SMS7

7th Annual Conference of the
Society for the Metaphysics of Science

6-8 SEPTEMBER 2022
UNIVERSITY OF BRISTOL
BRISTOL, UK

FOREWORD

A welcome from the President:

On behalf of the SMS council and the local organisers, I would like to warmly welcome you to this (much delayed!) 7th meeting of the Society for the Metaphysics of Science. Our previous conferences took place in Newark, Geneva, New York, Milan, and Toronto, and last year we went fully online for the first time. This is the first SMS conference in the UK and I'm very pleased to host it here in Bristol, which I have always regarded as one of the leading places for metaphysics of science – quite independently of my own arrival here in 2018! My colleague Samir Okasha will deliver the keynote talk and I am very much looking forward to it.

I would like to express my thanks to the Programme Committee, chaired by Eddy Keming Chen, for putting together such an exciting and high quality programme. I'd also like to specifically thank all the commentators, as we all know that one thing that makes SMS such a special event is the very high quality of the dedicated comments on each paper.

The council worked hard in the changing environment to bring this conference to Bristol, and I think Tyler Hildebrand's contribution as the Secretary deserves a special mention. Finally, a big thanks to Elle Chilton-Knight, who has been doing an enormous amount of work in the background!

I hope to talk to many of you over the coming days, and also to see you at the AGM. If you like what the SMS is doing, do join us and tell us your views on how to make it even better.

Have a great conference, and enjoy Bristol!

-Tuomas Tahko

CONTENTS

Click on a title to go to the page

THE SMS

Officers
President: Tuomas Tahko
President-elect: Nina Emery
Secretary: Tyler Hildebrand (2019-2023)
Interim Treasurer: Kenneth Aizawa (2022)

Elected Council Members
Kerry McKenzie (Past-President, ex officio)
Giuliano Torrengo (2020-2023)
Christina Conroy (2018-2022)
Jessica Wilson (2018-2022)
Alastair Wilson (2021-2024)
Jo Wolff (2021-2024)

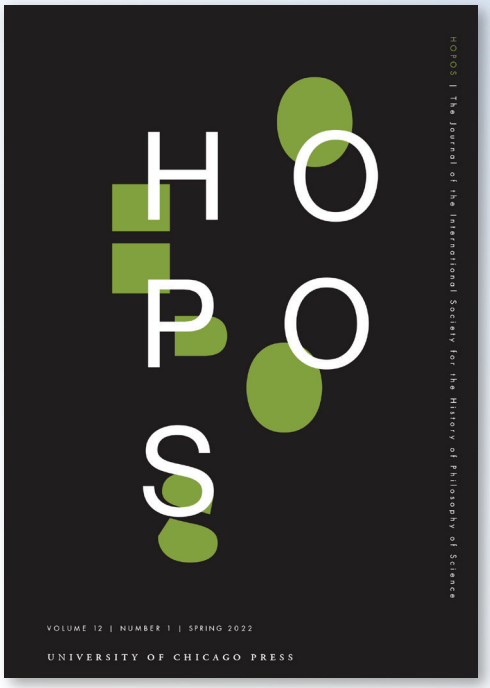
Program committee
Chair: Eddy Keming Chen (University of California, San Diego)
Sam Baron (Australian Catholic University)
Silvia de Bianchi (University of Milan)
Pierrick Bourrat (Macquarie University)
Karen Crowther (University of Oslo)
Alison Fernandes (Trinity College Dublin)
Peter Tan (Fordham University)
Michael Townsen Hicks (University of Birmingham)
Elizabeth Irvine (Cardiff University)
Katie Robertson (University of Birmingham)
Vanessa Seifert (University Athens)
Jonathan Simon (Université de Montréal)
Christopher G. Weaver (University of Illinois at Urbana-Champaign)
James Woodward (University of Pittsburgh)

Local organizing committee
Chair: Tuomas Tahko
Francesca Bellazzi
Elle Chilton-Knight
Toby Friend
Sam Kimpton-Nye
Will Morgan

EXPLORE JOURNALS from CHICAGO

The British Journal for the Philosophy of Science

Published for the British Society for the Philosophy of Science



HOPOS: The Journal of the International Society for the History of Philosophy of Science

