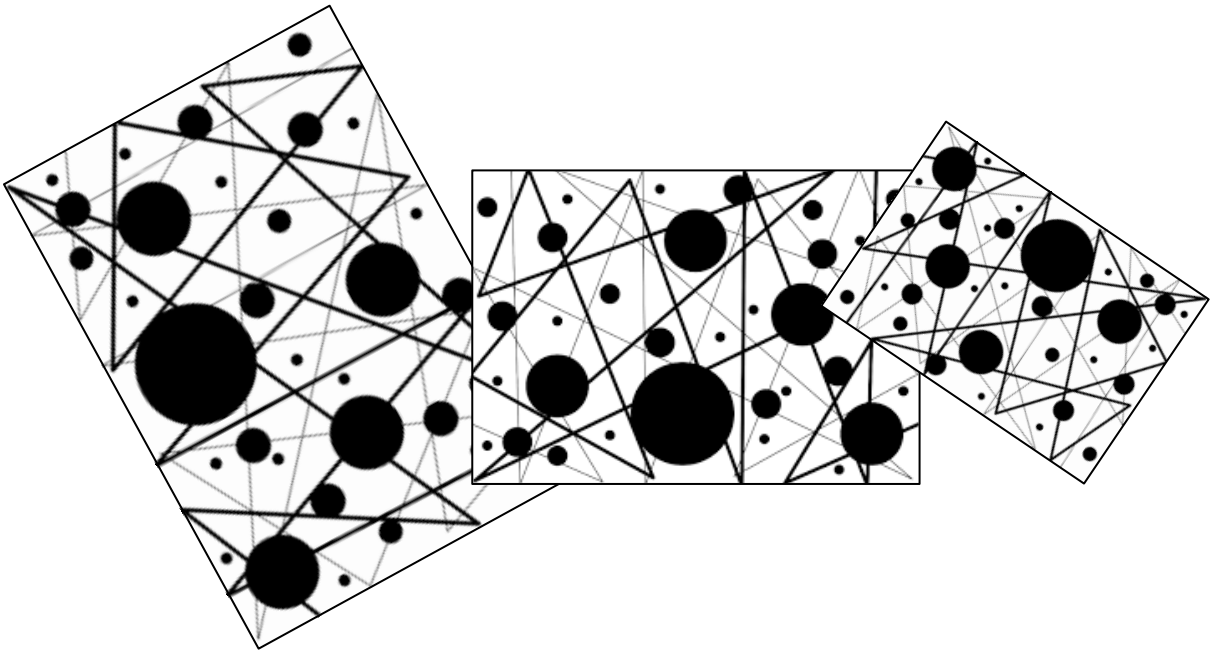
SMS 10

10th Annual Conference of the Society for the Metaphysics of Science



30 June through 2 July, 2025

Università della Svizzera Italiana
Lugano, Switzerland

Foreword

Message from the President

On behalf of the SMS Council, I would like to welcome you to the tenth annual conference of the Society for the Metaphysics of Science, held 30 June 2025 through 2 July 2025, at Università della Svizzera Italiana (USI) in Lugano, Switzerland.

Our conference program highlights the breadth and depth of exciting research in the metaphysics of science. I have been involved in the SMS for the last eight years, and I am always impressed by the high quality of talks at our conferences. I'd like to highlight a few events on this year's program. We are pleased to sponsor keynote talks by Elena Cassetta (University of Turin) and Fabrice Correia (University of Geneva)**,** taking place Monday morning and Tuesday morning, respectively. (Unfortunately, Jessica Wilson has had to cancel her keynote to handle a family emergency.) In addition, the annual Business Meeting of the Society will be held during Tuesday's lunch break. All conference participants are welcome to attend, and we encourage everyone to get involved in the leadership and organization of the society.

Planning and hosting a conference requires a tremendous amount of hard work. Special thanks are due to the Program Committee, chaired by Baptiste Le Bihan (University of Geneva), to the SMS Secretary, Jenn McDonald (Columbia University), and to our local organizers, Cristian Mariani (USI) and Damiano Costa (USI). In addition to hosting and handling all local arrangements, they have provided generous financial support through their SNSF funded projects on *Quantum Indeterminacy* and *Temporal Existence*, respectively. Finally, thank you to all our chairs, commentators, and speakers. Our society and our field of philosophy are thriving because of your contributions.

It has been a privilege to serve as your president this year. I am excited to see you all around Lugano over the next few days.

Tyler Hildebrand

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The SMS

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About the society

The Society for the Metaphysics of Science (SMS) is an international scholarly organization that promotes work in the metaphysics of science. The SMS embraces traditional philosophical inquiry into topics relevant to science (e.g., natural kinds, species, laws, time, etc.) as well as "science-first" methods of practicing metaphysics (e.g., causal structures in the social sciences, ontology of quantum physics, the nature of mechanisms in biology, etc.). We host an annual conference, rotating between in-person events in North America and the rest of the world (usually Europe), with a fully online conference every third year.

For more information about the society, see our website: https://socmetsci.org

Monday, 30 June

JUNE 30 2025	Room A21	Room A11	Room A12
8-9	Registration (8-9am) & Introductory remarks (8.45am)		
9-10.30	Keynote — Elena Casetta Can Metaphysics Help Save the Planet? *Chair: Cristian Mariani*		
10.30-10.45	*Coffee break*		
	Morning Chair: *Michael Miller*	*Morning Chair:* *Tyler Hildebrand*	*Morning Chair:* *Riin Kõiv*
10.45-11.45	Arana, Diego – Isn't the Physics of Spacetime Metaphysics Enough? Comment by Sebastián Murgeito Ramirez	Seifert, Vanessa – Why Water May Not Be a Natural Kind After All Comment by Elisa Ballabio	Zacki, Sadaf G. – Tracing Back the Identity of a Human Organism Comment by Thomas Graham
11.50-12.50	Cudek, Franciszek – Localising the Singular Structure of Spacetime Comment by Christian Wüthrich	LeBrun, Alex – No Science Without Composites Comment by Fabio Ceravolo	Cuciniello, Rebecca / Riccardo – Terminal Organisms at the Edge of Biological Normativity Comment by Sadaf Zaki
12.50-14.20	*Lunch*		
	Afternoon Chair: *Cristian López*	*Afternoon Chair:* *Vera Hoffmann-Kolss*	*Afternoon Chair:* *Stephen Harrop*
14.20-15.20	Friend, Toby – The Markovian Argument for Presentism Comment by Matej Kratky	Danne, Nicholas – Powers, Blueprints, and the Glue of the Universe Comment by Luca Gasparinetti	Kõiv, Riin – Three Concepts of a Population-Level Causal Relationship Comment by Sven Hirsbrunner
15.20-15.35	*Coffee break*		
15.35-16.35	Moro, Margherita – Empirical Incoherence in Quantum Mechanics Comment by Peter Lewis	Kistler, Max – Constitution and Causation in Mechanisms Comment by Kenneth Aizawa	Ortmann, Brian - The Exclusion Problem 2.0 Comment by Rebecca / Riccardo Cuciniello
16.40-17.40	Lewis, Peter – Quantum Pragmatism as a Global Pragmatism Comment by David Glick	Sendłak, Maciej – Metaontology of Dependence Comment by Alik Pelman	Jiang, Yihan – Beyond Mechanistic Metaphysics: A Processual Structuralist Defense of Dynamical Explanation Comment by Peter Tan

