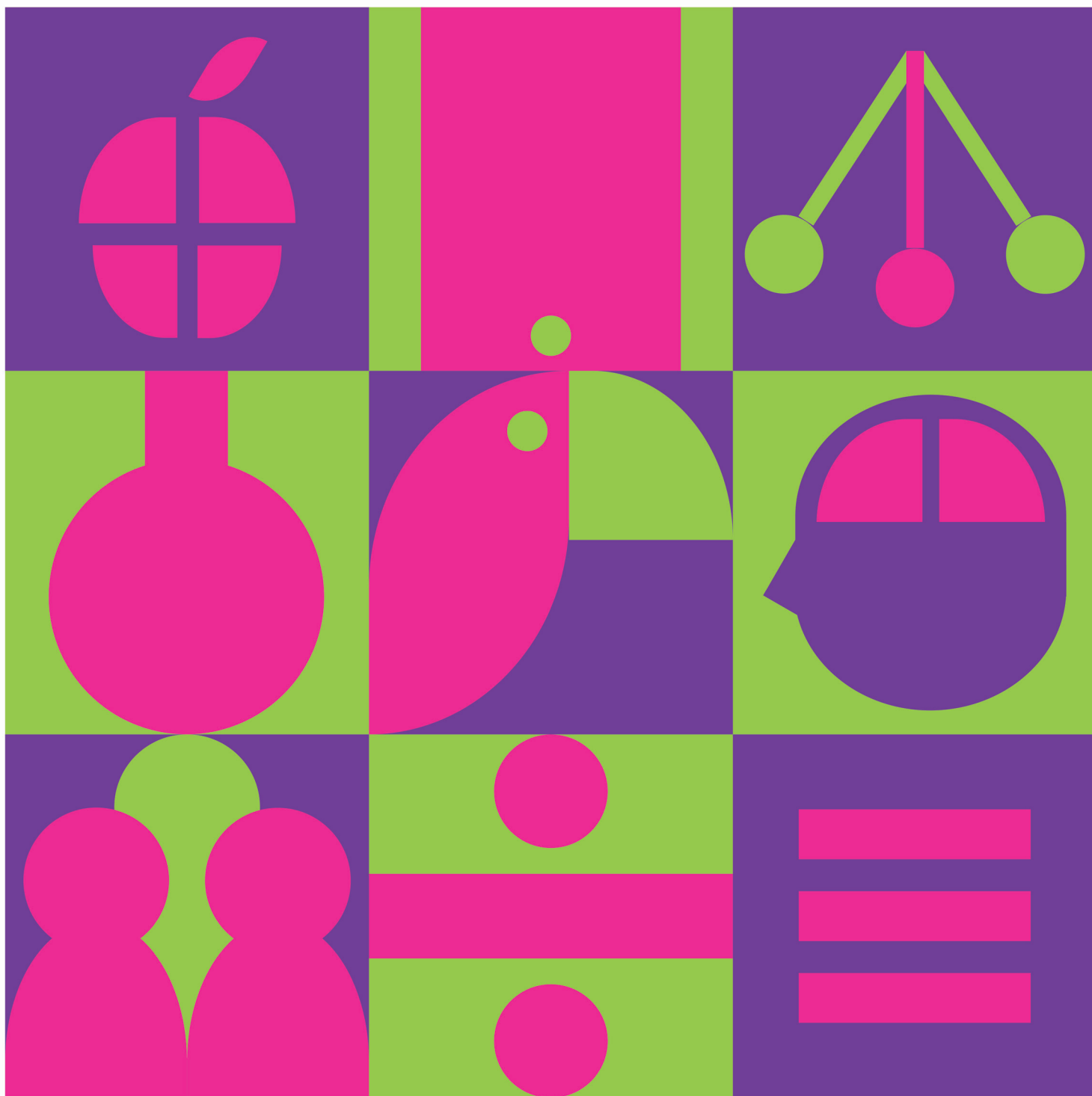




Keynotes

Asian Philosophy of Science Association Conference 2026

22-24 July 2026

Singapore Hokkien Huay Kuan Building
Nanyang Technological University



Craig Callender
University of California,
San Diego



Catarina Dutilh Novaes
Vrije Universiteit
Amsterdam



Kevin Zollman
Carnegie Mellon
University



Organized by
Nanyang Technological University School of Humanities
Asian Philosophy of Science Association

Local Organizing Committee:
James Openshaw (co-chair), Melvin Chen (co-chair)
Jacob Stegenga, Teru Miyake, Eugene Y.S. Chua

Keynotes

22 July 2026 | 10.00am to 11.30am (Online via Zoom)



CRAIG CALLENDER

University of California, San Diego

The Life Cycle of a Life Cycle Analysis: Preprints, Press Releases, and Policy

Universities occupy a central position in the epistemic infrastructure of democratic societies. Through their press offices, they shape how emerging research enters public discourse and informs policy. Existing analyses of misinformation often focus on a single stage in its production—such as biased research, industry influence, or media distortion. This paper offers a more comprehensive picture by tracing the full “life cycle” of a scientific claim, from preprint to press release to mainstream media coverage to law. As a case study, we use a press release from UC Davis that highlighted a controversial preprint claiming that cultivated meat could have a carbon footprint up to 25 times higher than that of retail beef. Drawing on a dataset of 439 distinct media items across May 2023–November 2025, we detail how the press release triggered a cascade of “churnalism,” propelling the preprint into mainstream and international media, embedding its most extreme claims into background knowledge, and contributing to legislative actions restricting cultivated meat. Our findings show how misinformation can arise from hype and the shared needs of journalism and academia, resulting in claims that prove resistant to subsequent correction. Because universities function as trusted epistemic authorities, strengthening communication norms is essential if they are to fulfill their democratic role.

Craig Callender is the Tata Chancellor Professor of Philosophy and a Founding Faculty and Co-Director of the Institute for Practical Ethics. He is also President of the Philosophy of Science Association and from 2019-2022 sat on the Freedom and Responsibility in Science Committee of the International Science Council. His main area of research and teaching is philosophy of science, ranging from the nature of time to various applied social and ethical issues. He obtained his Ph.D. from Rutgers University in 1997 with a dissertation on quantum mechanics and the direction of time. His book *What Makes Time Special?* (OUP 2017) won the 2018 Lakatos Award and the 2022 Suppes Prize.

Keynotes

22 July 2026 | 4.15pm to 5.45pm



CATARINA DUTILH NOVAES

VU Amsterdam

Science for Busy People

In my forthcoming monograph *Reason and Power in Argumentation* (2026, CUP), I develop a model of discursive practices that does justice to the inherent cognitive limitations of ‘bounded’ human agents and the effects of power relations for discursive rationality: the *Argumentation as Exchange* model (AEX). In the monograph, one of the applications of AEX is to scientific argumentation, offering in particular a more realistic, more plausible account of discursive practices in science than Helen Longino’s influential *critical contextual empiricism* (CCE) model. Indeed, CCE does not take into account (or not sufficiently) some important aspects of scientific practices, in particular: the *costs and risks* involved in extensive critical discursive interaction; the imperative of responsible collective *workload management* in a scientific community; and the need for mechanisms of *curation and filtering* in any sufficiently large epistemic community. By contrast, AEX takes as its starting point the observation that scientists are ‘busy people’ who must contend with limited resources (of time, energy, funding etc.). To illustrate the proposal, I discuss practices of *peer review* as instances of epistemic exchange, which perfectly exemplify the high costs involved in the kind of extensive critical discursive interaction recommended by CCE.

Catarina Dutilh Novaes is professor of philosophy and University Research Chair at the Department of Philosophy of VU Amsterdam, member of the Royal Netherlands Academy of Arts and Sciences (KNAW), and president of the European Philosophy of Science Association (EPSA) (2025-2029). Her research spans several philosophical areas and topics, including history and philosophy of logic, philosophy of mathematics, social epistemology, and philosophy of science. She is the author of, among others, *The Dialogical Roots of Deduction* (CUP 2020), which won the 2022 Lakatos Award, and *Reason and Power in Argumentation* (CUP 2026). Currently, she is primarily interested in the role of colonialism in science and epistemic practices more generally.

Keynotes

23 July 2026 | 10.00am to 11.30am



KEVIN J.S. ZOLLMAN

Carnegie Mellon University

Individual Rationality and Group Rationality: What Computational Philosophy Can Tell Us About the Independence Thesis

Rational individual epistemic behavior might be distinct from rational group epistemic behavior. Groups of rational individuals may not make for the epistemically best groups. This idea was called “The Independence Thesis” by Mayo-Wilson, Danks, and me. We originally focused on one particular model of group problem solving and with one particular definition of what counts as “rational.” In this talk, I will explore other ways of defining notions like individual and group rationality, and explore versions of the independence thesis for them. I will briefly introduce several models that illustrate independence-thesis-like behavior. Finally, I consider ways that one might rebut the independence thesis that parallel attempts to make cooperation rational in the prisoner’s dilemma. Ultimately, I conclude that epistemic rationality is like instrumental rationality: there can sometimes be a conflict between what’s good for the group and what’s good for the individual.