Published for the International Society for the History of Philosophy of Science

New to Chicago

Early Modern Women: An Interdisciplinary Journal

New to Chicago

Environmental History

History of Humanities

Isis: A Journal of the History of Science Society

New to Chicago

Journal of the Warburg and Courtauld Institutes

KNOW: A Journal on the Formation of Knowledge

Osiris 37: Translating Medicine across Premodern Worlds

PROGRAMME

Click on a session to view the abstract

TUESDAY 6 SEPTEMBER				
	LT1		**LT2**	**LT4**
10:00-11:10	**Matt Farr**, Do We Perceive the Direction of Time?			**Alexander Carruth**, Powers, Emergence and Flat Holism
11:30-12:40	**Pieter Thyssen**, Cross-Temporal Necessitation? A Reply to Leininger		**Joshua Babic & Lorenzo Cocco**, Mandersian Relationalism: Space, Modality and Equivalence	**Lorenzo Lorenzetti**, Functionalist Tools for Reductionism
14:10-15:20	**David Builes & Michele Odisseas Impagnatiello**, An Empirical Argument for Presentism		**Vera Matarese**, Quantum Fictionalism	**Tyler Millhouse**, A Bridge from Nowhere: Coarse-Graining, Reduction, and Non-Surjectivity
15:40-16:50	**Maria Nørgaard**, How Do Quantum Systems Persist?		**Samuel Fletcher**, The Representation and Determinable Structure of Quantum Properties	**William Morgan**, Does Reduction Entail Identity?
17:00-18:00			**Society AGM**	
WEDNESDAY 7 SEPTEMBER				
	LT1		**LT2**	**LT4**
10:00-11:10	**Ulrich Meyer**, Conventionalism about Topology		**David Mark Kovacs**, An Explanationist Analysis of Causation (and Grounding?)	**Jake Khawaja**, Rationalizing the Principal Principle for Non-Humean Chance
11:30-13:00	**Keynote lecture: Samir Okasha**, Devitt's Defence of Biological Essentialism			
14:30-15:40	**Cristian Mariani** Nowhere, Where Regions Are		**Margarida Hermida & James Ladyman**, Living Objects	**Tyler Hildebrand**, The Ideology of Pragmatic Humeanism
16:00-17:10	**Francesca Bellazzi**, Super (Proper) Powers of Biochemical Functions: Unity in Biochemistry		**Sebastian Murgueitio Ramirez**, Two Notions of Symmetries	**Callum Duguid**, Pragmatic Humeanism and the Measurement Problem
THURSDAY 8 SEPTEMBER				
	LT1		**LT2**	**LT4**
10:00-11:10	**Matthew Tugby** Do we Perceive the Direction of Time?		**David Glick & Baptiste Le Bihan**, Multiplicity and Indeterminacy in Everettian Quantum Mechanics	**Kenneth Aizawa**, A Material Theory of Abduction?
11:30-12:40	**Michael Townsen Hicks**, An Inference Problem for Potentiality		**David Schroeren**, Quantum Permutations Are Not Qualitative Isomorphisms (And What This Tells us About Haecceitism)	**Milenko Lasnibat**, Against (Super) Explanatory Essentialism
14:10-15:20	**Samuel Kimpton-Nye**, Modal Anti-realism: The Really Poisoned Pawn		**Mario Hubert**, Is the Statistical Interpretation of Quantum Mechanics ψ-Ontic or ψ-Epistemic?	**Jennifer McDonald**, Essential Structure for Apt Causal Models
15:40-17:10	**Presidential lecture: Tuomas Tahko**, Making Reductionism True			

ABSTRACTS

07/09, LT1, 11:30-13:00

Keynote Lecture: Samir Okasha (University of Bristol)

DEVITT'S DEFENCE OF BIOLOGICAL ESSENTIALISM

Chair: Tuomas Tahko (University of Bristol)

In his forthcoming OUP book, which builds on his much-discussed 2008 paper, Michael Devitt offers a forthright defence of biological essentialism, the doctrine that biological species (and possibly other taxa too) have partly intrinsic, probably genetic, essences. Devitt's position is striking, since the consensus in the philosophy of biology has long been that intrinsic essentialism of this sort is incompatible with both evolutionary theory and with standard taxonomic practice. However, Devitt argues that this consensus rests on a mistake. He argues that the anti-essentialist consensus stems from a failure to distinguish between the taxon question, which asks what makes an organism a member of one species rather than another, and the category question, which asks what all the different species taxa have in common. Devitt claims that a "relational" answer to the category question is compatible with an "intrinsic essence" answer to the taxon question. I scrutinize this claim and find it to be untenable, on the basis of a logical analysis of the relationship between the taxon and the category questions. I take this to refute Devitt's claim that the anti-essentialist consensus rests on a mistake.

08/09, LT1, 15:40-17:10

Presidential Lecture: Tuomas Tahko (University of Bristol)

MAKING REDUCTIONISM TRUE

Chair: Tyler Hildebrand (Dalhousie University)

When one higher-level phenomenon is ontologically reduced to some lower-level phenomena, what does this entail about the ontological status of the phenomenon being reduced? For instance, if composed entities are reducible to their components, then does this mean that the composed entities do not exist? And if so, how can we continue referring to the reduced higher-level phenomenon in our talk and theories? There are two popular strategies used to regiment reduction: grounding and truthmaking. I will examine these strategies and propose that ontological reductionism is best formulated in terms of minimal truthmakers. I will then put this strategy to use in a case study at the biology-chemistry interface.

ABSTRACTS 06/09

06/09, LT1, 10:00-11:10

Matt Farr (University of Cambridge)

DO WE PERCEIVE THE DIRECTION OF TIME?

Comments: David Builes (Princeton University)

Chair: Margarida Hermida (University of Bristol)

Does our experience of time favour the hypothesis that time is directed? This paper addresses this issue by questioning in what sense our experience of time can be thought to itself be directed, or to represent time, or processes in time, as being directed. I set out a series of different options for categorising the time-directedness of our experience, and argue that there is no aspect of our experience that is especially problematic for the hypothesis that time itself is direction-less.