Tuesday, 1 July

JULY 1 2025	Room A21	Room A11	Room A12
9-10.30	Keynote — Fabrice Correia Location as a Topic-Neutral Concept *Chair: Damiano Costa*		
10.30-10.45	*Coffee break*		
	Morning Chair: *Fabrice Correia*	*Morning Chair:* *Adrien Avramoglou*	*Morning Chair:* *Elisa Ballabio*
10.45-11.45	Cinti, Enrico and Le Bihan, Baptiste – Mereology Emergence in String Theory Comment by Sebastián Murgeito Ramirez	Barnes, Kate – Do Causal Discovery Methods Imply Different Ontologies? Comment by Samuel Lee	Green, Charlie – Phenomenal Properties as Real Patterns: Towards a Special Science of Relational Perception? Comment by Giuliano Torrengo
11.50-12.50	Wüthrich, Christian and Le Bihan, Baptiste – Is Spacetime an Accident? Comment by Alastair Wilson	Townsen Hicks, Michael – Minding Our Business: Why Inference is Still a Problem for Laws of Nature Comment by Firdaus Gupte	Onnis, Erica – Emergent Novelty: Causal and Qualitative (That Is, What Types of Properties Emerge When Properties Emerge) Comment by Giacomo Giannini
12.50-14.20	*Lunch*		
13.40-14.10	*Business Meeting of the Society* *Election of Council Members*		
	Afternoon Chair: *Lorenzo Lorenzetti*	*Afternoon Chair:* *Alastair Wilson*	*Afternoon Chair:* *Peter Tan*
14.20-15.20	Dardis, Anthony – Free Will and the Free Will Theorem Comment by Laurie Letertre	Kooiman, Isa – The Bilking Argument for Forward Causation Saving Retrocausality Comment by Christian Wüthrich	Fazzini, Edoardo – The Burden of Independence: A New Dilemma on Structural Isomorphism Comment by Xingyu Lyu
15.20-15.35	*Coffee break*		
15.35-16.35	Nørgaard, Maria – Quantum Systems Do Persist Comment by Michael Miller	Hoffmann-Kolss, Vera – A Supervaluationist Theory of Causal Indeterminacy Comment by Alessandro Torza	Lee, Chanwoo – A Lakatosian Against Stance Comment by Joshua Babic
16.40-17.40	Fraser, Patrick – Natural Quantum Properties Comment by Cristian López	Torza, Alessandro – Reducing Metaphysical Indeterminacy to Objective Chance Comment by: Jens Jäger	Aizawa, Kenneth – Zetetic Scientific Realism Comment by Alex LeBrun

Wednesday, 2 July

JULY 2 2025	Room A21	Room A11	Room A12
9-10.30	Presidential Address — Tyler Hildebrand Who cares about the metaphysics of laws? Humeanism, Non-Humeanism, and Minimalism *Chair: Kenneth Aizawa*		
10.30-10.45	*Coffee break*		
	Morning Chair: Xingyu Lyu	*Morning Chair: Annica Vieser*	*Morning Chair: Firdus Gupte*
10.45-11.45	Pedersen, Ray – Everettian Quantum Mechanics and the Problem of Ontological Extravagance Comment by Mario Hubert	Perry, Zee R. – Laws as Proportionality Relations Between Quantities Comment by Ashley Coates	Demarest, Heather and Isaac Wilheim – Three Ontological Options for the Laws of the Best System Comment by Adrien Avramoglou
11.50-12.50	Hubert, Mario – Is the Quantum Reconstruction Program Compatible with the Ontological Model Framework Comment by Patrick Fraser	Tan, Peter – How Scientific Metaphysics Provides Explanatory Understanding Comment by Carla Peri	Kimpton-Nye, Samuel – Pragmatic Laws and Possibility: A New Modal Anti-Realist Programme Comment by Stephen Harrop
12.50-14.20	*Lunch*		
	Afternoon Chair: Baptiste Le Bihan	*Afternoon Chair: Toby Friend*	*Afternoon Chair: David Glick*
14.20-15.20	Matarese, Vera – Dark Energy Fictionalism Comment by Enrico Cinti	Coates, Ashley – Pragmatic Anti-Humeanism Comment by Heather Demarest	Wilson, Alastair – Explanations of and in Worlds Comment by Chanwoo Lee
15.20-15.35	*Coffee break*		
15.35-16.35	Murgueitio Ramírez, Sebastián – Rethinking Symmetries: A Basic Counterexample to Two Key Theses Comment by Gregor Gajic	Voggenauer, Martin – Revisiting the Analogy Between Grounding and Causation Comment by Annica Vieser	Miller, Michael E. and Fraser, Patrick – Precision and Determinacy Comment by Cristian Mariani
16.40-17.40	López, Cristian – The Open System View and the Metaphysics of Symmetries Comment by Charlotte Zito	Rolffs, Matthias – Can Grounding-Related Causes Overdetermine Their Effects? Comment by Martin Voggenauer	Lyu, Xingyu - Against Color Objectivism: A Critique from Electrodynamics Comment by Anthony Dardis

Abstracts

Keynote Lecture 1: Elena Casetta (University of Turin)
CAN METAPHYSICS HELP SAVE THE PLANET?

My presentation pursues two interconnected aims. First, on a meta-metaphysical level, I argue for both the possibility and the usefulness of developing a metaphysics of conservation science. Second, within this broader framework, I defend the so-called restoration thesis—the claim that a natural environment can be restored to a previous state without any loss of value. To do so, I first reconstruct the debate surrounding the thesis; I then examine the arguments of its detractors, arguing that they are based on dubious metaphysical commitments. In the conclusion, I attempt to sketch a more precise and scientifically informed version of the restoration thesis.

Keynote Lecture 2: Fabrice Correia (University of Geneva)
LOCATION AS A TOPIC-NEUTRAL CONCEPT

Following a line of thought stemming from joint work with Claudio Calosi, I will argue that the concept of location has a range of applications that is much broader than is usually thought—in a slogan: location is, to a great extent, *topic-neutral*—and that properly appreciating this fact has far reaching consequences concerning how we should think about location. One of them is that we should view location as essentially relative to what Claudio and I call *locational structures*. Another one is that locational phenomena that are often taken to be "exotic" and therefore not worthy of too much attention—in particular, *multilocation* and *inexact location*—should, on the contrary, be taken seriously. Formulating a general theory of location that complies with this perspective on the concept is a challenge. I will briefly criticize extant contenders, propose a theory that I recently developed as a better alternative, and briefly discuss a more general theory recently devised by Claudio that goes in the same direction. I will end up applying my theory to the debate about persistence in a spatiotemporal setting, showing that the characterization of the perdurance / endurance it allows one to formulate avoids important limitations encountered by a now classic characterization that we owe to Cody Gilmore.

Presidential Address: Tyler Hildebrand (Dalhousie University)
WHO CARES ABOUT THE METAPHYSICS OF LAWS? HUMEANISM, NON-HUMEANISM, AND MINIMALISM

The philosophical literature on laws of nature is dominated by a discussion of two main theories. Humeanism denies that laws involve any kind of primitive necessity, whereas Non-Humeanism posits primitive necessities to account for laws. I'll provide an overview of the state of the field, discuss some methodological and epistemological problems with the field as it stands, and suggest two paths forward. One involves a new focus on non-metaphysical questions about laws, and one involves developing better criteria for metaphysical theories of laws.