Kevin J.S. Zollman is the Herbert A. Simon Professor of Philosophy and Director of the Institute for Complex Social Dynamics at Carnegie Mellon University. His research focuses on mathematical and computational modeling of social behavior. This work deepens our understanding of complex social behavior across multiple disciplines including philosophy, biology, economics, cognitive science, and computer science. His research answers questions like: how groups learn about the world, how animals communicate, how social norms evolve, how science progresses, and how rationality and morality interact.

Keynotes

23 July 2026 | 4.15pm to 5.45pm

APSA EARLY CAREER SCHOLAR ESSAY PRIZE KEYNOTE

The APSA Early Career Essay Prize is aimed at spotlighting the works of young scholars from and in Asia. The winner will have the opportunity for their paper to be published in the *APSA26: Selected Papers*, an edited volume to be published by Springer as part of the *Asian Studies in the Philosophy of Science*.

Presentations

Please report to the session room at least ten minutes before your presentation to check in with our student assistants and the chair of your panel.

As the conference schedule is tightly packed, we seek your understanding to keep your presentation within the time limit.

All seminar rooms are equipped with standard PCs and projectors. Presenters are to bring along your presentation slides in a thumbdrive and load this before the start of the session. Please approach the student assistant assigned to your room for assistance. We do not recommend using your own laptop to avoid delays.



Names of the Panel Chairs will be updated on the Conference website.

Please visit

<https://www.ntu.edu.sg/soh/news-events/conferences/apsa-2026/programme>
or scan QR code to view presentation abstracts.

Our Campus

CONFERENCE VENUES



The conference will be held on the NTU Campus.

The Keynote Lectures are all held at the Auditorium, Basement 1, Singapore Hokkien Huay Kuan (SHHK) Building.

All parallel sessions are held at the Seminar Rooms in the same building. Lunch and teas on all days will be provided at the Atrium of the same building.

The campus map is available on <https://maps.ntu.edu.sg/>

For the duration of the Conference, enquiries can be directed to our organising team at **soh-reconfigurations@ntu.edu.sg** or at the registration desk.

CAMPUS INTERNET

NTU provides internet access to visitors through Eduroam, we recommend setting up your device(s) for Eduroam if you are from an Eduroam-participating institution.

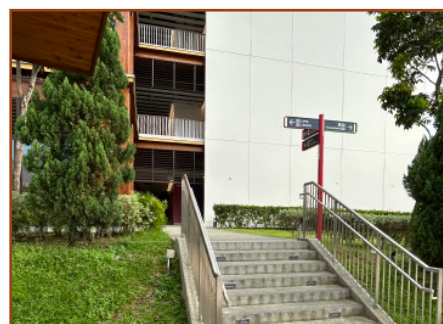
We also provide individual temporary Wi-Fi access for the duration of the conference. You will receive a unique username and password attached to your lanyard upon registration. Please log in through the 'NTU Guest' wifi.

DIRECTIONS TO NTU

Train (Subway) / Bus

The easiest way to get to the NTU School of Humanities is through the East-West MRT (Green) line.

1. Exit Pioneer MRT Train station via Exit A.
2. Walk past the food court and proceed to bus stop 22521 (located right outside the station).
3. Board bus service 179, which travels into the NTU campus.
4. Remain on the bus as it makes a loop around the campus.
5. Alight at the "Academic Building South" stop (bus stop 27251) after the loop is completed. This stop is easily identifiable by its distinctive timber structure known as Wee Cho Yaw Plaza.
6. Walk through Level 1 of Wee Cho Yaw Plaza building until you get to the Singapore Hokkien Huay Kuan Building (SHHK).



Getting Around

CONFERENCE HOTELS

Park Avenue Rochester is located in the Buona Vista district of Singapore.

Genting Hotel Jurong is located in the Jurong East district of Singapore.

Conference participants staying in these hotels can avail of a chartered bus to and from the Conference Venue on 22, 23, and 24 July 2026.

Nanyang Executive Centre (NEC) is located in the NTU campus. It is a 20-minute walk from NEC to the Conference Venue. Conference participants may refer to NTU Omnibus, NTU's very own navigation guide to campus venues, for directions.

Bus Pick Up Time	22 July 2026	23 July 2026	24 July 2026
Park Avenue Rochester to NTU	8:20am	9:10am	9:10am
Genting Hotel Jurong to NTU	8:20am	9:10am	9:10am
NTU to Park Avenue Rochester	6:10pm	-	4:40pm
NTU to Genting Hotel Jurong	6:10pm	-	4:40pm

CONFERENCE DINNER

Pre-dinner advisory

- Chartered buses will bring conference dinner attendees from NTU to Paradox Singapore.
- Please gather at the SHHK foyer at **5:40pm**.
- Please present your Dinner pass* to the staff-in-charge before you board the bus.

*Dinner pass will be issued to participants who have opted and pre-paid for dinner during onsite registration.

Post-dinner advisory

- Transport is available after the dinner to the Conference Hotels. Participants who wish to board the chartered bus should gather at the hotel lobby at **8:50pm**.
- Paradox Singapore is a 5-minute walk away from Clarke Quay MRT Station.

Visiting Singapore

Welcome to Singapore—a vibrant, gorgeous, dynamic cosmopolitan where you can find sheer enjoyment from all aspects of life, be it food, nature, heritage, culture, and more.

USEFUL APPS

You can navigate around Singapore easily using Google Maps.

Public transport in Singapore is very accessible.

There are several ways to pay for your bus or MRT rides: contactless bank cards, mobile wallets, stored value cards, concession cards or cash. Children travel for free on basic bus services and trains if they are below 0.9m in height and are accompanied by a fare-paying commuter, or if they are using a Child concession card.



You can use your contactless credit/debit cards for fare payments. No registration is required. You will pay adult fares with contactless credit/debit cards. Visit https://www.lta.gov.sg/content/ltagov/en/getting_around/public_transport/plan_your_journey.html for more information.

Charges for public transport rides will be reflected in your credit/debit card bills or bank account statement, similar to retail transactions. An admin fee will apply if you use cards issued outside of Singapore.



You can also get around Singapore by taxi or private-hire car. Download the Grab app, Comfort Zig app and set your location.

Payment methods on these apps include paying cash on board or linked credit cards.

Oral Session 1

Seminar Room 4: Philosophy of the Physical Sciences: Space and Time

Quasi-Local Approaches to Black Holes: From Global Ideals to Local Realities

Juliusz Doboszewski, Yichen Luo, Helen Meskhidze

What is a black hole? For relativists and mathematical physicists, it is often characterized by its event horizon, or the boundary of the causal past of future null infinity. But the event horizon is notoriously problematic. In this paper, we survey the philosophical literature surrounding event horizons to compile a list of desiderata. We use this list to evaluate quasi-local approaches to black hole horizons. In particular, we consider dynamical and isolated horizons and whether they represent successful de-idealizations of the event horizon. Finally, we consider whether these quasi-local horizons exhibit non-local behavior (i.e., “clairvoyance”). We argue that the characterization of these closed, trapped surfaces as clairvoyant is too critical. Though they might exhibit some non-local behavior, it does not undermine their fruitfulness or the prospects of the quasi-local approaches generally. We conclude by offering an optimistic outlook on the program and discussing open questions and ways forward.

Schwarzschild Black Holes & the Spacetime-Matter Dichotomy

Sanne Vergouwen, Niels Martens

What, if anything, makes the M parameter in the Schwarzschild metric a physical mass? In this paper we present and evaluate five possible interpretations of the mass of a Schwarzschild black hole. We argue that the concept of black hole mass is best understood by taking each of these five interpretations into account. We particularly show how a global interpretation of mass succeeds in referring to black hole mass, in spite of its significant difference from the traditional Newtonian notion of mass that is local. Finally, we argue not only a) that this global interpretation shows that the spacetime-matter dichotomy breaks down at the intensional level—in the sense that these conceptual categories become mixed—but also b) that the various interpretations suggest that the spacetime-matter dichotomy is best given up altogether, at least in the Schwarzschild context.

Diffeomorphism Invariant Quantities in Phase Space: More than Correlations

Alvaro Mozota Frauca

The mainstream view in the foundations of diffeomorphism-invariant theories is that their physical content is encoded in correlations or ‘observables’: phase-space functions that have vanishing Poisson brackets with the constraints related to diffeomorphisms. I study the phase-space structure of models with a temporal diffeomorphism invariance and prove a series of formal results that challenge this view in a few ways. First, I show how this view is not applicable to all the phase space trajectories of every diffeomorphism invariant theory. Second, I show how correlations can be proved to be invariant only in a way that generalizes the standard definition and in a way that does not provide smooth functions. Third, I prove that spatiotemporal relations are also invariant. Fourth, I prove that spatiotemporal structures are indispensable for defining the invariant content of diffeomorphism-invariant models. These results represent a challenge for some views in the foundations of general relativity and quantum gravity.

Evidence Synthesis via Formal Argumentation: Insights from the tobacco playbook

Juergen Landes, Paolo Baldi, Esther Anna Corsi, Hykel Hosni

Due to the presence of manufactured uncertainty, conflicts of interest, questionable research practices, and fraud, scientific evidence often cannot be taken at face value. The goal of this paper is to provide a proof of concept of how formal argumentation can be used to synthesise a body of evidence consisting of claims and counter-claims that may be affected by data imperfection. We argue that the theory of formal argumentation is a promising framework to take these issues into account by means of a stylised analysis of the so-called tobacco playbook.