06/09, LT4, 10:00-11:10

Alexander Carruth (University of Helsinki, Profi5 Mind & Matter)

POWERS, EMERGENCE AND FLAT HOLISM

Comments: Giacomo Giannini (London School of Economics)

Chair: Katie Robertson (University of Birmingham)

Drawing on resources from debates concerning the metaphysics of powers, this talk introduces a novel approach to the relationship between the more- and less-complex. Flat Holism preserves some key reductionist commitments, as it involves no radical ontological novelty, for instance, and is consistent with a one- or no-level ontology. It also, however, adopts the emergentist idea that the whole or context plays a crucial, metaphysically determinative role. The commitments of Flat Holism are explored and delimited through comparison with two neighbouring accounts: Sydney Shoemaker's micro-latency account and Carl Gillett's mutualism. Some potential advantages of Flat Holism are discussed in the final section of the essay.

06/09, LT1, 11:30-12:40

Pieter Thyssen (Institut Supérieur de Philosophie, UCLouvain)

CROSS-TEMPORAL NECESSITATION? A REPLY TO LEININGER

Comments: Lisa Leininger (Hobart and William Smith Colleges)

Chair: Margarida Hermida (University of Bristol)

According to Leininger, proponents of absolute becoming cannot explain why past and present regularities persist in the future. In order to do so, they would have to appeal to enforcers, such as causation, laws or dispositions. But in a world with no future, these enforcers are powerless and cannot guarantee future regularity. I disagree and offer two answers to Leininger's coordination problem: (1) By endorsing (open-future) Humeanism, the coordination problem can be avoided altogether. (2) By endorsing non-Humeanism, the coordination problem can be met by distinguishing type-from token-level necessitation. Whereas token-level necessitation is cross-temporal in nature and subject to the coordination problem, type-level necessitation is atemporal and immune to the coordination problem. For this solution to work, though, type-level necessitation must be ontologically prior to token-level necessitation. With respect to nomic necessitation, this forces us to adopt a Platonist position according to which universals are transcendent, and not immanent.

06/09, LT2, 11:30-12:40

Joshua Babic (University of Geneva)

Lorenzo Cocco (University of Geneva)

MANDERSIAN RELATIONALISM: SPACE, MODALITY AND EQUIVALENCE

Comments: James Read (University of Oxford)

Chair: Toby Friend (University of Bristol)

Modal relationism is the view that our best physical theories can dispense with substantival space or spacetime, talking instead of the geometrically possible configurations of particles. Kenneth Manders has argued that the substantivalist conception of space is in fact theoretically equivalent to this Leibnizian modal conception. To do so, Manders provides a translation f from the Newtonian theory T_N into the Leibnizian modal relationalist account T_L . In this paper, we show that the translation does not in fact establish equivalence, since it lacks a reverse translation f^{-1} .We then investigate what resources must be added on both sides to achieve Morita equivalence. We argue that the formal results disfavor modal relationalism, as understood by Manders and recently Gordon Belot.

06/09, LT4, 11:30-12:40

Lorenzo Lorenzetti (University of Bristol)

FUNCTIONALIST TOOLS FOR REDUCTIONISM

Comments: Katie Robertson (University of Birmingham)

Chair: TBC

Batterman has extensively argued that reductionism is unable to account for the existence of multiply realised or universal behaviour exhibited by certain physical systems. The primary aim of this paper is to show what can functionalism bring to reductionism, by showing how a functional reductionist account fares better than traditional reductionism in dealing with Batterman's objection. However, the standard functional reductionist model defended by Lewis and Kim is unfit for the purpose. The main novel contribution of the paper will thus be that of proposing anew framework for functional reductionism, which is also able to account for Batterman's challenge.

06/09, LT1, 14:10-15:20

David Builes (Princeton University)

Michele Odisseas Impagnatiello (Massachusetts Institute of Technology)

AN EMPIRICAL ARGUMENT FOR PRESENTISM

Comments: Nick Effingham (University of Birmingham)

Chair: Samuel Kimpton-Nye (University of Bristol)

According to Presentism, everything is present. According to Eternalism, the present is just one part of a four-dimensional reality that includes both past and future things. A very influential objection to Presentism is empirical: insofar as Presentism entails that there is an absolute relation of simultaneity, Presentism seems to be in conflict with relativistic physics. Our goal in this paper is to argue against the orthodox view that our best physical theories strongly support Eternalism. However, we won't be directly responding to the objection from relativity. Many have already responded to the objection from relativity, and we don't have anything to add beyond their responses. Instead, we will argue that there is a different aspect of our best physical theories, which so far has been overlooked, that strongly supports Presentism.

06/09, LT2, 14:10-15:20

Vera Matarese

QUANTUM FICTIONALISM

Comments: Alyssa Ney (UC Davis)

Chair: Toby Friend (University of Bristol)

Quantum mechanics is arguably our most successful physical theory, and yet the debate on its ontology is still far from offering a definite answer. On the one hand representationalists claim that quantum states directly represent quantum beables, on the other hand anti-representationalists interpret quantum states only prescriptively or instrumentally. Much effort was put into refining and evaluating these two unsatisfactory camps, rather than offering new alternatives. This paper proposes, articulates, and defends a fictionalist view which accounts for the nature of quantum objects, and which combines elements of the representationalist and of the anti-representationalist camps. The core idea is that quantum objects do not physically exist, since they exist qua fictional entities, and yet, they have an explanatory power that underwrites the kind of explanations normally given by representationalists.

