervals than NHST.

The Empirical Adequacy of Cumulative Prospect Theory and its Implications for Normative Assessment

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It is lately cliché advice in the social sciences to design policy for people as they are, rather than as they should be according to idealized normative theories. In welfare economics it is widely claimed that normative assessment should recognize that people are not expected utility maximizers, but make risky choices in accordance with cumulative prospect theory (CPT). We criticize the experimental methodology that has led to this conclusion, review all current experimental data bearing on it using econometrically superior techniques, show that the conclusion is unsupported, and diagnose an underlying philosophical muddle involving misaligned concepts of welfare and well-being.

On the Problem of Relevance: The Dilemma of Jiggling and Whiggling

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The problem of relevance is the challenge of determining which information is relevant for certain purposes. Different fields have somewhat different terminology of the issue: classicist cognitive science characterizes it in terms of the “frame problem”, in machine learning it is conceived as the problem of “feature extraction schemes”, in cognitive neuroscience as “selection of preferred stimuli” and in philosophy of science in terms of incorporating “difference making” objects and properties into models. But, the underlying problem is common for all: How to determine what information is, and what isn't relevant? In this presentation, we (i) outline an account of relevance, and (ii) analyze it in the light of recent experimental studies in cognitive sciences.

On Predators and Prey. Scientific Models, Fiction and Imagination

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I develop a novel explanation of models as representations by drawing on Walton's influential theory of fiction. To this aim I present an amended version of fictionalism about models, what I call simple fictionalism, that overcome what I take to be the false ontological dychotomy between traditional indirect fictionalism (defended by Frigg) and direct fictionalism (defended by Toon and Levy). And I draw an explanation of how models represent in terms of two main conditions, an aboutness condition and an epistemic condition. The key to understanding how models represent resides in the idea that the representation relation between models and the world is a kind of indirect referential relation that is mediated by imagination.

Explanatory liberalism and structural necessitation

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Traditionally, philosophers have conceived of good explanations as explanations whose explanantia are true, or at least approximately true. This view, which I here refer to as explanatory conservatism, entails that scientific models cannot be explanatory, because models idealise, distort, and seem to exist only in our imagination. Some philosophers have however recently begun to doubt this consequence. Contrary to extant accounts of model explanation, I argue in this paper that we should overcome explanatory conservatism in favour of explanatory liberalism, according to which truth is inessential to good explanations. In my account, models explain their target by means of structural necessitation. Good explanatory models can be individuated accordingly and explanatory anarchism, where 'any explanation goes', can thus be avoided. Throughout I relate my discussion to the recent surge of 'fictionalist' accounts of scientific models, which conceive of models as akin to literary fictions.

Weak and Strong Mechanistic Realism and the Identification-Problem of Mechanisms

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One strand of criticism of ontic requirements in the context of mechanistic explanation consists in arguing that mechanisms cannot be metaphysically real since human epistemic interests are necessarily involved in identifying putative components as relevant to a mechanism (the identification-problem). I propose a distinction between a weak and a strong sense of realism about mechanisms and argue that the identification-problem only undermines the plausibility of strong mechanistic realism. Weak mechanistic realism, on the other hand, does solve the identification-problem when combined with the constitutive-relevance-account of mechanisms developed by Craver. I further argue that committing to weak mechanistic realism suffices for a plausible account of mechanistic explanation, in both its ontic and epistemic version. Finally, I argue that much of the philosophical literature on mechanisms remains unclear about which kind of realistic commitment (weak or strong) is actually made.

Isolating the Effects of Coherence

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Bayesian coherentists claim that the more coherent a set of propositions is, the more probable, all else being equal. To test this claim, one must determine what must be held constant to satisfy the ceteris paribus condition. Formal philosophers of science disagree on this issue, relying almost entirely on their intuitions to adjudicate what factors to fix in isolating the epistemic effects of coherence. This paper offers a principled account for determining the factors that are appropriate to fix. The account is developed and defended via a study of how to isolate causal influences in controlled experiments. Applied to the coherentism debate, this account results in a set of factors that differs from all previous suggestions in the literature. Thus, we end with a more informed formal investigation into the probabilistic implications of various explications of coherence, when the effects of degrees of coherence are isolated via the ceteris paribus condition defended in this paper.