What is “normal” about the “normal range”? Reference intervals, clinical decision limits, and varieties of normativity in laboratory medicine

Benjamin Chin-Yee

“Normal ranges” play a central role in contemporary biomedicine, yet their significance is contested. In laboratory medicine, the term has been replaced by “reference interval” (RI) to emphasize that RIs are not by themselves criteria for health or disease. Yet in practice, RIs are routinely treated as normatively significant, guiding judgments of abnormality and action.

Such uses are attributed to clinicians mistaking RIs for decision thresholds. This explanation, however, is insufficient. The difficulty stems from the capacity of RIs to support multiple, distinct forms of normativity.

I distinguish four forms relevant to RIs: statistical, salience, biological, and prescriptive normativity. Each relies on different justificatory practices and licenses different inferences. Many RIs warrant statistical and salience normativity; far fewer warrant biological or prescriptive normativity without additional justification. RIs, however, frequently invite stronger normative interpretations than they can properly support, a predictable consequence of a single representational tool serving multiple normative roles.

The Narrative Path Towards Precision

Hamed Tabatabaei Ghomi

Current precision medicine faces a paradox: striving for accuracy through traditional Evidence-Based Medicine (EBM) often increases clinical imprecision. By relying on stratified randomized controlled trials, “black box” algorithms, and reductionistic approaches, the field suffers from reduced statistical power, uninterpretable biomarkers, and a reductionist neglect of human complexity. This paper argues that the failure stems from applying general models to inherently unpredictable complex systems. Drawing on complex systems theory, I propose narrative precision medicine as a superior alternative. Unlike the data-centric EBM paradigm, narrative reasoning treats the patient as a unique trajectory rather than a population data point. By framing clinical care as a “coarse-grained simulation,” narrative reasoning integrates physiological, social, and personal causal factors into a temporal description. This shift from reductionist markers to narrative competence offers a “practically precise” framework capable of managing the non-linear dynamics of human health.

Oral Session 1

Seminar Room 7: Philosophy of Technology and AI: Mechanistic Interpretability and Explainability

What's mechanistic in mechanistic interpretability?

Kristian Barman, André Curtis-Trudel

Mechanistic interpretability (MI) is an emerging research program in machine learning and AI safety that seeks to understand neural networks by identifying internal “components” and assigning them mechanistic and causal roles. Yet these components are virtual patterns in parameter and activation space rather than spatially discrete components capable of exchanging energy. This paper analyses MI case studies to clarify what, if anything, is genuinely mechanistic in such explanatory and causal claims, and what epistemic value mechanistic talk adds. We argue that existing neomechanist, computational-mechanist, and purely heuristic readings each capture something important but fail to fit MI practice as a whole. We develop a fourth, hybrid view on which MI operates with “fictional mechanisms”: structured, deliberately idealised models that misdescribe underlying ontology but, via well-calibrated links between representation and target (that capture counterfactual dependence), nonetheless support reliable interventions, and explanatory and predictive practices.

Concept Formation as the Basis of Explainable AI: Structural Conditions for Human–AI Understanding

Lee-Sun Choi

In this talk, I argue that the problem of explainable artificial intelligence cannot be resolved at the level of transparency or post-hoc justification alone. Explanation has an internal structure composed of concepts, and explanatory success requires that these concepts be understood. When artificial systems form concepts that are not translatable into human concepts, explanations articulated in those terms fail to be intelligible. I reframe explainable AI as a problem of conceptual translatability rooted in concept formation. I develop an integrated account of world representation that combines distributed and probabilistic representations, according to which concepts are individuated by structural properties of probability distributions over feature spaces, such as modality, density, and spikeness. Structural similarity across concept formation processes enables translation under conceptual pluralism, allowing multiple representations of the same world without collapsing into solipsism. On this view, explainability is the operational manifestation of successful conceptual translation between human and artificial intelligence.

Constructivism and the Binding Problem in AI

Xiaotong Li

In recent years, Artificial Neural Networks have exhibited a series of compositional defects in multimodal tasks, including “superposition catastrophe” and “mismatching” in multi-objects representations. These phenomena constitute the “compositionality problem”. Empirical evidence suggests that compositional failures are rooted in the model's inability to perform “binding”. Specifically, the “binding problem” refers to the ability to achieve reconfigurable structural representations within a distributed representation system.

This study argues that the binding problem is an inherent lack of capability rather than a “patchable error”, requiring a conceptual reconstruction necessitated by empirical failures. In this regard, existing theories face a dual dilemma. Structural Reductionism suffers from representational rigidity, while Weak Emergence fails to account for the downward causation required for logical reconfiguration. I propose Constructivism, treating binding as a “structurally constructive activity.” This approach provides policy-useful guidelines for future architectures by demonstrating that building binding capability requires structural design rather than mere parameter expansion.

Oral Session 1

Seminar Room 8: General Philosophy of Science: Causal Inference

Causes Don't Push

Angela Potochnik

Complex systems approaches have proved useful in a wide range of scientific fields. Here I explore implications of these approaches for our very concept of causation. Philosophical accounts of causation—physical and counterfactual alike—assume causation can be conceptualized as isolated direct influence. I conjecture that this model of causation, what I term billiard-ball causation, is deeply misleading. Instead, consideration of complex systems methods and the uses and limitations of experimental practices and modeling techniques supports a different conception of causation, what we might think of as a causal mesh. Shifting our conception of causation from billiard balls to a causal mesh clarifies some features and limitations of scientific techniques and resolves some philosophical puzzles about causation, especially puzzles that have emerged for the popular manipulability conception of causation.

Causal Inference Beyond Evidence-Based Medicine: A Bayesian Appraisal of Mechanistic Plausibility

Ethan Vorster

EBM prioritises statistical evidence from RCTs when assessing causal claims about medical interventions. While effective in pharmaceutical contexts, it encounters difficulties when applied to interventions whose effects are realised through complex engineered systems. This paper introduces machine-based medicine as a category of intervention characterised by strong biophysical rationale and mechanistic evidence, but limited statistical evidence. Using particle-beam therapy as a case study, I examine how existing evidential hierarchies struggle to accommodate interventions that exhibit high causal plausibility yet resist conventional trial-based evaluation. Three approaches to causal appraisal are analysed: EBM, EBM+, and Bayesianism. I argue that while pluralist frameworks successfully underscore the epistemic relevance of mechanistic evidence, they lack the resources for systematic evidence integration. A Bayesian framework, by contrast, offers a transparent and principled method for combining mechanistic and statistical evidence. The paper contributes to ongoing debates on confirmation, causal inference, and evidential pluralism in healthcare.

Measuring Implicit Bias: On the Applicability of the Vera Causa Ideal in Social Science

Karim Bschrir

Implicit bias is a frequently invoked explanatory concept in social-psychological studies of discriminatory and prejudiced social behavior. A common way to detect implicit attitudes is via indirect measurement, e.g. in the so-called Implicit Association Test (IAT) developed in the late 1990s. In this paper, I contribute to the ongoing debate about the validity of indirect measures of implicit attitudes by referring to the so-called vera causa ideal that played a historically important role in the assessment of theoretical entities primarily in biology or the earth sciences. I discuss the applicability of the ideal to studies of implicit attitudes, insofar as they aim at causal explanations of empirical phenomena (e.g. prejudiced behavior) by reference to the causal agency of a theoretical entity (e.g. implicit bias).

Oral Session 1

Seminar Room 9: General Philosophy of Science: Confirmation and Induction

Confirmation is Value-laden

Adrià Segarra

In this article, I delineate a category of legitimate non-epistemic value influences in science that the current literature has largely overlooked or dismissed. In particular, I argue that confirmation, understood here as the logical relation of inductive support, is value-laden. In order to show this, I examine the main accounts of confirmation in the literature and expose some of the points at which non-epistemic values must play a role. I conclude that the project of managing non-epistemic values in science must extend to the very foundations of inductive logic.

Induction without Rules

Kevin Davey

It is commonly assumed that science depends on a rule of induction that lets us infer unobserved facts from observed ones. While thinkers like Norton propose a patchwork of local inductive rules, I argue that even this view is implausible. Instead, I suggest we abandon the notion of inductive rules altogether. Claims about the unobserved are justified directly by background knowledge and observation, without the need for overarching rules. Even in resolving doubts or disputes about induction, careful review or additional evidence—rather than rules—is typically sufficient, both in practice and in theory.

Thermodynamics at Small Scales: A Case for Stochastic Thermodynamics at Strong Coupling

Aditya Jha

I argue that extending thermodynamics to small systems exposes background assumptions that are largely invisible in its traditional macroscopic domain. Using mesoscopic stochastic thermodynamics, I examine the underappreciated weak-coupling idealization—negligible system–environment interaction—which normally secures an unambiguous split between heat and work. Drawing on a current debate (Talkner & Hänggi 2016; Seifert 2016; Jarzynski 2017), I show that in the strong-coupling regime this demarcation becomes partly conventional and renders heat especially ambiguous. The key reason is that work is then defined via the Hamiltonian of Mean Force for an effective system, rather than by changes in the system's bare Hamiltonian, which generally differs from the HMF. I then assess contrasting philosophical responses amongst physicists concerning this (dis)ambiguation—essentialism versus functionalism—found respectively in Pucci et al. (2013), Cohen & Mauzerall (2004), Talkner & Hänggi (2016, 2020), and in Jarzynski (2007, 2017) and Seifert (2016).