Abstracts of accepted papers

Aizawa, Kenneth
ZETETIC SCIENTIFIC REALISM

Anjan Chakravartty has described three dimensions of realist commitment: metaphysical, semantic, and epistemological. According to Chakravartty, 1) "Metaphysically, realism is committed to the mind-independent existence of the world investigated by the sciences" (Chakravartty, 2017, p. 5), 2) "Semantically, realism is committed to a literal interpretation of scientific claims about the world" (Chakravartty, 2017, p. 5), and 3) "Epistemologically, realism is committed to the idea that theoretical claims ... constitute knowledge of the world" (Chakravartty, 2017, p. 6). In this paper, I propose that, insofar as historians and philosophers of science wish to understand certain episodes of scientific experimentation and confirmation—insofar as they wish to understand what scientists are doing—it will be helpful to have a weaker version of scientific realism. I propose a notion of *zetetic scientific realism* that does not include Chakravartty's third epistemological commitment. The term "zetetic" is meant to bring out the fact that this realism is part and parcel of scientific inquiry explicitly rejecting the presupposition that an individual bit of evidence—a single experimental result—in support of some mind-independent entity yields knowledge, belief, or acceptance. One of the important features of zetetic scientific realism is that it allows historians and philosophers of science to acknowledge that scientists sometimes recognize the ontological implications of an abductive argument, even though they wish to resist those ontological implications.

Arana, Diego
ISN'T THE PHYSICS OF SPACETIME METAPHYSICS ENOUGH?

Recent debates about substantivalism in General Relativity (GR) have unfolded along two partially disjoint paths. On one hand, metaphysical approaches ask whether spacetime is truly independent from matter in modal or grounding terms, often dismissing the formal apparatus of GR as a mere tool for representing possibilities. On the other hand, formal approaches rely on category theory and related mathematics to argue for or "block" conclusions about space-time's metaphysics without, ostensibly, invoking additional metaphysical assumptions. This paper aims to bridge these perspectives by urging that GR be seen as an interpreted theory. In doing so, it already prescribes a way to describe which possibilities it allows: once one fixes a model and an interpretive context, many "metaphysical" questions are effectively answered within GR. At the same time, purely formal results—like dualities between manifold-based GR and Einstein Algebras—do not, on their own, establish physical equivalence or "same facts" claims without further interpretive or metaphysical premises. Thus, both views err if they disregard GR's built-in interpretive content: metaphysicians sometimes seek external descriptions that replicate what GR already specifies, while formalists presume to "block" disputes by mathematics alone, overlooking that category-theoretic claims become substantive only through interpretation.

Barnes, Kate
DO CAUSAL DISCOVERY METHODS IMPLY DIFFERENT ONTOLOGIES?

Methods for inferring causal structure based on statistical relationships in data, broadly called causal discovery, are now common practice in many fields of science. I provide a critical review of two such methods, *statistical matching* and *inductive causation (IC)*, drawing attention to the different ontologies these methods imply. The first widely used scientific method for estimating causal relationships was the random control trial (RCT). Statistical matching approximates RCT experiments by comparing treated and untreated units matched on all observed covariates to ensure maximal similarity between the two groups. Unsurprisingly, this method cannot uncover causal direction without reference to temporal direction. By contrast, the newer IC method does uncover causal direction without incorporating temporal direction into the analysis. The IC

method works by constructing causal networks consistent with conditional independencies in observational data. Take the case where two independent events A and B both covary with a third event C (represented graphically as A—C—B). Following Reichenbach's assertion that statistical dependence be understood as causation in disguise, we assume that either C is a common cause of A and B (A<—C—>B), or A and B are dual causes of C (A—>C<—B). However, if C were the common cause, we would have observed a statistical dependence between A and B. Since we did not, we can conclude that A and B are dual causes of C. Using this sort of reasoning, the IC method orients edges without reference to the temporal order of events A, B, and C, raising widespread implications for the metaphysics of science.

Cinti, Enrico and Le Bihan, Baptiste
MEREOLOGY EMERGENCE IN STRING THEORY

That spacetime might emerge from a more fundamental ontology according to the physics of quantum gravity has been widely discussed in recent years. Leveraging T-duality, we show that the main approach to quantum gravity, string theory, suggests an even more radical view: that the fabric of reality has no unique mereological structure, and thus no absolute fundamental level or unique stratification into relatively more fundamental levels. Thus, string theory might not only suggest that the world fails to be fundamentally spatiotemporal, but also mereologically structured.

Coates, Ashley
PRAGMATIC ANTI-HUMEANISM

On an influential Humean view, the laws of nature are those true descriptions or summaries of concrete reality that jointly best meet the criteria for lawhood implicit in scientific practice. Recently, some Humeans have argued that these criteria for lawhood include pragmatic criteria that are designed to meet the epistemic aims of limited human agents. Consequently, these pragmatic Humeans argue that to be a law is, at least partly, to meet certain pragmatic criteria. While the so-called 'powers-BSA' provides a way to combine this pragmatic Humean account of laws with an anti-Humean account of properties, the literature does not currently include any views that combine pragmatism about laws with an anti-Humean view of *laws*. Here I develop this sort of view. This position works by taking over pragmatic Humeans' standards for determining which law-candidates are laws, while modifying pragmatic Humeanism by taking law-candidates to be unreduced facts of natural necessity rather than summaries of concrete goings-on. I then argue that this view provides a novel combination of key advantages of pragmatic Humeanism with key advantages of standard anti-Humean accounts of laws. On this basis, I conclude that the current neglect of pragmatic anti-Humeanism in the metaphysics of laws is a mistake and that the position deserves significant further consideration.

Cuciniello, Rebecca / Riccardo
TERMINAL ORGANISMS AT THE EDGE OF BIOLOGICAL NORMATIVITY

This paper examines the unique ontological status of *terminal* organisms (organisms which have lost the capacity to self-maintain but are nonetheless alive) at the edge of biological normativity. I argue that they expose a currently overlooked tension in biological normativity. If the organism's capacity for self-maintenance is the organisms' source of normativity, and malfunction negates self-maintenance, then malfunction undermines the very conditions required for normative ascriptions – rendering the concept self-defeating. In other words, if "the only wrong cell is the dead [or dying] one" (Heras-Escribano et al. 2013), natural normativity cannot exist in any meaningful sense. To address this issue, I take an organisational approach to biological normativity (OA). The paper is structured as follows. In the introduction (§1), I articulate theoretical *desiderata* for a robust theory of biological normativity. I then introduce the OA (§2) and its account of malfunction (§3), which satisfy such *desiderata*. Using Barandiaran and Egbert's (2014) modelling of viability limits and normativity in organisms, I distinguish between 'futile' cases (e.g. a trapped cockroach, which *could* self-maintain but will

starve to death) and 'terminal' ones (e.g. a beheaded cockroach). The discussion (§4) centres on the latter, demonstrating that terminal organisms fall outside of the biological requirements of normativity. As I show, this bears two important implications for biological normativity: 1) pathology exists *within* rather than *outside* functionality; 2) organisms incapable of self-maintaining maintain 'traces' of intrinsic norms.