Easy Road Nominalism, Mathematical Explanation, and Fractional Quantum Statistics

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The "hard road" to nominalism, taken by Hartry Field for instance, includes purging our best scientific theories from quantifying over abstract mathematical objects. It has been recently debated whether or not there exists an alternative "easy road" to nominalism. Mary Leng has outlined such an approach, where the idea is that mathematical abstracta represent approximately instantiated physical structures. In this paper I will appeal to a recent distinction made by John Norton between "approximation" and "idealization," and a case study that has received little attention in the literature–the emergence of anyons and fractional statistics in fractional quantum Hall effect systems–in order to object to Leng's account and impede her path to easy road nominalism. In doing so, I partly defend Mark Colyvan's claim that there is no easy road to nominalism, and make a connection between this debate and the literature in philosophy of science on essential idealizations.

Emergent chance

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According to prevalent views the probabilities in classical statistical mechanics and other special sciences are objective chances, although the underlying mechanical theory is deterministic, since the low level is inadmissible or unavailable from the high level. These arguments are based on anti-reductionist views according to which the high level properties are multiply realizable by low level properties. We propose an even stronger notion of emergent chance, in which the high level is inaccessible from the low level. We offer a reductionist account of probabilities which, we claim, is the right way to understand statistical mechanics and other special sciences. We then show why in a non-reductionist picture the high level is not accessible from the low level, so that even Laplace's Demon cannot know the high level probabilities and so the high level probabilities are genuinely primitive. We end with comments on metaphysical presuppositions in the formation of high level sets.

Extrapolation and Expert Judgment in the Human Sciences

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Because of the limits of correlational research, a neo-mechanistic movement gained momentum in the last two decades. The study of mechanisms has, in fact, many methodological advantages. For instance, it can complement statistical methods in extrapolation problems (as stated by the Russo-Williamson thesis). However, standard analyses of scientific extrapolation fail to recognize the crucial role of expert judgment in science. Some extrapolation problems are hard cases that require expert judgment, a notion that can be analysed from two standpoints: psychology of expertise and hermeneutics. The former perspective explains how training and experience develops expert judgment and perception. Hermeneutics, in turn, shows how interpretive methods or "hermeneutic experiences" (Gadamer) enhance our sensitivity to psychological and cultural differences, thereby developing our capacity to assess extrapolation problems in the human sciences.

Vision, Olfaction, and the Unity of Senses

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There is an ontological controversy concerning the philosophical characterizations of olfactory content. While philosophers agree that olfactory experiences present odours, some authors characterize odours as objects but other interpret them as features. I address this controversy by analysing, relying on psychological results, the subject/property status of odours, their mereological structure, and identity conditions to judge whether they belong to the same ontological category as visually presented objects or features. I argue that olfactorily presented odours constitute a sui generis ontological category in virtue of their non-classical mereological structure. Nevertheless, they share important characteristics with visually presented objects: they are subjects and have unitary synchronic individuators. These investigations constitute a step in establishing whether different human modalities are ontologically unified by organizing the environment according to the same categories.

Philosophical conclusions from historical analyses: The case of genetic information

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Semantic concepts abound in molecular biology (e.g. 'information', 'meaning', 'code') and their content and role are still controversial. The debate is often approached by bringing to bear pre-existing notions of information (or code or meaning) and assessing the extent to which they apply in the molecular context. In this paper, I argue that this approach needs to be supplemented with an explicitly historical analysis of how scientists actually employed (apparently) semantic concepts. I present a detailed analysis of how the proponents of 'genetic information' used this term between 1953 and 1958 in both published and unpublished sources. The findings allow conclusions about its theoretical role and shed new light on the plausibility of some recent philosophical work in this area (e.g. Shea 2013, Griffiths & Stotz 2016).