06/09, LT4, 14:10-15:20

Tyler Millhouse (Santa Fe Institute)

A BRIDGE FROM NOWHERE: COARSE-GRAINING, REDUCTION, AND NON-SURJECTIVITY

Comments: Luke Fenton-Glynn (University College London)

Chair: Milenko Lasnibat (University of Bristol)

Coarse-graining is a vital part of scientific modeling, allowing scientists to simplify complex data and reveal higher-level patterns. List (2019) holds that a coarse-graining is a partition which maps a set of fine-grained things into a set of non-empty sub-sets. A key consequence of this view is that coarse-grainings are surjective. As I will argue, however, important ways of preparing data for modeling (including some coarse-grainings) are non-surjective. Non-surjective coarse-grainings have important philosophical consequences—not least of which is that they give rise to an unrecognized mode of reductive failure.

06/09, LT1, 15:40-16:50

Maria Nørgaard (University of Geneva)

HOW DO QUANTUM SYSTEMS PERSIST?

Comments: Sam Baron (Dianoia Institute, Australian Catholic University)

Chair: Samuel Kimpton-Nye (University of Bristol)

In the philosophical debate on the nature of quantum mechanics, an important question has so far remained almost completely unaddressed: how do quantum systems persist? Persistence is a central issue of metaphysics, and despite the development of several formal accounts (1) in recent years, only a handful of articles have been dedicated to the investigation of persistence of quantum systems.(2) In this paper, I argue that the traditional account of persistence does not successfully extend its application to the quantum domain. The problem arises because some quantum systems fail to have any definite position (and hence exact location)during their lifetime. Pashby (2016) attempts to avoid this challenge by redefining exact location as minimal entire location, yet I argue that this account faces a serious challenges. I argue that a satisfactory account of quantum persistence is yet to be developed, and that it is unclear whether quantum persistence can be accounted for within the traditional framework of persistence developed for classical objects.

(1) See for instance Gilmore (2008), Balashov (2010), and Calosi and Correia (MS).
(2) Pashby (2013; 2016)

06/09, LT2, 15:40-16:50

Samuel Fletcher (University of Minnesota, Twin Cities)

David Taylor (not present)

THE REPRESENTATION AND DETERMINABLE STRUCTURE OF QUANTUM PROPERTIES

Comments: Jo Wolff (University of Edinburgh)

Chair: Toby Friend (University of Bristol)

Orthodox quantum theory tells us that properties of quantum systems are represented by self-adjoint operators, and that two properties are incompatible just in case their respective operators do not commute. We present a puzzle for this orthodoxy, pinpointing the exact assumptions at play. Our solution to the puzzle specifically challenges the assumption that non-commuting operators represent in compatible properties. Instead, they represent incompatible levels of specification of determinates for a single determinable. This solution yields insight into the nature of so-called quantum indeterminacy and demonstrates a new and fruitful application of the determinable-determinate relation in quantum theory.

06/09, LT4, 15:40-16:50

William Morgan (University of Bristol)

DOES REDUCTION ENTAIL IDENTITY?

Comments: Alexander Geddes (King's College London)

Chair: Milenko Lasnibat (University of Bristol)

According to one understanding of reduction in the philosophy of science and metaphysics, reduction entails identity: if A reduces to B, or the Bs, then A is identical to B or the Bs. I argue that this understanding of reduction is committed to two controversial metaphysical theses: Mereological Essentialism, according to which a whole has its parts essentially, and Unrestricted Composition, according to which for any things, there is something that they compose. These theses, I argue, are particularly controversial for biology and the philosophy of biology. To avoid being committed to them, reductionists must take reduction to be a weaker relation than identity.

ABSTRACTS 07/09

07/09, LT1, 10:00-11:10
Ulrich Meyer (Colgate University)
CONVENTIONALISM ABOUT TOPOLOGY
Comments: Claudio Calosi (University of Geneva - not present), read by Cristian Mariani (State University of Milan)
Chair: Samuel Kimpton-Nye (University of Bristol)

This paper argues that realism about space-time topology is metaphysically extravagant - it makes distinctions without observable differences - and that topological conventionalism ought to be preferred as the more frugal alter-native. There is a way around this argument, but it requires that we reject Hume's thesis that there are no necessary connections between distinct existences. In other words, topological realists need to be anti-Humeans.

07/09, LT2, 10:00-11:10
David Mark Kovacs (Tel Aviv University)
AN EXPLANATIONIST ANALYSIS OF CAUSATION (AND GROUNDING?)
Comments: Nick Emmerson (University of Birmingham)
Chair: Toby Friend (University of Bristol)

The goal of this paper is to offer an analysis of causation in terms of explanation. The basis of the analysis is a plausible principle about "cause-tracing explanations", i.e. explanations that cite causes: a cause c causes e if and only if the fact that c causes e explains why the fact that c (causally) explains e. I use this principle to develop an analysis of causation in terms of the role it plays in explanation. In the course of developing this view, I also offer a parallel analysis of grounding in terms of explanation. I then offer four arguments for my "explanationist" analysis: it scores well on the desideratum of parsimony; it accounts for the unity of explanation; at the same time, it answers the question of what distinguishes grounding from causation; and finally, it offers a compelling synthesis of two seemingly incompatible pictures of explanation and explanatory relations.