Cudek, Franciszek
LOCALISING THE SINGULAR STRUCTURE OF SPACETIME

I argue that the singular structure of spacetime is best conceptualised as a non-local, but localisable, extrinsic property of spacetime regions (of any size), and that there is no unique, best definition of a singular region of spacetime. There is, however, a schema that any adequate definition instantiates. Moreover, the question of what kind of incomplete curves witness singular structure is intimately connected to the question of what kind of curves represent possible trajectories of observers in 'physically reasonable' motion.

Danne, Nicholas
POWERS, BLUEPRINTS, AND THE GLUE OF THE UNIVERSE

One difficulty that Neil Williams identifies for powers ontologies is the Problem of Fit—an explanation of how causal dispositions intrinsic to their bearers, defined in terms of their manifestations, ever cooperate with one other. Williams's solution, expanded recently by William Bauer, is a powers holism, whereby literally all kinds of powerful interactions are mapped within a metaphorical "blueprint," which powers possess as information for cooperation (as when butane and oxygen react to the heat of a spark). In this talk, I criticize the blueprint metaphor for a background assumption on which it trades: that the time of the universe is continuous. Should the time of the universe instead prove discrete (a live scientific hypothesis), I argue, then large swaths of fundamental powers suffer thoroughgoing failures of fit. These powers are the electromagnetic dispositions studied by philosophers of science, such as intensity, reflectance, and refraction. To restore their mutual fit in a discrete-time universe, I treat discrete time as powerful and add it to the blueprint.

Dardis, Anthony
FREE WILL AND THE FREE WILL THEOREM

(Conway and Kochen, 2009) following (Bell, 1964) and others offer a "Free Will Theorem". The FWT says that QM and relativity together entail that determinism is false. Conway and Kochen provocatively report "It asserts, roughly, that if indeed we humans have free will, then elementary particles already have their own small share of this valuable commodity" (226). (Landsman, 2017) argues that (Lewis, 1981) provides a conception of free will that clarifies what they might mean by 'free will', and goes on to argue that the FWT challenges Lewis's conception of compatibilist free will. This paper argues that the challenge does not succeed.

Demarest, Heather and Wilhelm, Isaac
THREE ONTOLOGICAL OPTIONS FOR THE LAWS OF THE BEST SYSTEM

What, ontologically speaking, are best system laws? Should the laws of the best system account be identified with sentences, or propositions, or perhaps something else? These questions differ from more familiar questions about which criteria we should use to pick out the best system laws: regardless of whether laws are picked out using simplicity, informativeness, tractability, predictability, perfect naturalness, or whatever, there remains the question of what, ontologically, the best system laws are. But very little has been written on this issue; and what has been written is often ambiguous. So in this paper, we present and evaluate three ontological options for best system laws: taking them to be sentences, unstructured

propositions, and structured propositions. Surprisingly, the two most cited options—sentences and unstructured propositions— face significant problems. Defenders of the best system account will need to resolve these problems or, alternatively, perhaps take seriously the idea that best system laws are structured propositions.

Fazzini, Edoardo
THE BURDEN OF INDEPENDENCE: A NEW DILEMMA ON STRUCTURAL ISOMORPHISM

We present a new dilemma: either we consider the aptness criterion of Independence to be unnecessary, or we accept the distinction between default and deviant behavior as outlined in the causal modeling literature. The current work addresses positions that advocate for non-psychological solutions to resolve structural isomorphism, explicitly focusing on McDonald's forthcoming solution, which introduces a new aptness requirement known as Evident Mediation. We show that in cases where this new requirement introduces an additional variable that leads to a positive reversal of the causal verdict, breaking therefore the isomorphism between models under examination, a potential interpretation exists that results in a metaphysically impossible scenario. This outcome would violate the criterion Independence, hence giving rise to the dilemma. While both paths might seem viable at first glance, we argue that Evident Mediation should ultimately be rejected, as it fails to meet Woodward's criterion of Independent Fixability in the context of inquiry.

Fraser, Patrick
NATURAL QUANTUM PROPERTIES

Natural properties play an important role in many approaches to fundamental metaphysics, and it is generally thought that our best theories of physics inform us about what (at least some of) the most natural properties actually are. Yet, there is presently no stated view of what the natural properties are according to quantum theory, our best framework for physical theorizing. Here, I show how to locate the most natural properties of quantum theory. It turns out, however, that quantum theory presented in terms of Hilbert spaces yields a different account of natural properties from quantum theory presented in terms of C^*-algebras. I argue that the resolution to this problem depends on deeper issues of metaphysics, namely, the relative direction of metaphysical dependence between essence and modality.

Friend, Toby
THE MARKOVIAN ARGUMENT FOR PRESENTISM

I present a critical response to Builes and Impagnatiello's (forthcoming) empirical argument for Presentism. I'll show that that the evidence from the world being Markovian (or near enough) is only a uniquely temporal feature under certain questionable conditions. This means both that certain forms of Presentism favoured by the authors undermine their own argument, and that there is the potential to employ a parallel of their argument for an implausibly radical analogue of Presentism (*Hereism*). I'll also show why non-Presentists (spec. Eternalists) can explain Markovian features by recourse to new work in the foundations of physics.

Green, Charlie
PHENOMENAL PROPERTIES AS REAL PATTERNS: TOWARDS A SPECIAL SCIENCE OF RELATIONAL PERCEPTION?

Naïve realism about perception is strongly realist about object-property ontology at macroscopic scales. Campbell (2002) argues that a basic relation of conscious acquaintance to the categorical properties of ordinary objects is required to explain our capacity to demonstratively refer to them, and to ground our behavioural and referential dispositions in relation to the perceptual experiences we have of them. These are taken to be significant explanatory

advantages of naïve realism by its proponents. Yet recent metaphysical analyses of modern physics, such as that of Wallace (2024), suggest a far sparser ontology of the external world, whereby the translation of the mathematical content of a microphysical theory into an object-property ontology is questionably appropriate, leaving the mathematical content alone as an appropriate representation of the micro-world. This raises the question as to what extent naïve realism is consistent with this variety of ontic structural realism (Wallace, 2022) at the macroscopic scale of perception. This paper sketches a constitutive functionalist model of special science ontology within a structuralist framework, following Knox and Wallace (2023), and applies it to a naïve realist account of phenomenal properties. It is shown how a special science theory is required to define the functional role of such properties. It is suggested that such an account is "realist enough" about phenomenal properties to maintain the explanatory advantages of naïve realism, which whilst not consistent with the letter of Campbell's view, is a closely aligned externalist account of phenomenal character that places it in continuity with the other sciences.

Hoffmann-Kolss, Vera

A SUPERVALUATIONIST THEORY OF CAUSAL INDETERMINACY

Cases in which many agents contribute to an outcome, such as individual agents contributing to climate change, pose puzzles for theories of causation. Tiefensee has recently argued that these cases may be infected with indeterminacy, since it is sometimes indeterminate whether such actions can make a difference to an effect. This result is consistent with earlier arguments by Bernstein, Sartorio, and Swanson, that causal statements are sometimes indeterminate. In this paper, I develop a theory of causal indeterminacy that can adequately capture both cases. The theory I propose combines Woodward's interventionist approach to actual causation with the conceptual tools of supervaluationism, which are commonly used to explain semantic vagueness.

Hubert, Mario

IS THE QUANTUM RECONSTRUCTION PROGRAM COMPATIBLE WITH THE ONTOLOGICAL MODEL FRAMEWORK?