New Balances: Finding Equilibrium in Integrable Quantum Statistical Mechanics

Eugene Chua and Yichen Luo

Philosophers have worried that some systems -- black holes (Dougherty & Callender 2016), self-gravitating systems (Robertson, 2019), relativistic systems (Chua & Callender forthcoming) -- are not really thermodynamic. We argue that a similar breakdown occurs in quantum statistical mechanics. Classically, and (typically) in the quantum domain of non-integrable systems: macroscopic observables relax to microcanonical values, small subsystems look Gibbsian, finite temperatures track mutual equilibrium, and equilibration washes out initial conditions. However, in the fuller quantum domain, much of this package fails. Quantum 'scarring' preserves nonthermal behavior for atypical initial states even for non-integrable systems; integrable and many-body localized systems relax to generalized Gibbs ensembles

constrained by additional (quasi-)conserved quantities, and temperature alone cannot play its Zeroth-Law role; driven Floquet systems approach infinite-temperature states. However, we argue that equilibrium reasoning -- generally construed -- can continue by finding the right scales, observables, and suitable regime-specific conditions of applicability, even when classical thermodynamics itself no longer applies.

Relational Information: Towards a New Kind of Information in Quantum Mechanics

Niccolò Covoni, Marco Sanchioni

This talk argues that von Neumann entropy plays two conceptually distinct roles in quantum theory. When applied to global mixed states, it expresses the quantum analogue of the informational entropy. But when applied to reduced states of entangled systems, it measures objective physical correlations. We propose that this second usage realizes a new informational kind, which we call relational information. Unlike information in communication theory, it reflects structural interdependence between systems, not probability about a certain outcome. We further suggest that this informational kind has ontological significance: relational information is a physically instantiated feature of entangled systems, and not merely an agent-relative concept.

Oral Session 2

Seminar Room 6: History and Philosophy of Science: Integrated HPS and Methodology

Inventing Risk: A Subjectivist Perspective

Caterina Sisti, Luca Zanetti

This paper examines the notion of objective probability, or chance, in the works of early subjectivists, particularly Frank Ramsey and Bruno de Finetti. To this end, we propose a clarification and characterisation of Ramsey's notion of chance and of its objectivity as agreement among agents and convergence of their degrees of belief, drawing on an independent suggestion by de Finetti regarding Knight's distinction between risk and uncertainty. The interpretation we propose allows us to preserve the epistemic and pragmatic spirit of subjectivism while explaining how a meaningful sense of objectivity can emerge within it, a feature that is still relevant in contemporary debates on the foundations and applications of probability.

An integrated HPS approach to methodological ideals in linguistic relativity research

Ilir Isufi

The linguistic relativity hypothesis states that language influences thought, so that speakers of different languages think differently about the world. While this thesis was initially put forward within the field of anthropology, the cognitive revolution of the 1950s and the subsequent formation of the field of cognitive science dramatically changed the scene. Nowadays, most cognitive science is conducted by experimental psychologists. This has also impacted linguistic relativity research, which has moved from anthropology to experimental psychology in the lab, following specific research methods. According to these, language needs to be isolated from culture, which is treated as a confounding variable, so that language-specific causal contributions to cognition can be identified. I argue that replication failures in linguistic relativity research are partly the result of historically contingent methodological ideals inherited from experimental psychology. An integrated HPS perspective reveals why anthropologically grounded approaches have been systematically marginalized despite their epistemic advantages.

The Practical Function of Modern HPS

Fons Dewulf

"Ever since the inception of HPS, its scholars have disagreed about its aims and methods. In these discussions, one mostly finds a similar origin story of HPS, focusing purely on intellectual motivations: in the early 1960s, Hanson, Feyerabend and Kuhn used the history of science to make philosophical theories of science concrete, countering the logical empiricists' empty formal models. Supposedly, these efforts cemented widespread interest in HPS.

I will argue that this classical origin story is misguided for two reasons. First, it neglects important efforts by atom bomb scientist just after the Second World War. Second, it obscures the broader socio-cultural motivations for universities to invest in HPS. I point out that HPS emerged primarily due to its potential as a mediator between science and its socio-cultural environment. HPS, I argue, should take this cultural context of its own emergence to heart in discussions on its aims and methods."

Oral Session 2

Seminar Room 7: Philosophy of the Cognitive Sciences: Perception and Imagination

Do Androids Imagine Electric Sheep? Radical Simulationism and AI Imagination

Jake Hawthorne

According to orthodox simulationism, episodic memory is a past-directed form of episodic imagination. For a subject *S* to remember an episode *e*, *S* must possess a representation of *e*, and this representation must be produced by a construction system that is properly functioning, episodic, and aimed at producing a representation from *S*'s personal past. Recently, Michaelian (2024) has developed radical simulationism, which abandons the personal past condition. This is to remove the ambiguity Michaelian sees in the notion of the personal past. In this paper, I object that this entails that many of the videos produced by video-generating artificial intelligences (VGAs) are imaginings. This misconstrues episodic imagination, as these videos do not possess an essential feature of episodic imagination—namely, autonoesis. I conclude by suggesting that the simulationist can avoid the ambiguity associated with the personal past by incorporating a representation of the subject's body into it.

Illusionism in Intensity Discrimination: a psychophysical analysis of the user-illusion

Hyungrae Noh

This paper develops a psychophysical analysis of Dennett's user-illusion account by examining intensity discrimination under the Weber–Fechner law. Qualia realists assert that distinct phenomenal states within a single sensory dimension (e.g., '100g-qualia' vs. '200g-qualia') are necessary for perceiving stimulus differences. Drawing on cross-species data—from human psychophysics to bacterial chemotaxis, both captured by the Weber–Fechner law—I show that logarithmic encoding of intensity arises from non-conscious algorithmic processes without invoking qualia. I then present a debunking argument for illusionism: an independent explanation of our phenomenological intuitions demonstrates that, if qualia spectra truly underlay discrimination, their systematic correlation with behavioral thresholds would constitute an implausible coincidence. Given this cross-species evidence, the phenomenological intuitions are debunked: neural mechanisms of intensity discrimination operate independently of qualia. Thus, sensory discrimination exemplifies Dennett's view that consciousness is a representational interface lacking causal power, motivating a targeted elimination of qualia realism in perception.

A Geometrical Account of Imaginative Resistance

Jianlang Yin

Imaginative resistance refers to the difficulty in imagining scenarios such as morally deviant worlds or logical contradictions. Existing accounts either have a limited scope or appeal to unexplained inferential mechanisms shared between belief and imagination. Drawing on Gardenfors' theory of conceptual spaces, I propose a unified geometrical explanation: imaginative resistance arises from the difficulty of voluntarily constructing representations that violate the geometrical constraints of our conceptual spaces.

I explain three types of resistance: Constitutive resistance arises from separating integral dimensions or adding unrelated ones (e.g., imagining pain without intensity or a green melody). Topological resistance occurs when a representation must occupy disjoint regions simultaneously (e.g., imagining something red and green all over). Mapping resistance arises from distorting established mappings between different spaces (e.g., imagining killing a baby is morally right). By explaining resistance geometrically, this account unifies moral and non-moral cases and explains why resistance is graded rather than absolute.

Oral Session 2

Seminar Room 8: General Philosophy of Science: Models, Data, and Simulation

Beyond “More or Less” Detail: Abstraction Levels in Scientific Explanation

Jietong Xu

Models are widely used in scientific explanation (Bokulich, 2017). Various kinds of levels are involved in models, including mechanistic levels, organizational levels, metaphysical levels, and their significance for explanation has been extensively studied (see Robertson & Wilson, 2024). By contrast, the question of whether abstraction itself gives rise to explanatorily significant levels has received less attention. When abstraction is often regarded as omitting details in a description (Kuokkanen, 2022; Levy & Bechtel, 2013), Robertson and Wilson (2024) suggest that the distinction between less-detailed and more-detailed descriptions bears little epistemic significance.

This paper challenges this view. I argue that abstraction levels, often understood as less-and more-detailed descriptions, are explanatorily significant because different abstraction levels display distinct structures, and because the epistemic consequences generated at one abstraction level are not reducible to those available at another. The argument proceeds in three steps.

Evaluation of Bogen-Woodward Framework: Contextualising Phenomenon-Data Relationship in Scientific Enquiries

Varun Bhatta

Bogen and Woodward (BW) argued that scientific theories do not explain data, but only phenomena (1988). Woodward (1989) further clarified that phenomena are not inferred “downward” from theory, but rather “upward” from data. The BW framework has received a spectrum of responses. Some scholars like Schindler (2007), Tal (2011) and Lusk (2021) have identified case studies that challenge Woodward’s proposal that phenomenon-identification is only upward, from data to phenomena. None of these critics, however, further clarifies why the BW-framework fail in these cases. I argue that the current confusion is due to not contextualising inferences in specific enquiries. Woodward’s analysis of his claim is situated in hypothesis verification. In contrast, Schindler’s and Tal’s case studies are situated in other contexts and in these, upward/downward claims do not make sense. Through this analysis, I identify a few drawbacks in the current approach to analyse scientific practice through the case-study methodology.