07/09, LT4, 10:00-11:10
Jake Khawaja (Rutgers University)
RATIONALIZING THE PRINCIPAL PRINCIPLE FOR NON-HUMEAN CHANCE
Comments: Michael Townsen Hicks (University of Birmingham)
Chair: Eddy Keming Chen (UC San Diego)

According to Humean theories of objective chance, the chances reduce to patterns in the history of occurrent events, such as frequencies. According to non-Humean accounts, the chances are metaphysically fundamental, existing independently of the "Humean Mosaic" of actually-occurring events. It is therefore possible, by the lights of non-Humeanism, for the chances and the frequencies to diverge wildly. Humeans often allege that this undermines the ability of non-Humean accounts of chance to rationalize adherence to David Lewis' Principal Principle (PP), which states that an agent's degrees of belief should match what they take to be the objective chances. In this paper, I propose two novel approaches to justifying (PP) for non- Humean chance, hence defusing the Humean objection. The first approach justifies (PP) via the role it plays in informing outright beliefs about long-run frequencies. The second approach justifies (PP) by showing that adherence to (PP), even for non-Humean chance, maximizes expected epistemic utility according to the chance function that in fact obtains in any particular world. I then address two different circularity objections to this approach, one concerning our epistemic access to non-Humean chance, and another concerning the justificatory status of the antecedent rationality principles.

07/09, LT1, 14:30-15:40
Cristian Mariani (State University of Milan)
Claudio Calosi (University of Geneva - not present)
Nowhere, Where Regions Are
Comments: Sam Baron (Dianoia Institute, Australian Catholic University)
Chair: Tuomas Tahko (University of Bristol)

We provide a reply to the *Argument from Intimacy* in Baron (2020) on behalf of defenders of emergent spacetime in theories of quantum gravity. The crucial insight is that spacetime regions are nowhere; they are locations but do not have locations

07/09, LT2, 14:30-15:40
Margarida Hermida (University of Bristol)
James Ladyman (University of Bristol)
LIVING OBJECTS
Comments: Ellen Clarke (University of Leeds)
Chair: Alastair Wilson (University of Birmingham & Monash University)

Extant theories of organismality are either incomplete or rest on unstated metaphysical assumptions regarding composition. Here we develop a new account of organisms based on a naturalistic answer to the special composition question – the bound state view, which states that a plurality of things composes a physical object if it forms a bound state of matter. We argue that physical structure, including a boundary, is essential for life, and therefore organisms are a subset of physical objects, namely all and only those objects that are alive. The living objects view obviates the need for disjunctive accounts of composition for living and non-living entities, and places 'organism' within the context of broader scientific ontology, while at the same time providing a clear criterion of organismality that can be used in adjudicating debates concerning biological individuality.

07/09, LT4, 14:30-15:40
Tyler Hildebrand (Dalhousie University)
The Ideology of Pragmatic Humeanism
Comments: Callum Duguid (University of Leeds)
Chair: Eddy Keming Chen (UC San Diego)

According to the Humean Best Systems Account, laws of nature are contingent generalizations in the best systematization of particular matters of fact. Recently, it has become popular to interpret the notion of a best system pragmatically. The best system is sensitive to our interests—that is, to our goals, abilities, and limitations. This account promises a metaphysically minimalistic analysis of laws that fits scientific practice. However, I argue that it is not as minimalistic as it might appear. The concepts of goals, abilities, and limitations that drive the analysis are modally-robust. This leads to a dilemma.

07/09, LT1, 16:00-17:10

Francesca Bellazzi (University of Bristol)

SUPER (PROPER) POWERS OF BIOCHEMICAL FUNCTIONS: UNITY IN BIOCHEMISTRY

Comments: Renata Arruda (Federal University of Goiás)

Chair: Tuomas Tahko (University of Bristol)

In this paper, I consider the theme of biochemical functions and how unity can be achieved at the biochemical level. I will do so by arguing in favour of the weak emergence of biochemical functions from chemical properties. The argument will be supported by reference to vitamin B12. The structure of the paper is the following. In §1, I will present briefly the debate concerning biochemical kinds and why this is relevant for one on unity. In §2, I will present why biochemical functions are often taken as problematic and as a source of disunity. In §3, I will defend a way to interpret biochemical functions that is compatible with unity. I will argue that biochemical functions can be analysed in terms of sets of dispositional properties that contribute to biological processes. In §4, I will explore a way to achieve non-reductive unity via weak-emergence (Wilson 2021).

07/09, LT2, 16:00-17:10

Sebastian Murgueitio Ramirez (Purdue University)

TWO NOTIONS OF SYMMETRIES

Comments: Michael Townsen Hicks (University of Birmingham)

Chair: Alastair Wilson (University of Birmingham & Monash University)

Why does a spring inside a ship moving with constant velocity behaves in the same way (with the same amplitude, period) no matter what the velocity of the ship is? The conventional wisdom goes, roughly, as follows: springs are mechanical systems, and the laws describing mechanical systems have the very special property that they are invariant under boosts (boosts are symmetries of these systems). In this paper, I will show that, contrary to what is usually assumed, there is nothing special about the fact that boosts preserve the laws of mechanical systems; any transformation that acts on all the parts of a system in the exact same way will lead to the preservation of the laws that characterize the behaviour of mechanical systems. And this includes transformations that are usually not counted as symmetries, such as constant accelerations, harmonic accelerations, and other transformations many of which might lack a clear physical interpretation. Furthermore, it is also usually said that there are very interesting connections between symmetries and measurements, and symmetries and representation. But, for similar reasons as why the conventional wisdom goes wrong when giving such a special status to boosts and spatial translations, I will show that these connections are, in a sense, much more trivial than usually assumed (any transformation that acts on all the parts of the system in the same way, not just boosts or spatial translation, exhibit the same features). I will end by showing that there is a mismatch between the kinds of symmetries physicists usually focus on, and the kinds philosophers focus on. In particular, the ones philosophers focus on usually map solutions to themselves (trivially), and the ones physicists usually focus on map solutions to different solutions. I will show that this distinction will bring some clarity to some of the recent discussions on the philosophy of symmetries.