Causal Explanatory Strength

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Schupbach and Sprenger (2011) introduced a novel probabilistic approach to measuring the explanatory strength that a given explanans exerts over a corresponding explanandum. We show that the measure obtained by Schupbach and Sprenger gives incorrect results for distinctively causal explanations, and go on to define an alternative measure of explanatory strength that is better able to model the strength of causal explanations. This alternative approach relies crucially on Pearl's notion of an 'intervention' and suggests the existence of both an ontic and an epistemic component of explanatory power.

Natural Selection and Mathematical Explanations

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The nature of natural selection has been a very debated issue in the last years in philosophy of biology. Some authors, known as statisticalists, have claimed that the concept of natural selection is statistical in character and cannot be construed in causal terms. On the contrary, other philosophers, known as causalists, have argued against the statistical view and reaffirmed the causal interpretation of natural selection. The paper will firstly present those two opposite conceptions of natural selection in some detail. Then, it will try to illustrate how the debate on the nature of natural selection is deeply related to a more general debate that is going on in philosophy of science, i.e. the debate on whether non-causal explanations, namely mathematical explanations of natural phenomena, are genuine scientific explanations. This move will consent us to better point out the philosophical relevance and scope of the current debate on the nature of natural selection.

Stability of traits as the kind of stability that matters: How holobionts might be units of selection

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Holobionts are biological units that result from the symbiotic merge of a host plus all its associated microbiota. They are considered to be pervasive: all plants and metazoans are taken to be, at the end, holobionts. In recent years, many researchers, biologists (Brucker & Bordenstein 2013) and philosophers (Dupré and O'Malley 2009) have claimed that holobionts are units of selection, whereas others (Moran & Sloan 2015; Skillings 2016) have denied it, basing their argument in the lack of intergenerational stability of the different lineages that compose the holobiont. In this talk, I will distinguish two notions of stability (stability of lineages and stability of traits), characterize what "stability of traits" consists in and argue that holobionts always satisfy this notion of stability. Finally, I will contend the arguments presented against the role of holobionts as units of selection by claiming that stability of traits is what matters for taking holobionts as units of selection.

The cultural assimilation model: revisiting the last major transition in evolution

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Adopting an inclusive inheritance perspective and a major transition framework, we discuss to which extent cultural transmission can be regarded as a major transition in evolution. In particular we focus on the last bio-cultural major transition and we propose to split it into two steps: 1) the evolution of cumulative culture and 2) the evolution of language. We also propose that a common evolutionary dynamic might underlie these two steps and we identify it with the assimilate stretch principle. This model originally stressed the importance of genetic assimilation. However, bringing the inclusive inheritance perspective to its natural consequences, we suggest that the model should be integrated with what we label a cultural assimilation component, according to which a behavioral innovation can undergo assimilation not only in the genetic but also in the cultural inheritance system. We discuss under which conditions cultural assimilation might have occurred in hominin evolution.

A Physicalist Account for Meaning and Truth in Physics

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A physical theory is a partially interpreted axiomatic formal system (L,S), where L is a formal language with some logical, mathematical and physical axioms, and with some derivation rules, and the semantics S is a relationship between the formulas of L and some states of affairs in the physical world. In our ordinary discourse, the formal system L is regarded as an abstract object or structure, the semantics S as something which involves the mental/conceptual realm. This view is of course incompatible with physicalism. How can physical theory be accommodated in a purely physical ontology? The aim of this paper is to outline an account for meaning and truth of physical theory, within the philosophical framework spanned by three doctrines: physicalism, empiricism, and the formalist philosophy of mathematics.

Fictional explanations of quantum phenomena

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It is argued that the absorption spectrum of Rydberg atoms is explained by classical orbits (Bokulich 2008, 2012, 2016). Current realism typically infers realist commitments from the scientific explanation of phenomena (Psillos 1999, Kitcher 2001). However, explanatory theoretical entities that are knowingly unreal demands further philosophical work on what explanation is and how the realist should interpret explanations. In this paper I will focus on the important case of Rydberg atoms, critically engaging with Bokulich's model-structural explanation. I will (i) analyse the classical orbits' fictitious status: in what sense are they fictions?; (ii) specify their explanatory role: how are they indispensable?; and (iii) I will propose a novel interpretation of the models involved, recovering a causal explanation a la Woodward.