The Delusion of Simulations as Higher-Order Evidence: A Comparative Study on Rarity-Based Cosmology

Tianzhe Cozette Shen

Computer simulations play a significant role as higher-order evidence in scientific practice. In contemporary cosmology, large-scale cosmological simulations are oftentimes used to test a cosmological model, commonly by locating analogs of rare celestial events/phenomena/systems, like a colliding galaxy cluster. Multiple studies based on different simulations were conducted to locate analogs of the Bullet Cluster, while the outcomes are conflicting. By reconstructing their logic(s), I argue that this method’s logic is inherently flawed, and accordingly, simulations as higher-order evidence can be delusional mainly for two reasons: (1) there is no proper measure of similarity or resemblance to our universe, and (2) the idea of rarity is not quantitatively well-defined. We can meaningfully compare neither these studies with each other, nor one such study with real observations, with generalizability to other sciences like (paleo)ecology and (paleo)climatology. I also consider alternative approaches to rarity-based simulation studies.

Oral Session 2

Seminar Room 9: Philosophy of Technology and AI: Machine Speech, Content Alignment, and LLMs

Machine speech: the very idea

Matthew McKeever & Xindi Ye-Martinsky

This paper is about the question of machine speech—whether sophisticated machines, such as LLM-based chatbots, speak. I argue that responses to the question of machine speech fall into two camps: the deepists, who say that internal architecture and processes determine whether a machine speaks (Block 1981, Bender and Koller 2020, Chomsky 2023, Shanahan 2023), and the shallowists, who say that external behaviour determines whether a machine speaks (Turing 1950, Dennett 1987, Chalmers 2023). Which side is right? I argue that both deepists and shallowists latch on to important aspects of how we think about speech. But given that the meaning of words like ‘speaks’ is too underdetermined, it’s unlikely that we will come to consensus about the question of machine speech via descriptive analysis alone. What we should focus on, instead, is a normative analysis of speech—of what speech should be, or what ‘speaks’ should mean.

The problem of human-AI content alignment

Nikolaj Jang Lee Linding Pedersen

The issue of how to align the values implemented by AI systems with human values has received a great deal of attention in AI research, as it is regarded as a key component of AI safety. Aligning AI values with human values will help mitigate AI risk. This talk introduces the problem of human-AI content alignment and explores its connection to value alignment. Let ‘human content’ denote content featured in human minds or expressed by human language, and let ‘AI content’ denote content configured by AI states or expressed by AI outputs. How can alignment between human content and AI content be achieved, and why is it important? This talk does three things. First, examples of content misalignment are provided. Second, it is argued that failures of content alignment sometimes bring with them failures of value alignment. Third, considerations on how to address the problem of content alignment are offered.

Large Language Models are Fundamentally Next Token Predictors

Yue Ma

The prevailing consensus posits that Large Language Models (LLMs) are next token predictors (NTPs). Recently, three philosophers have challenged this view based on two central ideas. First, they argue that characterizing models merely as NTPs is a significant underestimation. Second, based on a deconstruction of the training process, they advance the Function and Explanation Objections. I aim to defend the Grounding View—the thesis that LLMs are fundamentally NTPs. This position acknowledges that models possess emergent properties, but maintains that the generation of these properties remains grounded in the process of token prediction. I argue that only the latter idea constitutes a potential rebuttal to my position. Furthermore, I contend that objections based on the training process are mistargeted. I will illustrate my point using the “Swamp Model” thought experiment.

Lightning Presentations

Seminar Room 7: HPS, Physics, Metaphysics

Reichenbach's probabilistic Realism - In what sense it can be compatible with contemporary pragmatic realism?

Hyung goo Kang

Hans Reichenbach(1891-1953), who was an eminent philosopher of Logical Empiricism, defended a weak version of scientific realism in his *Experience and Prediction* (1938). His version of scientific realism can be characterized as “probabilistic realism”, because he repeatedly emphasized the concept of probability in his epistemology and exhibited a clear commitment of its centrality in his scientific realism. But his realism can be also characterized as ‘pragmatic realism’, because he argued that the probability concept can make scientific propositions(sentences) “usable(available)” for our scientific practices. If Reichenbach's probabilistic realism was a kind of pragmatic realism, then what is the relation between his version of realism and contemporarily reviving pragmatic realism such as Hasok Chang's active realism(Realism of realistic people, 2022)? In this paper, I will compare Reichenbach's realism with Chang's realism and argue that they are on a continuous line of empiricist tradition.

Between Realism and Perspective: The Limited Force of Massimi's Perspectival Realism”

Kai Zhang

This paper critically examines Michela Massimi's perspectival realism as a proposed middle ground in the debate between scientific realism and anti-realism. It argues that while Massimi's account offers a compelling, practice-oriented account of how perspectival science can yield knowledge of a mind-independent world, it ultimately constitutes a weaker form of scientific realism rather than a fundamentally distinct position. First, I distill the core commitments of traditional scientific realism – metaphysical, semantic, and epistemological – to establish a baseline for comparison. Second, I provide a detailed exposition of Massimi's perspectival realism. Third, I identify internal tensions within Massimi's account – the key concept of “lawlike dependency” is critically underdeveloped, and her theory of truth struggles to bear its heavy epistemic load. Finally, I argue that Massimi's perspectival realism shares metaphysical and epistemological stances, yet licensing fewer realist commitments without surpassing traditional realism in resolving its central challenges.

Quidditism and Laws of Nature

Ju Yeon Kim

Quidditism holds that fundamental properties possess primitive identities independent of their nomic roles. This commitment generates Ramseyan Humility: multiple qualitatively indiscernible worlds could be actual, and we cannot know which one is. While this epistemic cost is often accepted as unavoidable, its extent depends on one's theory of laws. I introduce a framework distinguishing the Mosaic (M), the qualitative pattern of a world, from the Quiddity Mosaic (MQ), which adds facts about which properties realize that pattern. Under Humean Supervenience (HS), laws supervene on MQ, yielding exactly k indiscernible worlds. Under Anti-Humean Supervenience (AHS), laws are primitive and independent of MQ, expanding the ignorance space to at least $k \times m$ worlds. I argue that AHS-Quidditism incurs additional costs: it violates both Occam's Razor and Hume's Razor simultaneously, and generates “double humility”, the independent ignorance of both quiddities and laws. Quidditists should therefore prefer Humean Supervenience.

The parallel between pure mathematics and analytic metaphysics. What can we learn?

Fabio Ceravolo

Pure mathematics is applicable and therefore valuable. Mainstream analytic metaphysics is also applicable, in a similar sense. Therefore, withholding value from mainstream metaphysics requires special justification. Recent philosophers endorse versions of this argument but the first premise makes the applicability of mathematics sufficient for value and ‘applicable’ is polysemous. It is not clear that on every reading of this term being applicable guarantees value. So I recommend a different parallel between pure mathematics and metaphysics. Take the class of past events that we would agree to consider causal outcomes of mathematics ‘being used for scientific purposes’ (on reasonable interpretations of that phrase). Some such events are good in respects that critics of metaphysics do not deem trivial. Therefore, critics should not argue from the value of these consequences to blanket claims that applying metaphysics to science has only trivially good outcomes. Any justification for such claims must come from elsewhere.

Lightning Presentations

Seminar Room 7: HPS, Physics, Metaphysics

Reduction and Reductive Explanation: From Statistical Mechanics to Statistical Physics

Nanxin Wei

Philosophical discussions of statistical mechanics often frame it as a reduction of thermodynamics via two approaches: Boltzmannian and Gibbsian statistical mechanics. Although complementary, the Boltzmannian approach is typically regarded as more fundamental due to its clearer ontological commitments, while the Gibbsian approach is favored by practicing physicists for its computational power. However, the orthodox Boltzmannian approach has limited scope for underpinning modern thermodynamics, which is itself essentially statistical, and alternative conceptions of reduction may align better with the Gibbsian approach and its indispensability in practice. More importantly, philosophical work has largely overlooked that statistical physics primarily aims not at metaphysical reduction but at providing reductive explanations of complex phenomena with many degrees of freedom. The Gibbsian framework supports this explanatory role through a mode of reasoning best described as “abduction to characterization”, enabling the construction of generative mechanisms under physical constraints that produce salient characterizations of the target phenomenon.

Why unboundedness is not a problem for quantum mechanics? In response to Carcassi, Calderón, and Aidala

Zhonghao Lu

In a recent paper, Carcassi, Calderón, and Aidala argue that conventional Hilbert spaces contain unphysical states of which the expectation values of physical observables are undefined, and suggest that we should use some dense subsets of Hilbert spaces, the Schwartz spaces for instance, to represent physical states in quantum theories. I demonstrate that the existence of unbounded self-adjoint operators is the cause for their worry. I argue that we have reasons to treat all states in the whole Hilbert spaces as physically meaningful. By the spectral decomposition, physical observables represented by unbounded self-adjoint operators have a well-behaved probability distribution on any states in the Hilbert spaces, and their expectation values cannot be directly observed. Furthermore, replacing Hilbert spaces with the Schwarz spaces in quantum theories will bring many problems. More specifically, Schwarz spaces are not closed under some generic Hamiltonian evolutions, and excluding these Hamiltonians is ungrounded.