In his article Defending the Quantum Reconstruction Program, Berghofer (2024) argues that the Quantum Reconstruction Program (QRP) "puts pressure" on -ontic theories of quantum mechanics. I show that Berghofer's arguments can be symmetrically applied to the Ontological Model Framework (OMF), thus putting pressure on the QRP itself and neutralizing Berghofer's argument. The underlying issue is that these programs disagree on how to build and anchor a physical theory. While the OMF shows how the mathematical formalism of a quantum theory refers to objective physical properties (objective reality), the QRP shows how the quantum formalism can be derived from (information-theoretic) principles. Since typical theories reconstructed within QRP deny the existence of objective physical properties, they do not fit into the OMF; therefore, the only remaining way to justify the formalism is to derive it from certain axiomatic principles.

Jiang, Yihan

BEYOND MECHANISTIC METAPHYSICS: A PROCESSUAL STRUCTURALIST DEFENSE OF DYNAMICAL EXPLANATION

Dynamical models employ differential equations to describe system-level dynamics, abstracting away from the fine-grained details of individual components and their interactions. Mechanists, however, have questioned their explanatory power, arguing that dynamical models fail to describe the causal structures underlying phenomena, which they believe can only be achieved by detailing objects and their activities. This paper challenges the mechanist critique by exposing its reliance on a problematic, object-based metaphysics and defends the explanatory power of dynamical models through the development of a processual structuralist framework alternative to mechanistic metaphysics. By integrating processualism and structuralism (ontic

structural realism), I argue that the metaphysical underpinnings of dynamic systems are structurally constrained processes. The equations in dynamical models directly represent inherently causal or modal structures (as proposed by structuralism), whose ontological nature is understood here as processes. This framework demonstrates that dynamical models are not merely mathematical abstractions but provide genuine ontic explanations by describing the causal structures underlying phenomena without referencing discrete objects. To illustrate this, I apply the framework to evolutionary- developmental biology, focusing on the dynamical modelling of gene regulatory networks (GRNs). I show that dynamical models capture the processual structures that metaphysically underlie the dynamic system of GRNs, offering a compelling alternative to mechanistic explanations. By aligning processual ontology with structuralism, the paper provides a robust metaphysical foundation for dynamical model, challenging the mechanistic insistence on object-based explanations.

Kimpton-Nye, Samuel
PRAGMATIC LAWS AND POSSIBILITY: A NEW MODAL ANTI-REALIST PROGRAMME

This paper identifies two pressing problems with extant modal anti-realist theories: i) they do not provide a plausible account of nomological modality and, ii) they struggle to account for the value of modalizing. To remedy this, I provide a new modal anti-realist theory according to which possibility and necessity are logical consistency with and implication by (respectively) the laws of nature. But to ensure that this is an *anti-realist* theory with the attendant ontological and epistemological benefits, I argue we should understand the laws of nature as pragmatic Humean laws as per, e.g., Hicks (2017), Dorst (2017), and Loew and Jaag (2020).

Kistler, Max
CONSTITUTION AND CAUSATION IN MECHANISMS

Craver (2007) has argued that constitutive relevance can be discovered by mutual manipulability, based on interventions (Woodward 2003). However, the requirements on interventions make mutual manipulability of mechanisms and their constituents impossible (Baumgartner & Gebharter 2016). Craver, Glennan, and Povich's (2021) thesis that constitutive relevance can be reduced to "causal betweenness", between the input and the output condition of a mechanism, leads to the paradoxical result that there are no levels and thus no multi-level mechanisms, but only causal chains of fundamental level activities. The key to understanding how models of multi-level mechanisms can be constructed on the basis of empirical information is that 1) the relevant experiments directly provide only information about causal relations (contrary to what Craver 2007 claims), but that (contrary to what Craver, Glennan, and Povich 2021 claim) this information about causal relations can bear on variables at different levels. A multi-level model is built in two steps. 1) First, partial, purely causal, models are built for each hypothetical constituent variable Φi, on the basis of top-down and bottom-up experiments that modify or measure Φi in a level-specific way, 2) second, those partial models are merged in a comprehensive model containing both causal and constitution relations between variables, on the basis of information about the level of each variable and spatio-temporal constraints.

Kõiv, Riin
THREE CONCEPTS OF A POPULATION-LEVEL CAUSAL RELATIONSHIP

In various branches of biology, philosophy of biology, and epidemiology, some causal relationships are described as "population-level" relationships. However, what defines a causal relationship as "population-level" is rarely made explicit and concise. Moreover, it is not clear if the operative meaning of the term is the same across disciplines, or does it vary. This ambiguity may lead to confusion in both discussions that employ the term and in the interpretation of scientific findings. This paper addresses this issue. It elucidates three distinct operative concepts associated with "population-level" across different contexts. Additionally, it clarifies how these three concepts interrelate, demonstrating that they either intersect or are mutually

exclusive. By doing all this, the paper aims to facilitate clearer communication and more precise interpretation of causal claims across scientific and philosophical discussions.

Kooiman, Isa
THE BILKING ARGUMENT FOR FORWARD CAUSATION SAVING RETROCAUSALITY

The idea of retrocausality—that an effect can sometimes occur before its cause—is in tension with our conventional understanding of causation. The most prominent ob- jection to the coherence of retrocausality is the bilking argument. It has led many to reject—or at least profoundly doubt—the coherence of retrocausality. The bilking argument substantiates the deeply ingrained intuition that the past, being fixed and un- changeable, cannot be causally influenced and turns it into a substantive metaphysical claim. This paper, however, argues that the bilking argument does not pose a threat to the conceptual possibility of retrocausality. While the idea of retrocausality seems absurd, there are some reasons to think that it is interesting to more rigorously inves- tigate its coherence. One is that adopting retrocausation could potentially explain the apparent 'non-locality' of quantum mechanics. This paper aims to reject the bilking ar- gument as a threat to retrocausality by developing an analogue of the bilking argument for forward causation—which clearly draws a problematic conclusion. Distinguishing what goes wrong in the analogue argument allows this paper to identify a similar mis- take in the original bilking argument. It thereby argues that the bilking argument does not establish the incoherence of retrocausality.

LeBrun, Alex
NO SCIENCE WITHOUT COMPOSITES

In this paper, I attempt to show that there is no (faithful reconstruction of) science without composites. I do this by providing an objection to ex- tant composite object dispensability arguments. My argument is novel in that it leverages compositional explanations of properties in evolutionary biology to show that composites are indispensable. Those who are sympa- thetic to a science without composites have tools to paraphrase composites away, but I show that these face significant issues.

Lee, Chanwoo
A LAKATOSIAN AGAINST STANCE

Philosophers tend to take a philosophical position such as empiricism or materialism. Are these philosophical positions truth-apt propositions or non-truth-apt attitudes? Following Bas Van Fraassen, many eminent philosophers of science in recent years have begun to endorse the stance conception of philosophical positions, which views philosophical positions as non-truth-apt attitudes. This paper introduces the notion of stance and some of the influential arguments given for the stance conception, which I call the argument from the irresolvability of philosophical disputes and the argument from the lack of fixed concepts respectively. I argue, however, that adopting the stance conception is too hasty a move. I propose an alternative conception of philosophical positions heavily influenced by the insights from Imre Lakatos' philosophy of mathematics and science. The Lakatosian conception, I argue, can accommodate the driving motivations behind the stance conception without embracing its radical implication. Thus, the Lakatosian conception should be considered a strong contender when we debate the nature of philosophical positions.