Contingency, Counterfactual History, Underdetermination

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In this paper, we tackle two intertwined issues immediately related to the ongoing controversy on the inevitability/contingency of the results of successful science. First, we ask whether and how counterfactual history of science can bear on it, and suggest that plausible counterfactual narratives yield alternatives to our science that lie in its close vicinity, thereby supporting only qualified versions of the contingency thesis. Secondly, we discuss the relation between the inevitability/contingency controversy and the problem of underdetermination of theory by the evidence, and argue that counterfactual narratives can support the contingency thesis only insofar as they cover relatively short timespans.

Problem feeding and the nature of interdisciplinary research

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Interdisciplinarity and integration are topics that have drawn increasing interest from philosophers of science over the last decades. One feature that mark some such interactions is the sharing and transferring of problems between disciplines; what we call problem feeding. With a few notable exceptions, such as the work of Lindley Darden and Nancy Maull, it is an aspect of interdisciplinarity that remains underemphasised. The aim of this paper is to remedy this oversight by providing outlines of an account of interdisciplinarity as problem feeding; its prerequisites and the specific practical and epistemological challenges it involves. We proceed by first providing a philosophical framework and then applying this to two cases, both revolving around interactions between natural and social science disciplines.

From Ceteris Paribus Laws to Mechanisms [and back]

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The present paper aims to bring together accounts of ceteris paribus laws and mechanistic explanation. It is argued that two types of normalcy conditions have to be distinguished to do justice to generalizations in the sciences, as targeted by ceteris paribus laws: (a) interference and (b) shift normalcy conditions. Interference normalcy can be cashed out in terms of mechanisms being free of interferences, whereas shift normalcy indicates a shift in the mechanism referenced. Based on three examples from biology and physics it is argued that both types of normalcy conditions are employed by the sciences. In contrast to interference normalcy conditions, shift normalcy conditions can be avoided but are often endorsed. This is due their power to increase the systematicity of regularities described in the respective discipline.

Partial mastery of mathematics

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The goal of this paper is to develop a theory of partial mastery of a mathematical concept, and to establish how and when we attribute partial mastery to someone. This is not done from any established metaphysical theory, but from an investigation of partial mastery attribution in historical practice. Starting from a case study of Newton and Leibniz, I argue that the frequent re-interpretation of historical mathematicians offers an argument for an attributive, projective theory of concepts, and against more Fregean theories of grasping fixed concepts.

Models and how-possibly explanations: a demarcation problem

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One puzzle concerning highly idealised models is whether and under what conditions they can explain the world. They are often considered to provide so-called 'how-possibly explanations' (HPEs). Although it can potentially solve the puzzle, different views of HPEs have been proposed, with different implications. To simply consider models as HPEs therefore does not straightforwardly solve the puzzle. Rather, it raises an important question about the nature of HPEs, namely what distinguishes them from how-actually explanations?

My paper purports to provide an account of HPEs that clarifies their nature in the context of solving the puzzle of model-based explanation. I argue that the modal notions of 'actuality' and 'possibility' provide the relevant dividing lines between HPEs and HAEs. My proposal both contributes to the literature on the puzzle of model-based explanation and, more generally, to the literature on HPEs.

The Sommerfeld Miracle

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A 'no miracles' argument is still prevalent in the scientific realism debate, even if a lot has changed since Putnam's formulation of it, and even if the word 'miracle' is generally avoided. For example, realists think that if the most central 'working' parts of a scientific theory were not even approximately true (for any serious theory of 'approximate truth'), then it would be incredibly unlikely (loosely speaking 'miraculous') for that theory to deliver successful novel predictions with 'perfect' quantitative accuracy (e.g. to several significant figures). But this is precisely what we do indeed find in the case of Sommerfeld's prediction of the hydrogen fine structure spectral lines. This paper explores possible scientific realist responses to this dramatic historical challenge.