Object Boundaries, State Attribution, and Quantum Entanglement

Juhee Han

This paper examines the status of objecthood by following a conceptual trajectory from Max Black’s two-sphere example to Simon Saunders’ account of weak discernibility. Black’s case shows that numerical distinctness can depend on relational properties without appealing to intrinsic properties. By contrast, in cases of quantum entanglement, the unit of physical description shifts from the parts to the composite system as a whole. Saunders takes weak discernibility to be sufficient for objecthood, a move that leads to an ontological asymmetry between fermions and bosons. This paper argues that this asymmetry does not arise from any physical difference due to entanglement itself, but rather from a restrictive criterion of objecthood based on discernibility. Moreover, it shows that the more fundamental problem posed by quantum entanglement concerns the boundaries of state attribution rather than the numerical distinctness of objects, thereby motivating a reconsideration of system-centered approaches to quantum ontology.

Neurath’s Ballungen: A Postmodern and Feminist Reading

Sharon Yoon

Logical Empiricism *prima facie* appears to be opposed to Postmodernism or Feminist philosophy of science. However, Neurath’s anti-foundationalist and anti-reductionist position, unlike other Vienna Circle members including Carnap, can be revisited from Postmodernist and Feminist viewpoints. I will analyze Ballungen, the concept of imprecise verbal clusters that constitute everyday language, as the core of Neurath’s philosophy. Then, I will claim that Ballungen accords with Jacques Derrida’s concept of *différance*, where meaning emerges through relational differences rather than fixed reference. This postmodern reading of Ballungen as inherently non-foundational and relationally constituted extends to Donna Haraway’s notion of “Situated Knowledge” in feminist epistemology and philosophy of science. Yet unlike postmodernists/feminists who question the objectivity itself and view knowledge as subordinated to specific power structures, Neurath had the grand goal of starting from Ballungen to create an intersubjectively verifiable scientific language through which science would progress toward unified science.

Lightning Presentations

Seminar Room 8: AI, Technology, Mind

The Misleading Question of AI Consciousness: Subjectivity, Evolution, and the Limits of Functional Criteria

Qiaoying Lu, Liqian Zhou

We argue that the popular question “Can AI be conscious?” is conceptually misleading. Current debates often rely on a “checklist approach,” inferring consciousness from the presence of certain cognitive functions in AI systems. I show that such function-based criteria cannot bridge the explanatory gap between objective performance and subjective experience, as highlighted in classic discussions by Nagel and Searle. Drawing on evolutionary theories of animal consciousness, we propose that consciousness is grounded not in cognitive complexity but in subjectivity: a first-person point of view possessed by self-maintaining organisms for whom things matter. Minimal biological cases indicate that subjectivity evolved gradually and is rooted in biological organization. By contrast, contemporary AI systems lack embodied, self-sustaining, valenced organization and thus provide no basis for ascribing consciousness. We hence should start with a prior question: “What kinds of systems could host subjectivity at all?”

How LLMs Challenge Enactive Agency: A Critical Examination of Embodied Cognition in the Age of AI

Xue Yu and Zihan Gao

The unexpected success of Large Language Models (LLMs) challenges the core enactivism thesis that cognition requires biological embodiment. This paper critically examines Tom Froese’s “AI Dilemma”, which suggests LLMs may possess a “latent embodiment” derived from training data, effectively functioning as non-biological sense-makers. This paper argue against this reconceptualization by revisiting the minimal conditions for genuine agency: self-individuation (autopoiesis), interactional asymmetry, and normativity. The analysis demonstrates that while LLMs exhibit sophisticated structural mimicry, they categorically fail to possess autonomous organizational closure or intrinsic concern. Consequently, this paper conclude that LLMs simulate linguistic competence without achieving genuine sense-making. To preserve the insights of the life-mind continuity thesis, enactivism theory must maintain a strict distinction between the statistical processing of language and the authentic, lived enactment of meaning inherent to biological life.

AI and the Limits of Language: A Wittgensteinian Therapeutic Examination of AI Subjectivity

Song Jing Li

The development of artificial intelligence is deeply intertwined with philosophy’s linguistic turn. Turing’s pioneering work first explored, from a language-philosophical perspective, the possibility of machines recognizing formal languages and reasoning, while envisioning robots with human-like intelligence. Subsequent AI research has primarily focused on machines’ linguistic capabilities, ultimately leading to today’s large language models. These models demonstrate remarkable linguistic proficiency, yet fundamental controversies persist regarding their status as genuine cognitive agents and their ethical accountability. From a language-philosophical viewpoint, whether AI can qualify as a cognitive subject depends not on its ability to simulate human speech, but on its capacity for embodied interaction within the practical “lifeworld” and participation in authentic language games. Only through a paradigm shift from disembodiment to embodiment can AI evolve from an instrumental existence to a form of “co-being” as subjective entity.

Understanding Without Assuming Mental States: A Behavior-Based Framework for Animal Death Cognition

Qiushi Huang

“Can animals understand death? Susana Monsó (2021, 2022, 2024) proposes animals possess a “minimal death concept.” However, concept-centered approaches face methodological difficulties: animals are “clever black boxes” (Halina, 2024), and attributing human-like mental states risks anthropomorphism. Moreover, such approaches prematurely commit to underlying mechanisms (concepts as mental structures) before establishing phenomenal-level causal regularities, violating proper explanatory ordering between etiological and constitutive explanations (Siegel & Craver, 2024).

I propose an alternative behavior-based framework drawing on Woodward’s interventionism (2003) and Bayesian probabilistic models. Rather than inferring hidden concepts, I argue behavior itself embodies understanding. By identifying counterfactual dependence relations between death-related environmental variables and systematic behavioral responses, we can explain animal death cognition without invoking unverifiable mental representations. This framework avoids anthropomorphism, applies across species with different neural structures, and provides scientifically rigorous explanation through testable predictions rather than unobservable psychological commitments.”

Lightning Presentations

Seminar Room 8: AI, Technology, Mind

Deontic Modality, Free Choice, and Linear Logic

Jixian Yu

This paper studies Barker's resource-sensitive account of free choice (FC) inference under linear logic frameworks in [2]. We first present Barker's account and some fragments of linear logic. Then we propose: Barker's conditional variation of deontic modal sentence is inconsistent with the resource-sensitive use of $\multimap$ in general linear logic framework. Since the generality of δ eliminates the exact amount of resources required for the action, which makes the resource-sensitive use of $\multimap$ inconsistent with the conditional variation of deontic sentence. We then discuss possible solutions to the problem in contrast to Aloni's BSML and propose that both Barker's and Aloni's accounts emphasize the constructive nature of deontic modality of FC phenomenon.

How Generative Music AI Performs Gender

Minyeong Bae

This study explores how generative music artificial intelligence (AI) performs gender through auditory and musical elements, focusing on the widely used music generation model 'Suno'. It examines the system's user interface (UI) that requires the selection of vocal gender, the gendered voices and associated musical features produced by the model, and the generated lyrics. By exploring user-AI interactions, the study analyzes how a gendered, fictional vocal subject is constructed through this process. Rather than treating generative music AI as a tool for mere imitation or representation, this study conceptualizes it as a digital-technical performative apparatus through which gender is enacted in sound and music, highlighting new forms of technologically mediated gender construction.

Embodying Chronic Shame: A Feminist Enactivist Approach

Valencia White, Anthony Chemero

This paper adopts a feminist, non-individualist philosophy of mind to argue that chronic shame arises from distorted social interactions and manifests in one's embodiment. Examining its functions, we detail how chronic shame becomes an oppressive form of embodiment in women, drawing on feminist scholarship to highlight shaming social pressures targeting female bodies and behavior. We outline gender as an embodied practice sustained through interactions with others. Utilizing enactivist cognitive science, we demonstrate how identities are co-constructed through environmental interactions. Subsequently, we analyze the perpetuation of chronic shame as an embodied behavior upheld by interactions that preserve gendered power imbalances. Ultimately, chronic shame constitutes an interactional asymmetry, demanding women sacrifice their sense of

self and affective self-regulation to foreground others' embodied needs and expectations. Finally, we argue that embodied resistance, with a focus on self-regulation in social interactions, can be a tool in mitigating chronic shame.

Seeing What to Do: An Imperativist Account of Affordance Perception

Yukun Chen

I argue that affordance perception has directive rather than descriptive experiential content. It's commonly assumed that perceiving affordances (re)presents the environment as affording an actions (e.g. "the stairs are climbable"). Against this, I defend an imperativism, on which affordances are experienced in an imperative format ("DO ϕ !"), presenting the environment as calling for action. For soliciting affordances (i.e. those exerting a felt "pull" toward action) imperativism is parsimonious and phenomenologically adequate. It avoids positing an unmotivated transition from descriptive contents to directive states and better reflects the overall structure of the solicitation. This account finds support in neurological evidence. The dorsal stream's AIP-F5 network automatically translates perceived object properties into motor commands, with F5 neurons encoding action goals rather than objects. Medial premotor areas modulate these directives through inhibition, prioritization and planning, which is an architecture naturally understood as operating over directive contents that can be suppressed or weighted.