07/09, LT4, 16:00-17:10

Callum Duguid (University of Leeds)

PRAGMATIC HUMEANISM AND THE MEASUREMENT PROBLEM

Comments: Vera Matarese

Chair: Eddy Keming Chen (UC San Diego)

Defenders of the Humean approach to laws of nature have recently advocated for a pragmatic justification of the standards which pick out the laws. Dorst has pushed this position further, arguing that pragmatic Humeanism contains within it a dissolution of the measurement problem of quantum mechanics. By allowing derivative properties to feature in fundamental laws and characterising the measurement problem as motivated by an anti-Humean assumption, such a Humean can treat textbook quantum mechanics as a contender for best system. In this paper, I suggest that Dorst's proposal will lead to trouble for pragmatic Humeanism. There are long-standing difficulties with offering an ontology for the textbook recipe and the appeal to pragmatism in recent Humean work threatens to motivate an abandonment of Humean metaphysics. The instability of the resulting position is reflective of a deeper tension lurking within contemporary Humeanism

ABSTRACTS 08/09

08/09, LT1, 10:00-11:10

Matthew Tugby (Durham University)

DEFENDING THE GROUNDING THEORY OF POWERS

Comments: Neil Williams (The University at Buffalo)

Chair: William Morgan (University of Bristol)

In recent decades, the most popular anti-Humean theories of powers and laws have been dispositional essentialism (e.g. Ellis 2001, Bird 2007) and the powerful qualities theory (e.g. Heil 2003, Martin 2008). However, it is arguable that these theories face serious problems (Tugby 2021). This has led to the development of a new anti-Humean theory of powers which Tugby calls the grounding theory of powers. According to this theory, properties are not identical with, or essentially dependent upon, causal powers. Rather, properties are qualities which metaphysically ground powers. This theory is in its infancy and it remains to be seen whether the theory can overcome its own objections. In this paper, we shall anticipate four prominent objections and develop responses on behalf of the grounding theorist. We shall argue that none of these objections is fatal and that the grounding theory of powers remains a serious contender in the metaphysical debate about natural modality.

08/09, LT2, 10:00-11:10

David Glick (UC Davis)

Baptiste Le Bihan (University of Geneva)

MULTIPLICITY AND INDETERMINACY IN EVERETTIAN QUANTUM MECHANICS

Comments: Alastair Wilson (University of Birmingham & Monash University)

Chair: Michael Townsen Hicks (University of Birmingham)

The question of whether Everettian Quantum Mechanics justifies the existence of metaphysical indeterminacy has recently come to the fore. Three possible sources of metaphysical indeterminacy have been offered to make the case: from quantum superposition, and from the indefinite number and nature of branches that constitute the quantum multiverse. The paper reviews the evidence and concludes that there is no direct path from Everettian Quantum Mechanics to metaphysical indeterminacy.

08/09, LT4, 10:00-11:10

Kenneth Aizawa (Rutgers University)

A MATERIAL THEORY OF ABDUCTION?

Comments: Lena Zuchowski (University of Bristol)

Chair: Francesca Bellazzi (University of Bristol)

In recent work, we have proposed that scientists sometimes use abductive reasoning to confirm hypotheses of compositional generation. As an example, we proposed that Alan Hodgkin and Andrew Huxley used abductive reasoning regarding experimental results to support their hypothesis that fluxes of sodium and potassium ions across the membrane compositionally generate action potentials.

One might, however, wonder how this proposal fares in the light of John Norton's recent criticisms of abduction and inference to the best explanation(IBE). We believe that Norton provides an apt critique of some familiar philosophical accounts of abduction/IBE, but his critique does not block the development of a better account. One might develop a descriptive account of scientific abduction that addresses many of Norton's objections. Perhaps it would be a material theory of abduction. Here we will outline such a theory.

08/09, LT1, 11:30-12:40

Michael Townsen Hicks (University of Birmingham)

AN INFERENCE PROBLEM FOR POTENTIALITY

Comments: Stephen Mumford (Durham University)

Chair: William Morgan (University of Bristol)

What makes modal claims true? Potentiality theorists say that there is a special class of properties, potentialities, which generate possibilities. In this paper I aim to show that this view faces an inference problem. For actually possessing a property entails possibly possessing it. On the potentiality view, this means that two properties - the property of having green hair, and the property of potentially having green hair - must have some sort of deep connection. Having the one property (green hair) entails having the other (potentially having green hair). Since, on the potentiality view, these are just two distinct properties, it is hard to see what could justify this entailment relation, or in virtue of what it holds. This problem is not insoluble. I will conclude the paper by discussing ways in which the relationship between potentiality and manifestation can be made clear.