Non-Epistemic Values and Policy Relevance in Macroeconomics

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Philosophers of science nowadays widely accept that science is not, and could not, be value free. Yet in practice many scientists still appeal to traditional conceptions of value-freedom and objectivity, especially when defending their work in the context of policy making and public discourse. What does this mean for the philosophy of science? I analyze the motivations of economists who reject the philosophical suggestion to openly discuss the values that influence their research. This rejection is not based on a mistaken understanding of the role of values in science, but on a strong commitment to policy relevance. I argue that the argument from inductive risk, a popular philosophical argument against the value-free ideal, depends on a similar normative commitment. Although the behavior of economists looks like a rejection of the philosophical consensus at first, it can actually improve the notion of policy relevance that motivates the philosophical treatment of values in science.

Why should gravity be emergent?

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A way out of the conundrum of quantum gravity might be the proposal that GR is an effective field theory instead of a fundamental theory. Despite recent interest in the emergent gravity program within the physics as well as the philosophy community, an assessment of the theoretical evidence for this idea lacks at the moment. We intend to fill this gap in the literature by discussing the main arguments in favour (and also against) the hypothesis that the metric field and its dynamics are emergent. We argue that the following properties of GR are suggestive of underlying microstructure for spacetime: (1) the metric's universal coupling to matter fields, (2) the perturbative non-renormalizability of GR, (3) black hole thermodynamics, (4) holography, and (5) the realizability of several features of gravity, suchas Hawking radiation, in condensed matter systems. These plausibility arguments are strong hints towards the emergent nature of GR.

Causal Specificity, Biological Possibility and Non-parity about Genetic Causes

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Causal specificity has been used in order defend non-parity about genetic causes, which is the idea that some biomolecules often described as information-bearers (DNA, mRNA) play a unique role in life processes. Recently, Paul Griffiths and colleagues have developed a quantitative measure of causal specificity based on information theory. They use this measure to show that on certain assumptions concerning the probability distribution as well as the range of the values of the causal variables the causal specificity of DNA is comparable to that of (extreme cases of) alternative splicing. In this paper, I compare the causal specificities obtained by different choices of a domain for the causal variable, in particular the domain of physically possible as compared to biologically possible interventions. I show that a suitably understood notion of biological possibility yields non-parity of genes and mRNA with respect to protein sequence in terms of causal specificity.

Phase Transitions: Boltzmann Versus Gibbs

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There are two main frameworks in statistical mechanics associated with Boltzmann and Gibbs. Despite their well-known differences, there is the prevailing view that at least in practical applications they yield same results. We probe this view in the case of phase transitions and show that it is false. While the Gibbsian and Boltzmannian frameworks sometimes lead to the same results, there are important cases where they differ. If so, the Boltzmannian results are correct, and Gibbsian calculations are often useful because they indicate what might happen when the system is treated from a Boltzmannian perspective. Furthermore, contrary to common claims in the foundational literature, physicists working on phase transitions use both Gibbsian and Boltzmannian methods, sometimes in the same publication. This is harmless as long as it concerns cases where the Boltzmannian and Gibbsian frameworks agree or the Gibbsian framework is indicative of what happens in the Boltzmannian framework.

Putting rigour back into pragmatic trials:

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There is a prominent distinction in the medical trials literature between explanatory and pragmatic trials; the former being highly idealized and the latter being more similar to conditions encountered in clinical practice. We criticize three aspects of the standard view that pragmatic trials exhibit higher external validity. The first is that pragmatic trial attitudes increase external validity because they ensure that experimental populations are similar to target populations. We argue that similarity between populations is neither sufficient nor necessary for extrapolation. The second aspect we focus on is the naïve reliance on the superior external validity of pragmatic trials. We argue that benefits of pragmatic trials can only be reaped if trials are embedded in a rigorous extrapolative methodology. The third aspect we criticize is that there is a tradeoff between internal and external validity. We argue that calls for pragmatic trials overestimate the severity of this tradeoff.