Lightning Presentations

Seminar Room 8: AI, Technology, Mind

Caring-Counseling: Zhu Xi's Learning Theory and Its Moral Implications for Alleviating Learned Helplessness

Fengyuan Wang

“Learned helplessness, a psychological condition arising from repeated exposure to uncontrollable adversities, manifests as motivational and cognitive impairments and is often implicated in academic misconduct. While conventional interventions such as attributional retraining and cognitive-behavioral therapy present limitations, the Neo-Confucian learning theory of Zhu Xi provides a culturally resonant alternative. His framework prioritizes: (1) “learning for the self” (wei ji zhi xue) to reconstruct agential subjectivity amid external pressures; (2) “dialogical engagement” as a pedagogical practice to articulate learning obstacles and cultivate collaborative support networks; and (3) disciplined methods of reading and self-cultivation. Crucially, Zhu Xi integrates moral reflection into learning process, endowing his approach with ethical dimensions that embody relational care and self-care. Consequently, his theoretical system serves as a resource for philosophical counseling, offering insights from the Chinese intellectual tradition to inform contemporary psychological strategies for addressing learned helplessness.

Keywords: caring-counseling; moral implications; learned helplessness; Zhu Xi; learning theory

Epistemic Innocence and the Episodic-Semantic Distinction

Jethro Daryll Pugal

In Epistemic innocence and the production of false memory beliefs, Katherine Puddifoot and Lisa Bortolotti view three broad categorizations of false memory beliefs, and argue that they must be assessed as epistemically innocent, as opposed to the intuitive view that they are epistemically harmful. While the paper remains neutral on the type of memory, most of their examples are better described as both episodic and semantic memories, referring to Endel Tulving's distinction. I propose to improve on this view by looking closer at Tulving's distinction, and mapping them out to Kourken Michaelian's metacognitive position where I treat semantic memory as the belief-endorsing mechanism, while episodic memory serves the function of information-production. I believe that this account offers a more complete view of the epistemic innocence of cognitive mechanisms, particularly in memory, and contributes to the overall epistemology of memory.

Lightning Presentations

Seminar Room 9: General Philosophy of Science

Scientific Testimony Beyond the Lab: Simplification, Hype, and the Limits of Justification Reporting

Axel Gelfert

This paper examines science communication as a philosophical problem arising from the circulation of scientific claims beyond specialist communities in contexts marked by selective distrust in science. It focuses on selective uptake, whereby lay audiences reject particular public scientific testimony despite broadly accepting scientific authority, and argues that traditional consensus reporting is often ineffective under these conditions. The paper assesses the recently proposed alternative of Justification Reporting, which demands that scientific justification be made explicit in public reporting. While philosophically well-motivated and aligned with core features of scientific practice, Justification Reporting faces practical limitations when adapted for non-specialist audiences. These limitations are explored through a case study of media coverage of experimental plant physiology research on stress induced airborne sound emissions, widely framed through anthropomorphic metaphors. The paper argues that such oversimplification undermines epistemic warrant, challenges assumptions about scientific testimony, and risks assimilating Justification Reporting to consensus reporting.

Epistemic trust injustice in public health and how to ameliorate it

Elena Popa

Trust plays a key role in public health. The success of guidelines and recommendations requires a trusting relation between scientists, policymakers, practitioners, and members of the public. This makes warranted distrust especially among groups that have suffered oppression, but also more broadly in contexts where the relevant institutions involved are not sufficiently trustworthy, a problem. The term ‘epistemic trust injustice’ refers to cases where the conditions that ground public trust in experts, or enable public access to scientific knowledge, are not met, especially for members of oppressed groups. This can bring about additional harm, as it can limit access to needed health services or relevant medical knowledge. In this paper, I will explore several amelioration strategies, starting from increased attention to population-level approaches in public health, which are more likely to target the needs of marginalized groups, structural competence among healthcare professionals, and participation from the relevant stakeholders.

Bias and the Base Rate: revisiting ‘Why most published research findings are false’

Kit Patrick

In his widely cited 2005 paper, Ioannidis argued that bias makes most published findings false. He attempted

to establish this not on the basis of empirical studies but rather from a formal model of scientific research. The paper became a modern classic and remains influential in academia and beyond. However, we have been misreading Ioannidis’s formal model. For it actually shows that bias cannot explain most falsehoods. And, once we clearly understand the role bias plays in Ioannidis’s model, we can see that there are other sorts of bias it excludes that are more prevalent, and which counteract the second-rate effects of the bias he does consider. Moreover, empirical evidence gathered in the years since 2005 indicate that bias in Ioannidis’s sense isn’t prevalent enough for his argument to succeed. So, in fields of science where we find an over-abundance of falsehoods, we must look for alternative explanations.

Reliability-Preserving Pivots and Epistemically Justified Pivot Penalties

Anish Seal

A recent Nature article reports the “pivot penalty in research” (Hill et al., 2025): a general pattern whereby work researchers produce after professional (research) pivots tends to garner significantly less impact than pre-pivot work. This presentation abstracts from the extent to which actual cases of reduced impact have robust epistemological significance. Instead, it focuses on the normative modelling task of discerning when reduced impact, once understood as evidence that a researcher’s post-pivot work is less reliable than their pre-pivot work, has epistemic justification. In particular, I focus on pivots where methods considered reliable in pre-pivot domains are deployed in post-pivot domains with respect to which they are novel. I propose three jointly non-exhaustive, domain-general conditions tracking the extent to which such methodological adaptation respects standards of reliability in both the pre- and post-pivot domains. I conclude by noting some implications for the conservatism-versus-creativity debate in the social epistemology of science.

Reframing Simplicity: Defending Its Truth-Conduciveness with a Two-Step Model of IBE

Chenyang Lu

Many try to fit Inference to the Best Explanation (IBE) into Bayesianism by treating explanatory virtues like simplicity as properties raising an explanation’s probability. However, this approach cannot explain why auxiliary hypotheses would ever be needed, precisely what simplicity is often measured by. Nor can simplicity straightforwardly improve explanatory goodness: the conditions under which simpler explanations score higher on explanatory goodness would screen off any independent role for simplicity in producing that increase. Hence probability and explanatory goodness should be integrated systematically rather than treated in isolation. Instead of integrating them into a single function, I propose a two-step model of IBE: first, filter for “good

Lightning Presentations

Seminar Room 9: General Philosophy of Science

enough” explanations using explanatory goodness; second, evaluate the remaining candidates by probability and form beliefs accordingly. This model is compatible with Bayesianism, preserves a monotonic link between simplicity and probability, and better matches IBE in practice. Accordingly, truth-conduciveness means benefiting explanations in either step.

Higher-Level Causal Explanations, Spurious Specificity, and Model-Based Proportionality

Jiaming Zhan

List and Menzies (2009, 2010) argue for the autonomy of higher-level causal explanations by appealing to proportionality—the requirement that a cause be at the right degree of specificity, neither too abstract nor too detailed. They argue that a proportional cause, identified through a counterfactual test, can exclude both more abstract and more detailed candidates, thereby securing its autonomy. However, their account faces the spurious specificity challenge—the problem that conjunctive candidates artificially satisfy proportionality and threaten to displace non-conjunctive causes that are frequently used in ordinary causal reasoning. To address this, I propose model-based proportionality. Within a well-formed causal model, structural rules and model-specific evaluative information filter out illegitimate candidates before applying proportionality. This approach not only resolves spurious specificity in a principled way but also preserves the autonomy and practical utility of ordinary higher-level explanations.

Mechanistic Explanations in History: A Case Study

Yifan Li

This paper examines Ellen Meiksins Wood’s explanation of capitalism through the lens of the mechanistic approach to explanation. The paper argues that her explanation is recognizably mechanistic yet differs significantly from the paradigmatic mechanistic explanations in the literature. Her explanation is mechanistic in that its about how the system-level tendency came out from the interactions between the components of the system, i.e., landlords and farmers. It is distinctive in two ways: first, besides the usual (de-)compositional structure of mechanistic explanations, it contains a genealogical element beside showing how a society became capitalist. Moreover, the explanatory strategy of the genealogical element involves an interesting positive feedback loop structure. Second, it also aims at showing the compulsiveness of capitalism by accounting for the robustness and causal power of the tendency by pointing out features of the agent-level interactions. This demonstrates how mechanistic explanations can be adapted to satisfy diverse explanatory goals.

Evaluating understanding without its content: a process-based account

Congjia Zhou

What is understanding? Candidates include knowledge, epistemic achievement, intelligibility, grasping, a cluster of abilities, etc. Abilities may include answering related questions, using theories properly, being able to give an explanation, etc. In this paper, I will give a critical review of the above accounts, in order to argue: (1) to understand is to grasp, and (2) understanding consists of the grasping process plus the result of grasping. That means to evaluate one’s understanding, one needs to not only check the result of grasping but also justify the process. The result of grasping concerns the process *per se*, not its content or object. To do that, I argue that understanding is not knowledge or anything that looks like a propositional attitude. Unlike those ability accounts and hybrid accounts, mine is mainly normative and can draw a clear line between explanation and understanding.