08/09, LT2, 11:30-12:40

David Schroeren (University of Geneva)

QUANTUM PERMUTATIONS ARE NOT QUALITATIVE ISOMORPHISMS (AND WHAT THIS TELLS US ABOUT HAECCEITISM)

Comments: F. A. Muller

Chair: TBC

Permutations play an important role in both metaphysics and philosophy of physics: metaphysicians are interested in how (if at all) possible worlds are affected by permutations of the objects that inhabit those worlds; philosophers of physics are interested in how (if at all) permutations affect physical states of quantum systems. In the literature on the metaphysical implications of permutation invariance in quantum mechanics, it is standard to identify the two. In this talk, I argue that this identification is mistaken and investigate the metaphysical consequences of this conclusion.

08/09, LT4, 11:30-12:40

Milenko Lasnibat (University of Bristol)

AGAINST (SUPER) EXPLANATORY ESSENTIALISM

Comments: Marion Godman (Aarhus University)

Chair: Francesca Bellazzi (University of Bristol)

Super explanatory essentialism (SEE) is the view that a given property is the essence of a certain kind because it explains why members of the kind exhibit many correlated properties. The view is appealing since it bestows a crucial theoretical role on essences, according to which they turn out to be relevant for scientific practice. In this paper I contend that SEE happens to be wrong at least regarding biological kinds. I resort to the phenomenon of cryptic species to argue that SEE lacks the means to handle the problem of causal redundancy. On these grounds, I hope to cast doubts on attempts to determine the essences of kinds only by relying on scientific observations about the causal structure of the world. Although there may be good reasons to think that essential properties are super-explanatory, their (super) explanatory role is not the reason why they happen to be essential.

08/09, LT1, 14:10-15:20

Samuel Kimpton-Nye (University of Bristol)

MODAL ANTI-REALISM: THE REALLY POISONED PAWN

Comments: Siobhán Moriarty

Chair: William Morgan (University of Bristol)

Thoroughgoing modal anti-realism is unachievable. In fact, anti-realism cannot even curtail real modality because anti-realism about a given necessity implies realism about a corresponding possibility and vice versa (or so I'll argue), and this undermines the original motivation for modal anti-realism. However, the modal anti-realist's tools could still be put to fruitful work in figuring out where to draw the line between real necessity and real contingency, though this is a significant retreat from the original aims of the view.

08/09, LT2, 14:10-15:20

Mario Hubert (The American University in Cairo)

IS THE STATISTICAL INTERPRETATION OF QUANTUM MECHANICS Ψ-ONTIC OR Ψ-EPISTEMIC?

Comments: Nadia Blackshaw (University of Bristol)

Chair: Michael Townsen Hicks (University of Birmingham)

The ontological models framework distinguishes ψ-ontic from ψ-epistemic wave-functions. It is, in general, quite straightforward to categorize the wave-function of a certain quantum theory. Nevertheless, there has been a debate about the ontological status of the wave-function in the statistical interpretation of quantum mechanics: is it ψ-epistemic and incomplete or ψ-ontic and complete? I will argue that the wave-function in this interpretation is best regarded as ψ-ontic and incomplete.

08/09, LT4, 14:10-15:20

Jennifer McDonald (Columbia University)

AN INFERENCE PROBLEM FOR POTENTIALITY

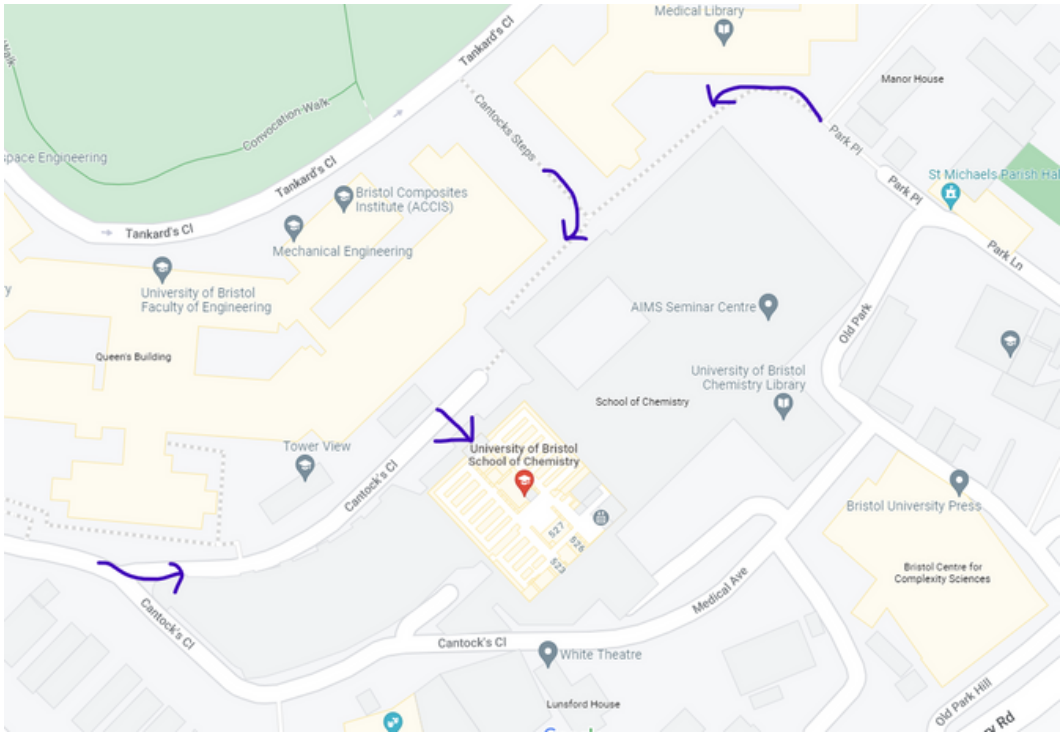
Comments: Toby Friend (University of Bristol)