Logical Anti-Exceptionalism and Theoretical Equivalence

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Anti-exceptionalism about logic takes logical theories to be continuous with scientific theories. Scientific theories are subject to criteria of theoretical equivalence. This talk compares two types of theoretical equivalence --- one syntactic and one semantic --- in the context of logical anti-exceptionalism, and argues that the syntactic approach leads to undesirable consequences. The anti-exceptionalist should therefore take a semantic approach when evaluating whether logical theories, understood as scientific theories, are equivalent. This paper argues for a particular semantic approach, in terms of categorical equivalence, to determine whether logical theories are equivalent.

Climate Models and Non-Epistemic Values

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The thesis that climate models contain value-laden elements is defended against recent criticism by Parker (2014) and Morrison (2014). In their view, the observation that many choices in model development are "epistemically unforced" does not justify the conclusion that values fill the gap. Instead, Parker suggests that pragmatic factors often determine the otherwise underdetermined decisions in model construction. This criticism presupposes that the main issue is whether non-epistemic value considerations are intentionally used in model construction. To emphasize a different perspective, I introduce the concept of cognitive interest. Even if an investigation was not intentionally designed to serve a particular cognitive interest, it will still do so. I argue that the factual cognitive interest enshrined within a climate model is the central concern, and that the range of acceptable cognitive interests cannot be determined without non-epistemic value judgments.

Practice-based Paradigms in Biological Sciences: Large-Scale Quantitative and Qualitative Analyses of a Case Study on Heart-Rate Variability

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This paper aims to address the following two questions: Are Kuhnian paradigms applicable to biological sciences? If so, what information about biological sciences can we gain from applying these paradigms? We first argue that Kuhnian paradigms are also applicable to biological sciences provided that we adopt Rouse's (2003 & 2012) practice-based understanding of a Kuhnian paradigm. We argue for this claim by conducting large-scale quantitative and qualitative analyses of the literature on heart-rate variability from 1970 to 2016. We then argue that the Kuhnian paradigm identified in our case study provides valuable information about the practical standards that various kinds of related modeling practices should comply with.

Against the direct fiction view of scientific models

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The direct fiction view of scientific models is an attempt at offering a viable answer to the questions about the nature of scientific models and about the way in which these models represent their intended targets. I will first present the claims that purport to show the superiority of this account over the indirect approaches and I will then show in what respects these claims fail to deliver on their promises. Worse yet, direct fictionalism does not appear to be an account of scientific modeling and if taken to be one, then it seems contradictory in its own terms. I will also argue that the direct fictionalism fails to enlighten the scientific practice of modeling and should be rejected on those grounds.

Posters

The division of cognitive labor: two missing dimensions of the debate

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The question of the division of cognitive labor gave rise to various models characterizing the way scientists should distribute their cognitive effort. These models often consider the scientific community as a self-governed sphere constituted by rational agents making choices on the basis of fixed rules. They were recently criticized for being strongly idealized, and for not taking into account the real mechanisms of science funding. Here, we complete this criticism by arguing that two unconsidered dimensions have to be taken into account to make the debate politically more relevant. First, we argue that these studies miss the existence of distinct levels of organization structuring the scientific community. Second, we denounce the absence of ontological considerations in the discussions. All the objects studied by science cannot be included in the same model of division of cognitive labor. In particular, we suggest that the question of complexity should be explicitly addressed.

On understanding through agent-based models (ABM)

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Our aim is to argue that there is rather more plausible to view understanding from ABMs as a non-explanatory form following some suggestions advanced by Lipton. We first look to the type of explanation that some authors claimed to be disclosed by these models: Weisberg analysis of IBM in ecology and Grune-Yanoff analysis of Anasazi model. We argue that their analyses fail to disclose the sort of actual explanation in order to qualify it as an explanatory understanding. This brings us further to Strevens' Simple View claiming the existence of a correct explanation behind any understanding and his strategy to dismiss the challenges posed by non-explanatory forms. We argue that this strategy incurs damaging costs on his view. In the last part we turn to Khalifa's critique on Lipton's proposals and argue that it is based on an unjustified construal of Lipton's framework. We show how his critique fails to establish the superiority of actual understanding over one from possible explanation.