Lewis, Peter
QUANTUM PRAGMATISM AS A GLOBAL PRAGMATISM

Healey's pragmatist interpretation of quantum mechanics promises to avoid the problems facing realist and instrumentalist interpretations. But it faces difficulties of its own: it relies on a

disputed quantum-classical divide; it has trouble accommodating quantum claims that cannot be straightforwardly cashed out in terms of Born probabilities; and it doesn't respect the ways that physicists describe quantum systems. To address the first of these problems, I suggest moving from Healey's local pragmatism, according to which the content of quantum claims *in particular* is given by the inferences they license, to a global pragmatism, according to which the content of *all* claims is given by the inferences they license. I argue that by broadening the class of inferences that are licensed by quantum claims, this move solves the second and third problem as well. Furthermore I argue that this approach does not harm the ability of pragmatism to address the foundational difficulties of quantum mechanics.

López, Cristian
THE OPEN SYSTEM VIEW AND THE METAPHYSICS OF SYMMETRIES

Philosophers have been drawing their attention to the metaphysics of symmetries. Most have taken a Closed System View, that is, the metaphysical assumption that closed systems are ontologically fundamental. In this paper, I explore the consequences of adopting a different perspective, the Open System View, according to which open systems are regarded as ontologically fundamental. I argue that by doing so our metaphysical understanding of symmetries changes substantially in three respects: epistemic approaches are favored, ontic approaches should change the set of physical symmetries regarded as fundamental, and the metaphysical connection between conservation principles and symmetries is weaker than thought.

Lyu, Xingyu
AGAINST COLOR OBJECTIVISM: A CRITIQUE FROM ELECTRODYNAMICS

The paper disputes color objectivism, which holds that colors are properties of material objects, by appealing to electrodynamics. Color objectivism is often alleged to be compatible with science. However, electrodynamics does not suggest so. The crux is that electrodynamics conceptually conflicts with the metaphysical view of light reflection involved in color objectivism. Specifically, color objectivism involves the view that the physical properties responsible for light reflection are intrinsic to material objects, while electrodynamics suggests that the physical properties responsible for light reflection are contextual, light-determined properties, arising from the light-matter interaction. This paper argues against color objectivism by drawing on boundary conditions derived from electrodynamics. To better understand the conflict between color objectivism and electrodynamics, the paper also discusses the electromagnetic reflection mechanism and its metaphysical implications. As a result, the rejection of color objectivism enables us to avoid several commonly discussed distinctions, conceptual frameworks, and the materialist notion of color properties that underpins color objectivism.

Matarese, Vera
DARK ENERGY FICTIONALISM

By discussing the case of dark energy, this paper aims to show that fictionalism provides a powerful metaphysical framework for supporting realism of an entity that suffers a severe problem of underdetermination. The predictive success of the ΛCDM model, our standard cosmological model, should be interpreted, within scientific realism, as evidence for the existence of the entities it posits, including dark energy. Yet, the proliferation of vastly different models to characterize dark energy arguably threatens semantic realism about dark energy. The underdetermination is particularly severe not only because it features very different physical hypotheses concerning the nature of dark energy, but also because many of them cannot be empirically distinguished. Fictionalism offers the conceptual tools to endorse dark energy realism and embrace, at the same time, its underdetermination. Positing the existence of objective fictional entities as possible characterizations of dark energy, indeed, ensures that dark energy realism is meaningful.

Miller, Michael E. and Fraser, Patrick
PRECISION AND DETERMINACY

Discussions of dynamical physical quantities sometimes presuppose a relation be- tween their precision and their determinacy. In this paper we argue that this is a mistake. The concepts of precision and determinacy, while both important features of physical quantities, are independent of one another in the sense that neither is to be analyzed in terms of the other. We develop a general view of precision and determinacy which we apply in the contexts of both classical and quantum mechanics. On the view we propose, precision concerns the specificity of a quantity relative to other quantities, whereas determinacy concerns the unique- ness of value of a quantity.

Moro, Margherita
EMPIRICAL INCOHERENCE IN QUANTUM MECHANICS

Some theories and ontological frameworks in non-relativistic quantum mechanics have been implicitly or explicitly charged with the accusation of being empirically incoherent, i.e., undermining the empirical justification we have for taking them as true. These charges have addressed disparate features of alternative ontologies, such as the lack of ordinary spatial properties, ontological indeterminacy, the multiplicity of outcomes, and their epistemic inaccessibility. I want to argue that bringing these charges together in a unified framework, which examines empirical incoherence in quantum mechanics, has relevant consequences for the foundations of the theory and the debate on quantum ontology. To achieve this, I will define and compare the constraints on macroscopic observations challenged by some approaches to quantum mechanics. In particular, I will consider the determinate, objective, and unique character of experimental outcomes. These features will be employed in my formulation of 'the problem of empirical incoherence'. Although related, this problem should be accurately distinguished from other issues in the field, such as the determinacy problem, and the measurement problem concerned with the theory's dynamics.

Murgueitio Ramírez, Sebastián
RETHINKING SYMMETRIES: A BASIC COUNTEREXAMPLE TO TWO KEY THESES

In this paper, I present a novel counterexample to two widely defended theses in the philosophical literature on symmetries: (1) that symmetry-related models represent observationally equivalent situations, and (2) that only invariant quantities can be measured. Unlike other cases discussed in recent years, the counterexample introduced here is remarkably simple. In fact, the counterexample is so elementary and involves a system so widely discussed in undergraduate physics classes that it is a bit surprising that it has been overlooked in the philosophical literature on symmetries. After introducing the case, I defend it against three potential objections inspired by recent discussions.

Nørgaard, Maria
QUANTUM SYSTEMS DO PERSIST

Despite the development of several formal accounts of persistence in recent years, only a handful of articles have been dedicated to investigating the persistence in quantum mechanics. Since the locative turn, persistence has been defined in terms of exact location – a locative notion that does not readily map onto quantum formalism. Efforts to adapt the traditional locative framework to quantum settings have produced discrete quantum paths, which are difficult to reconcile with locational accounts of persistence and cast doubt on whether quantum

systems persist at all. This paper introduces an alternative approach to quantum persistence, replacing exact location with a graded locative notion tailored to quantum mechanics: quantum location. The frame- work permits continuous quantum trajectories, overcoming the issues faced by the traditional account and making it compatible with both locational endurantist and perdurantist accounts of persistence – on the quantum location approach, quantum systems do persist. The paper suggests that quantum persistence requires a reevaluation of traditional metaphysical tools, advocating for an adaptable framework that can reconcile both quantum formalism and metaphysical concepts.

Onnis, Erica
EMERGENT NOVELTY: CAUSAL AND QUALITATIVE (THAT IS, WHAT TYPES OF PROPERTIES EMERGE WHEN PROPERTIES EMERGE)

Ontologically emergent phenomena are entities that depend on lower-level goings-on while maintaining some autonomy and manifesting some sort of novelty in relation to them. Yet, while there is agreement on the importance of these general features, there is no agreement about their precise meaning and scope. In this paper, I focus on novelty, that in the recent debate has been consistently interpreted in causal terms, and suggest that integrating the causal interpretation with a qualitative (i.e., non-essentially causal) one may be appropriate for several reasons. Also, I propose to disambiguate the notion of qualitative novelty by understanding it as the appearance of new qualitative properties and suggest that emergent qualitative novelty often grounds emergent causal novelty.