Chair: Francesca Bellazzi (University of Bristol)

An analysis of actual causation in terms of structural equation models has two components: a recipe for reading claims of actual causation off an apt model, and an articulation of what makes a model apt. The primary focus in the literature has been on the first component. But the recently discovered problem of structural isomorphs has made the second especially pressing(Blanchard and Schaffer 2017; Hall 2007; Hitchcock 2007a; Menzies 2017). Those of us with realist sympathies have reason to resist the standard response to this problem, which introduces a normative parameter into the metaphysics (Gallow 2021; Hall 2007; Halpern 2016b; Halpern and Hitchcock 2010, 2015). However, the only alternative solution in the literature leaves central questions unanswered (Blanchard and Schaffer 2017). This paper presents a new aptness requirement, Manifest Mediation, that provides the missing details and resolves the problem of structural isomorphs without need for a normative parameter.

PRACTICALITIES

CONFERENCE VENUE AND DIRECTIONS



There are three possible routes to access the Chemistry Building:

From the north - this route is via Tankard's Close. Go down Cantocks Steps then take the second set of steps to your right.

From the south or west - this route is via Woodland Road. Take the Cantocks Close turning and when you come to the fork, take the left-hand option. Walk until you see the building on your right.

From the south or east - this route is via Old Park Hill or St Michael's Hill. Turn onto Park Place and continue until you see the ascending steps pictured right. Follow the path past Cantocks Steps (on your right), then take the descending stairs straight ahead of you.

Finding us in the building - enter via the main entrance (indicated on the map above), turn left, and walk down the corridor. The east foyer and lecture theatres are straight ahead of you.

TRAVELLING TO AND AROUND BRISTOL

Bus services:

- 1/2 - Services run from opposite Station Approach Road (outside the Reckless Engineer pub) by Bristol Temple Meads rail station and the city centre.
- 3/4 - Services run from the city centre.
- 8/9/72 - Services run from Bristol Temple Meads rail station and the city centre.

For all the above bus services ask for the top of Park Street which is across the road from Wills Memorial Building. Bus timetable: www.firstgroup.com/bristol-bath-and-west/

By Train: Temple Meads is the closest train station. Bus services 8, 9 & 72 run from Temple Meads. Alternately you can walk down Temple Approach and take buses 1 or 2 from outside the Reckless Engineer pub (ask for the top of Park Street which is across the road from Wills Memorial Building).

Taxi: V Cars: +44 (0)117 925 2626 www.v-cars.com/locations/bristol

Car Parking: There is no parking at Wills Memorial Building. The NCP West End Car Park, Berkeley Place, BS8 1EH is the most convenient long stay parking for access to Wills Memorial Building. From the car park the building is approximately a 5-10 minute walk away. For more information and charges please visit: www.bristol.gov.uk/parking/west-end-long-stay-carpark

Alternatively, Park and Ride services allow you to park without difficulty on the outskirts of the city. A bus transports you to the city centre. For further information please visit: www.travelwest.info/parkandride

By Air: Bristol International Airport is only 13 km to the south of the city. The Bristol flyer provides a bus service from the airport into the city centre. For more information please visit: https://flyer.bristolairport.co.uk/

Other Transport: Travelling by car, train or plane? Please visit the following website for further information: www.bristol.ac.uk/maps/

JOIN THE WI-FI

Visitors capable of using edu*roam* should do so in preference to UoB Guest (edu*roam* will give you a far better user experience, is much faster and gives access to internal resources). Connect to the edu*roam* wireless signal and follow your own organisation's setup instructions to connect (the Bristol instructions will only work for Bristol users).

Visitors who don't have access to edu*roam* can connect to UoB Guest:

- Connect to the UoB Guest wireless signal
- Your device will ask you to sign in to the Wi-Fi network.
- You will be asked to select an authentication method - the quickest and easiest method is to use either your Google, Facebook or Twitter account. Alternatively you can opt to receive a code via SMS text message.
- Follow the on-screen instructions to get connected.

CATERING

Please help us reduce waste by bringing a drinks bottle. The water fountain is in the west foyer (to the right when entering the building).

The following breaks are planned for each day. Vegan and gluten free diets will be catered for.

- Morning (20 mins) - tea/coffee and pastries
- Lunch (1.5 hours) - no catering, opportunity to explore the locale
- Afternoon (20 mins) - tea/coffee

THE LOCALE

- Park Street (5 mins): bakery, cafés, and a large range of international cuisine (both restaurant and takeaway options).
- Clifton Triangle (6 mins): supermarkets, cafes, bars, restaurants.
- Top of St Michael's Hill (9 mins): pub lunch, bakery, supermarket.
- Cotham Hill (13 mins): restaurants and café bars.

Please ask the MetaScience team for specific recommendations.

DRINKS RECEPTION

Please join us from 17:45 on Thursday for drinks and canapes in the Reception Room of Bristol's iconic Wills Memorial Building. Tuomas Tahko's Metascience project is thrilled to sponsor the event and the team will be on hand to usher you to the reception venue at the conference's close.