Why a Good Bayesian Explication of the "Best Explanation" Should Take into Account Both Likelihoods and Priors

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We aim at the problem of the compatibility between Bayesian confirmation theory (BCT) and Inference to the Best Explanation (IBE). This problem, in our view, hangs upon the question of whether the key concept in IBE - that of "the best explanation" - can be given a satisfactory Bayesian explication. All existing explications of the concept, in the form of measures of explanatory power (EP), are not satisfactory in that they do not account for prior knowledge (i.e. they are not sensitive to the prior probabilities of the hypotheses). We show by way of examples that prior knowledge in some cases plays a crucial role in judgments about the best explanation. Then we introduce a measure of EP which can account for such cases. In conclusion we show, based on our examples and the newly introduced measure of EP that IBE is a special case of BCT.

Bringing the public (back) into science? The cognitive role of the public according to philosophers of science

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The aim of the paper is to discuss arguments in contemporary philosophy of science that outline certain roles the public could play in science, such as the arguments by Heather Douglas, Philip Kitcher and Alison Wylie, and to compare these roles with those accorded to the public in earlier accounts of science, as described by Marta Fehér (1990). Such a comparison allows appreciating some distinct features of contemporary approaches to the role of the public, which can in turn be related to more general themes in philosophy of science today—specifically, the interest in the role of social values in science and the recognition of their inevitable presence there.

References

Fehér, Marta (1990). "The Role Accorded to the Public by Philosophers of Science". *International Studies in the Philosophy of Science* 4(3), 229–240.

Actual Causation in Physics

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My talk has two aims. Firstly, I want to clarify the relation between causal laws and statements of actual causation in an interventionist framework. Hitchcock and Knobe (2009) suggested that in cases where some causal structure is given, subjective norms determine the causal factors that count as actual causes. I will argue that in cases where the causal structure is not given the order is reversed: we can build models of the causal structure only through reference to hypotheses of actual causation. The second aim of my talk is to elucidate the role of actual causes in physics. Here I want to take up the idea that I developed in the first part. I will argue that statements of actual causation play a central role in building causal models that are essential to reasoning in the context of experimental practice. This will be illustrated on the example of the discovery of the Cosmic Microwave Background.

Specifying the "materiality" of objects in science. Material integration and continuity of samples in a case of ocean science

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This paper addresses the materiality of objects used in scientific practice and the value of materiality for epistemic purposes. Based on an empirical case study of a long-term marine ecological survey that involves physical samples containing marine organisms, I introduce two notions, which shall lead to a deeper understanding of materiality: first, "material integration" for a process, in which materials of the research technology and the research target are integrated to form new objects; and second, "material continuity" for the handling and preservation of the very material that was integrated. The samples in my case are difficult to grasp with most accounts of sampling in scholarly literature, which primarily attribute the epistemic role of samples to representation. With material integration and material continuity, I associate the epistemic value of objects directly with their materiality.

Planet-life selection

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The possibility of clade selection has been found to be conceptually misguided since clades do not reproduce and therefore, it makes no sense to talk about clade fitness. Yet there is a mega-clade which escapes this limitation: Earth-Life, which constitutes the only as-yet known instance of a new level in the hierarchy of life: planet-life. Although unable to reproduce per se, planet-life can potentially expand to other planets, thus exhibiting the expansion and persistence components of fitness and potentially outliving the parent planet-life entity. The set of all planet-life entities fits the criteria required of a population for natural selection to act upon it, including (assumed) variability in traits which are likely to correlate with differences in fitness, and which are inherited by their offspring planet-life entities. Hence selection can be expected to act upon this level, and with time, change the frequencies of different types of planet-life in the universe.

Group fitness and group productivity: a critical assessment of this relationship

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In multi-level selection theory, it has become customary to consider that a group may be considered fitter than another one if the average individual fitness within it is higher. This paper begins by showing that this assumption is not compatible with the two most influential frameworks for understanding evolution by natural selection (the "variation in fitness of heritable traits" and the "replicator-interactor" frameworks). It then goes on to analyze two potential ways of salvaging this notion of group fitness. The first consists in seeing group productivity (i.e. a group's output of individual offspring) not as a definition of a group's fitness but as a trait on which group selection may act – but this would be a Pyrrhic victory. Another solution would be that of attempting to embrace a more inclusive notion of fitness – but parsimony considerations preclude this possibility. The perspectives for continuing to define a group's fitness as its productivity are thus not very promising.