Ortmann, Brian
THE EXCLUSION PROBLEM 2.0

Kim's (1998; 2005) exclusion problem is the inconsistency of the causal efficacy of mental events with the following four claims: (i) Distinctness according to which mental events are distinct from physical events, (ii) Completeness according to which every physical event has a sufficient physical cause, (iii) Nonoverdetermination according to which the effects of mental causes are not overdetermined, and (iv) Exclusion according to which nothing has more than one cause unless it is overdetermined. This paper argues for the exclusion problem 2.0. That is, the inconsistency of any sort of (causal and non-causal) influence of the mental is inconsistent with Distinctness, Completeness, Nonoverdetermination, and a plausible generalised form of Exclusion according to which no event has more than one sufficient determinative/generative influencer unless it is overdetermined. The exclusion problem 2.0 reveals that the physical domain is even more exclusive than Kim's original exclusion problem has suggested in that it also excludes non-causal external influences. As a result, it takes issues with Blanchard & Hüttemann's (2024) recent attempt to solve Kim's exclusion problem by endorsing an account of mental causation (due to Kroedel 2020) according to which mental events do not influence their effects directly but indirectly by influencing their physical realisers which then causally influence the effects.

Pedersen, Ray
EVERETTIAN QUANTUM MECHANICS AND THE PROBLEM OF ONTOLOGICAL EXTRAVAGANCE

Everettian quantum mechanics (EQM) is polarizing. On one hand, it avoids the measurement problem while neither relying on a collapse postulate nor postulating any hidden variables. For this reason, EQM has emerged as an attractive option among the various realist interpretations of quantum mechanics, and proponents of EQM thus celebrate its simplicity over that of its competitors. On the other hand, the most common interpretation of Everett's formalism involves a rather off-putting commitment to many worlds—a feature that it does not share with its equally empirically adequate competitors. Everettians have given the concern over EQM's ontological extravagance little serious attention, dismissing it as an unsubstantiated incredulous stare. Still, this concern is sufficiently strong to dissuade some non-Everettians from viewing EQM as a viable option altogether. In this paper, I carefully develop several versions of the

objection to EQM on the basis of ontological extravagance, only one of which is immediately dismissible. In their haste, Everettians have failed to recognize the numerous viable versions of this objection and the norms associated. By disambiguating the in- credulous stare objection to EQM, I open numerous possible paths forward for future inquiry into Everettian ontology.

Perry, Zee R.
LAWS AS PROPORTIONALITY RELATIONS BETWEEN QUANTITIES

This talk develops an account of the laws of nature according to which the laws are "relations of proportionality" that hold between physical quantities. The view that the laws of nature are relations between properties, understood as metaphysical entities in their own right, is usually associated with the anti-Humean Necessitarian views of Dretske, Tooley, Armstrong (DTA). However, the traditional DTA account has rightly fallen out of favor among anti-Humeans due to serious objections that these accounts face. I propose a theory of law that retains some of the key benefits of DTA-style accounts, while combining certain features of the primitivist governing accounts (often associated with Maudlin and Carroll) allowing it to avoid the common pitfalls of those views. The resulting account is one on which the laws of nature consist of relations between determinable quantities (Mass, Acceleration, Charge, etc), but where the governing of the laws operates at the level of determinate magnitudes (2kg, 15m/s2, 4C). I show how such an account solves the most serious objections raised against DTA accounts, avoids the quietism common to many primitivist governing views, and can even be extended to explain how it could be that some quantities are "defined by" their role in the dynamical laws.

Rolffs, Matthias
CAN GROUNDING-RELATED CAUSES OVERDETERMINE THEIR EFFECTS?

Compatibilists about mental causation maintain that every effect of a mental cause also has a sufficient physical cause. This, many object, looks suspiciously like overdetermination. In response, compatibilists typically argue that there is a key difference between genuine overdetermination and compatibilist mental causation: While the overdetermining causes in genuine overdetermination are independent, the causes in compatibilist mental causation are grounding-related. For this reason, they cannot overdetermine their effects.
In this paper, I argue that, to the contrary, grounding-related causes can sometimes overdetermine their effects. I present a novel counterexample, which arguably qualfies as a case of grounding-related causes overdetermining an effect. I show how this counterexample refutes three proposed necessary conditions on overdetermination, by Bennett (2003), Kroedel and Schulz (2016), and Stenwall (2020). Finally, I suggest ways to modify the three proposed necessary conditions such that they no longer misclassify the counterexample.

Seifert, Vanessa
WHY WATER MAY NOT BE A NATURAL KIND AFTER ALL

I present an argument that undermines the standardly held view that chemical substances are natural kinds. This argument is based on examining the properties that are required to pick out members of these purported kinds. In particular, for a sample to be identified as -say- a member of the kind-water, it has to be stable in the chemical sense of stability. However, the property of stability is artificially determined within chemical practice. This undermines the kindhood of substances as they fail to satisfy one of two key requirements: namely that they are picked out by (some) natural properties and that they are categorically distinct. This is a problem specifically for the natural realist interpretation of kinds. I discuss whether there are other ways to conceive of kinds in order to overcome it.

Sendłak, Maciej
METAONTOLOGY OF DEPENDENCE

This paper proposes a general account of the dependence relation. The view is inspired by Humean supervenience and demonstrates that adopting the so-called Best System Account approach to laws of nature opens the possibility of identifying the common features of different dependence relations. I structure this paper in four main sections. First, I introduce the concept of dependence and its role in explanation, highlighting the divide between internalist and externalist approaches. Second, I explore the challenges in characterizing dependence relations and present the foundations of my proposal as a potential solution. Third, I demonstrate how this can accommodate various philosophical debates and resolve apparent tensions in our understanding of dependence and explanation. Finally, I examine the implications of the proposed account for pivotal issues in the philosophy of explanation, including (i) the tension between metaphysical necessity and pragmatic context-dependence, and (ii) the relation between internalism and externalism.

Tan, Peter
HOW SCIENTIFIC METAPHYSICS PROVIDES EXPLANATORY UNDERSTANDING

This paper develops a novel account of metaphysics' explanatory contributions to the philosophy of science. A recent objection alleges that explanations of features of science in metaphysical terms are nothing more than rephrases of their target explananda. That is, these explanations are alleged to fail with respect to what has recently been called "explanatory distance." In response, I show that putative explanations of the scientific image in metaphysical terms exemplify an explanatory strategy found elsewhere in science, which I call type-token explanations. If successful, these explanations would achieve appropriate explanatory distance. Additionally, because this mode of explanation coheres with a preexisting explanatory strategy in science, my account implies that the metaphysics of science can generate understanding about its target phenomena in the same way that scientific explanations can provide scientific understanding of their target explananda.

Torza, Alessandro
REDUCING METAPHYSICAL INDETERMINACY TO OBJECTIVE CHANCE

Metaphysical indeterminacy is indeterminacy originating in the non-representational world. I develop a theory of metaphysical inde-erminacy in terms of objective chance with a number of attractive features: it provides a reductive analysis of metaphysical indeterminacy; it applies at both macroscopic and microscopic scales; it demystifies the target phenomenon by employing no special-purpose metaphysical primitives; it does not prejudge the question whether the logic of a language capable of describing indeterminate subject matters is classical, or whether the semantics is bivalent; it comes with built-in epistemic criteria; it is informed by a naturalistic methodology. It is concluded that the chancy approach is overall preferable to the best-theorized alternatives, which involve either many-valued logics or a worldly counterpart of Finean supervaluationism.

Townsen Hicks, Michael
MINDING OUR BUSINESS: WHY INFERENCE IS STILL A PROBLEM FOR LAWS OF NATURE

What are we doing when we do metaphysics of laws of nature? On my view we are offering philosophical explanations of a particular set of modal notions: nomic necessity and possibility. These are the modal operators associated with the laws of nature: the *must* of "what goes up must come down," the *can* of "we can go to the moon," and the *would* of "if you approached a black hole, you would be spaghettified." What should these explanations be like? Well, they should give us some understanding of what makes these modal claims true. In doing so, they ideally will help us figure out *when* the modal claims are true and false. They should also give us some insight into the structure of these operators: when we understand what makes

sentences including them true, we should come to see why those operators have the entailments they do. We could call this "the entailment problem". Unfortunately a number of recent theories of nomic modality don't do this, and seem to be proud of it. The idea seems to be that just asking for this sort of explanation is fundamentally misguided, and confused about metaphysical methodology. As [Schaffer, 2016, p. 577] puts it, "the non-Humean need only say that it is the business of laws to govern", and that's all there is too it. In this paper, I will look at the Axiomatic solution, especially as it is applied to primitivist views of laws such as Chen and Goldstein [2022] and Adlam [2022]. I'll argue that these views fail to explain the truth of the laws, that this is a serious–though nonfatal–demerit of the views.

Voggenauer, Martin
REVISITING THE ANALOGY BETWEEN GROUNDING AND CAUSATION

Grounding is often regarded as a kind of metaphysical causation (Schaffer 2016, Wilson 2018). Some even consider causation as a particular grounding (or building) relation (Bennett 2017). However, although there are strong similarities in content, structure, and form, the analogy is not uncontroversial given some notable differences (Bernstein 2016). In this paper, I argue for a restricted analogy that does justice to both the striking similarities and the key differences. Specifically, I argue that the analogy holds only between causation and particular grounding relations, namely those that connect events (or facts about events) on different levels of nature. I show that this refined analogy overcomes in particular the problems of missing grounding analogs for productive, negative, and probabilistic causation.

Wilson, Alastair
EXPLANATIONS OF AND IN WORLDS

Our scientific explanations should have a character which matches their subject-matter: if a fact is not apt for causal explanation, we should not try to explain it causally. In this paper, I first review some cases where causal explanation has been extended beyond its proper limits, identifying a pattern of error which I call the *problem of causal overreach*. I then relate these considerations to the debate over causal locality in Everettian (many-worlds) quantum theory (EQM), in the context of three metaphysical distinctions which are central to recent discussions of locality: event causation vs. worldshaping causation, local branching vs. global branching, and overlapping worlds vs. diverging worlds. I argue that worlds in EQM are not properly regarded as themselves subject to causal explanation: Everettians should instead regard causation as a wholly in- world matter. This approach avoids any non-local causal explanation; quantum entanglement instead supports a new category of non-causal worldshaping explanations.

Wüthrich, Christian and Le Bihan, Baptiste
IS SPACETIME AN ACCIDENT?

Many approaches to quantum gravity suggest that spacetime emerges from a more fundamental, non-spatiotemporal structure. What then is the modal status of the emerging spacetime: is it necessary or contingent? We demonstrate that according to an empirical conception of modality—one that tracks physical possibilities in the spaces of solutions of physical theories—at least two approaches to quantum gravity, string theory and causal set theory, imply that spacetime is physically contingent. We then review a number of implications for current issues in metaphysics.

Zacki, Sadaf G

TRACING BACK THE IDENTITY OF A HUMAN ORGANISM

A division in the multicellular organism that exists before day 14 after conception is problematic for marking the beginning of the existence of a human organism. That is because an individual human being is by definition indivisible. So when the organism cannot possibly divide anymore, then we – or most animalists – pinpoint the beginning of our existence; when our identity begins. However, this leaves the question of the identity of the pre-14-day multicellular organism. It sure did not die or go out of existence. In this paper, I will argue that the identity of a human organism can be traced back to fertilization. While twinning poses significant philosophical challenges, I propose that the identity of the original organism ceases upon division, giving rise to new identities. This ontological cessation does not undermine the claim that the biological beginning of the organism occurs at fertilization but reflects a natural transformation in its developmental trajectory. By addressing this phenomenon through the lens of ontological cessation, I aim to reconcile the indivisibility of identity with the biological realities of twinning.

Practicalities

Venue

The conference venue is the 'Palazzo Rosso' (Red Building) in the main campus of the Università della Svizzera Italiana (USI, Lugano), in via Giuseppe Buffi 13, 6900 Lugano. The rooms devoted to the SMS are rooms A11 and A12 on the ground floor, and room A21 on the first floor.

Registration desk

On Monday, June 30, starting from 8am, we will open the registration desk, where your badge will be waiting for you. The introduction and first talk start at 9am. Although there's plenty of time, we encourage you not to come at the registration desk too late.
The registration desk is located at the main entrance of the USI West Campus, in Via Buffi 13, Lugano: MAP HERE (this is also where coffee breaks will be served).
After the first morning, instead of a typical registration desk, you will find a self-registration desk at the entrance of the red building, where the conference will take place: MAP HERE.

Information about talks and for chairs and commentare

1. Keep in mind that each parallel session lasts 1 hour. We'd like your talks to last for no longer than 30 minutes. There will be 5 minutes for remarks by the commentators, followed by a short reply from the authors, and the Q&A.
2. For the chairs:Your main responsibilities are to (i) adhere to and enforce the schedule, (ii) introduce speakers and commentators, and (iii) manage the queue during Q&A if requested by the speaker. Please prioritize those who have yet to ask questions, etc. There are only 5 minutes between parallel slots.
3. Commentaries should be around 5 minutes. Brevity is a virtue. Please bear in mind that your primary role is not to present objections (though of course you may do so), but to stimulate philosophical discussion.
4. For the audience: raise your hands for new questions, and fingers for follow-ups. The chair may skip follow-ups if there's not enough time.
5. If you have slides, you can connect your computer directly to the cables at the desk (USB-C and HDMI ports are available) and selecting the corresponding input on the screen at the desk. The system is quite straightforward, but there are also instructions available directly on the desk in case you need assistance.

Lunches

While the coffee breaks will be offered on site, we remind you that we haven't planned anything for the lunch breaks. Here's a list of places that may be interesting for you to consider, all pretty close to the conference venue:

- Ristorante Fresco, Italian restaurant: map
- Tasta, quick and cheap take away pizza: map
- Usi Caffetteria: map
- I Calafatari. Expensive but good fish restaurant: map
- Diametro 31 (closed on Tuesday). Pizzeria Naples style, easy to take away and eat at the park:map

Program and Booklet

The latest version of the program will always be available at the conference website: https://socmetsci.org/2025

Business meeting agenda

1. President’s introduction
2. Report from Secretary
3. Report from Treasurer
4. Elections
    a. President-elect
    b. Treasurer
    c. Council Member x2
5. AOB

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