How to cure the Wittgensteinian anxiety? The two-dimensional approach to introspection in cognitive linguistics

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Since its very inception of modern linguistics, the use of first-person methods has been the bone of contention. The "mentalist camp" of (among others) F. de Saussure and E. Sapir maintained that language was essentially psychological and advocated introspection as a mode of accessing the

mental aspect of language. The “behaviorist camp” of L. Bloomfield and W. Twaddell held that language should be studied exclusively through publicly observable actions of speakers.

One way of alleviating this conflict is the adoption of a variant two-dimensional semantics, a version of possible world semantics, in first-person research. The two-dimensional approach proposes to split the knowledge of mental phenomena into the intersubjective aspect, which is in principle subject to intersubjective testing, and the orthosubjective aspect, which is not testable and falls outside the domain of scientific linguistics.

Prior Contextual Knowledge: The Topicality of Neyman’s Approach to Sampling and Estimation

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The goal of the paper is to explicate Neyman’s conceptions of sampling and estimation with respect to the issue of the role that auxiliary knowledge and socio-economic contexts may play in scientific investigation. If these factors are influencing research independently of the methodological paradigm used for performing the research, then resistance to these indigenous influences can only be strengthened by their explicit consideration prior to the research and consecutive adjustment of research stages so that the final conclusion better approximates the truth. That is why Neyman’s solutions for sampling and estimation — which instead of leaving these factors outside the protocol as unknown or irrelevant, are giving them explicit mathematical meanings and use knowledge of these factors to minimize bias and maximize accuracy of estimation - are still relevant alternatives.

Problems with the notion of energy in General Relativity and physical meaning of this quantity

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In my presentation I will resume problems with the notion of energy in General Relativity and propose an approach to study them. The law of conservation of energy in GR is not a proper one; this can be cured by introducing a new component interpreted as energy of metric, but in general it is not well defined. This leads to a question whether the notion of energy is present in GR at all. In order to answer this question we should give detailed analysis of this notion as it appears in classical physics. There are some characteristics crucial to it, namely the mentioned conservation law, its

relationality and the fact that the energy of a system is the system's capacity to produce change. We should find which of them are most important for the physical meaning of this quantity and in the light of the results of this analysis determine whether the notion of energy is present in GR or not.

On explanatory integration versus explanatory unification

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Recent philosophy of science has conflated explanatory integration and explanatory unification. I propose to distinguish both. Explanatory unification is the process of developing general, simple, elegant, and beautiful explanations, while explanatory integration is the process of combining multiple explanations in a coherent manner. One can also define methodological unification as the process of developing general-purpose, simple research methods, and methodological integration as the process of combining multiple methods in research. The distinction will be useful to highlight distinct features of scientific representations.

Several dimensions of the unity of scientific representations will be discussed: (1) invariance or unbounded scope ; (2) simplicity and parsimony, or lack of redundancy; (3) elegance or beauty; and the interrelationships between them, in particular in mechanistic explanation. The analysis is hoped to help avoid future conflation of unification and integration.

A New Grounding Problem for Wallace's Everettian Quantum Mechanics

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This talk identifies a new epistemic concern for Wallace's Everettian quantum mechanics. The concern is that linear quantum mechanics is not able to empirically support the viability of assumptions inherent in Wallace's emergent quasi-classical theory. This is a very unusual state of affairs for any emergent theory, and is caused by the exceptional nature of linear QM, which has a very sparse ontology, and makes no direct empirical predictions.

To elucidate this concern, I set out a crucial Everettian assumption about the nature of the universal wave function, and the severe difficulties faced by any attempt to justify this assumption. If, as I argue, no direct means of supporting this assumption can be given, then Wallace's recovery of emergent classicality would rest on a bold and unsupported claim about the nature of reality. This might give us a significant reason to favour other interpretations over the Everettian.