Epistemic Infrastructure and the Mechanization of Proof: Neuro-Symbolic AI, Formal Verification, and the Politics of Mathematical Knowledge

Fan Yang

Neuro-symbolic AI systems are reconfiguring what “proof” means in contemporary mathematical practice. This paper argues that formal verification should be treated not as a binary property of a proof text, but as an infrastructural achievement sustained by socio-technical dependencies (standards, libraries, maintenance, and governance). Building on bi-level epistemology, it distinguishes an infallibilist first-level justification delivered by proof-assistant kernels from a fallible second-level justification grounded in human-managed infrastructure and semantic interpretation. A three-layer L1–L3 framework (kernel verification; heuristic search; socio-technical embedding) clarifies why neuro-symbolic provers suppress step-level errors while concentrating risk at the translation interface between informal intent and formal specification. The paper concludes with normative proposals—provenance-first artifacts, decoupled evaluation of translation vs. reasoning, human-in-the-loop interaction, and recognition of library maintenance as epistemic labor—to sustain trustworthy “industrialized proof.”

Probabilities of counterfactuals and imaging

Jingzhi Fang, Jiji Zhang

The truth or assertability of a conditional is often linked to its corresponding conditional probability, a principle known as Adams’ thesis. According to Stalnaker’s hypothesis, the probability of a counterfactual is equivalent to the conditional probability of the consequent given the antecedent. However, this equivalence leads to a triviality result shown by Lewis and is recovered when conditioning is replaced by a more general probability revision operation known

Lightning Presentations

Seminar Room 9: General Philosophy of Science

as “imaging”. The equivalence between probabilities of counterfactuals under Lewis’ semantics and the corresponding imaging probabilities does not hold in general. This work identifies the specific conditions under which this equivalence can be restored by refining Lewis’ semantics or specifying the imaging operation. Building on this connection, we propose a probabilistic semantics for counterfactuals, grounded in the updated probabilities generated by imaging.

Covid-19 in Retrospect: Reassessing the Role of Modeling in Policy-Making

Arnon Levy

The role of scientists in shaping policy is philosophically interesting and has concrete socio-political significance. But while policy-relevant science, as such, has received significant attention, there isn’t much discussion of the roles of different sorts of science and scientists vis-à-vis policy. In this paper I want to take a few initial steps on this score, focusing on models and modelers, especially during the Covid-19 crisis. I begin by reviewing some work on Covid-19 science-for-policy – by Birch, Winsberg and Harvard and Broadbent and Streicher. Against this background, I argue, first, that responsibility for both the process and outcomes of policy-making should rest chiefly with political leaders. Second, that political leaders must be better informed about the role and limitations of models. Finally, that a fundamental lesson of the pandemic is the need to base policy-making, perhaps in a crisis, on a range of modeling tools and approaches.

Oral Session 3

Seminar Room 4: Philosophy of the Physical Sciences: Quantum Foundations

Violating Statistical Independence: the problem of Fundamentality

Gabriele Cafiero, Luca Molinari, Jonte Hance

In this work we approach the issue of theories that introduce a violation of statistical independence as a means of circumventing Bell's theorems, highlighting that some of them have the character of a more metaphysical than scientific proposition. After a review of such proposals, we present a distinction between two types of superdeterministic theories, naive (NSD) and metaphysical (MSD) ones, and show how NSD presents significant epistemic flaws. We illustrate how NSD justifies itself through claims to fundamentality, thus connoting itself as a metaphysical proposal rather than a scientific one. We finally show that the most developed MSD model so far, Invariant Set Theory, implicitly proposes a confused form of priority monism. Our paper thus reinforces the thesis that theories should demonstrate rather than presuppose their fundamentality and that it is methodologically flawed for them to assume fundamentality with the sole purpose of defending against criticisms.

Phenomenology and Quantum Physics: Cutting the Chain of Correlations?

C. D. McCoy

Steven French's recent book *A Phenomenological Approach to Quantum Mechanics* (OUP 2023) elaborates what he characterizes as a phenomenological approach to understanding measurement in quantum mechanics, where "phenomenological" here refers not to the context of experiment, as it usually does in physics, but rather to the philosophical program of Edmund Husserl. Husserl's transcendental phenomenology, developed roughly in the first half of the 20th century, aims to disclose universal, essential structures of consciousness through a presuppositionless inquiry into conscious experience. In this paper, I argue that French's proposal is not based on a correct understanding of Husserl's views or phenomenology more generally, and furthermore that the problem of measurement addressed by this view is not even unique to quantum mechanics but instead arises also in classical statistical theories, such as classical statistical mechanics.

Algebraic Quantum Gunk

Isaac Wilhelm

When arguing over the structure of physical reality, metaphysicians often appeal to Newtonian mechanics, non-relativistic quantum mechanics, and other theories fairly far removed from the quantum field theories studied in physics today. This paper shows what metaphysicians stand to gain from focusing on more up-to-date theories, like quantum field theories, instead. Specifically, I show that certain algebraic quantum field theories (AQFTs) support an interesting argument for mereological gunk.

The paper proceeds as follows. To start, I summarize the AQFT framework which will be relevant here, and I explain the important role which projections play in that framework. Then I propose an analysis of mereological parthood among the physical structures which projections represent. Finally, by combining that analysis with well-known results that physically reasonable AQFTs generically involve type III von Neumann algebras (factors)—algebras with no nonzero minimal projections—I formulate an argument for mereological gunk.

Oral Session 3

Seminar Room 6: Formal Philosophy

The Disastrous Implications of the Argument from a Bad Lot

Seungbae Park

The argument from a bad lot (ABL) has three disastrous implications on the pessimistic induction (PI). The first one is that the conclusion of PI requires the disprivilege principle that most current theories are more likely to be picked out from bad lots than from good lots. The second one is that the inference from the premise to the conclusion of PI requires the privilege principle that the conclusion is more likely to be picked out from a good lot than from a bad lot. The third one is that ABL makes it more likely that PI is infinitely problematic.

Proof, Computer and Mathematical Agent

Min Cheol Seo

This paper critically examines Hamami and Morris's plan-based account of proof and proof understanding, arguing that its core thesis—that a written proof is an isomorphic report of a rational plan—is fundamentally challenged by machine-assisted proofs exhibiting strategic autonomy, most notably, McCune's automated proof of the Robbins Conjecture. Further, I demonstrate that the “as-if” stipulation introduced to address understanding of such cases destabilises the theory, divorcing the text from the prover's planning rationale and reducing understanding to post hoc rationalisation. To address this tension, I propose a framework called, Stratified Intentionality: a four-layer architecture disaggregating proof construction into Theorem-level, Strategic, Tactical, and Operational commitments. This hierarchical model accommodates the distributed nature of modern mathematics, where high-level strategies may be human while operational layers are algorithmically generated. Understanding, I argue, consists in recognising Intentional Realisation, where lower-level operations fulfill higher-level strategic constraints.

When the Practice Doesn't Settle Philosophy

Chanwoo Lee

The practice-oriented approach to philosophy of science heeds the scientific practice, but the practice is not always sufficient for deciding the relevant philosophical questions. To complement this approach, I suggest a further methodological norm that, given two options equally well-supported by the scientific practice, we should prefer an option that is more philosophically neutral. I call this the 'Neutrality Norm'. As case studies, I consider two debates on set-theoretic practices and illustrate how the Neutrality Norm can inform them. Also, I provide two independent arguments for the Neutrality Norm, arguing that it aligns with the spirit of the practice-oriented approach and enjoys support from general epistemological considerations.

Oral Session 3

Seminar Room 7: Philosophy of the Cognitive Sciences: Predictive Processing and Active Inference

Integrating Phenomenological Insights into Predictive Processing: The Case of The Paradox of Pain

Junjie Huang

Pain poses a long-standing paradox: it is epistemologically accessible only through first-person experience, yet it seemingly demands an objective, physicalist explanation. This paper addresses this tension by integrating predictive processing theory with phenomenological analysis. It argues that pain is not generated by nociceptive input alone, but by the precision-weighted prioritization of bodily threat signals within a hierarchical predictive system. Phenomenological accounts constrain this model by specifying the experiential structures that any adequate explanation must capture, while predictive processing provides a generative mechanism for those structures. The paper proposes a non-reductionist interpretation of pain, according to which its unity lies in its functional role within a biologically and socially shaped predictive hierarchy. The so-called pain paradox is thus re-interpreted as a failure of alignment between explanatory perspectives, rather than an ontological dilemma.

Reclaiming Realism for Models of the Free Energy Principle: A Perspectivist Account

Yihan Jiang, Yuyou Wu

The free energy principle (FEP) has emerged as a unifying framework in biology and cognitive science, yet realist interpretations of the active inference models remain contested. A growing instrumentalist consensus holds that, because these models rely on heavy idealization and permit explanatory pluralism, they cannot be veridical descriptions of cognitive architecture. In this talk, we defend a realist interpretation by arguing that these critiques presuppose an outdated “God’s-eye” conception of scientific realism. Drawing on perspectival realism (Massimi 2022), we show that models need not offer literal, isomorphic depictions of their targets to be truth-apt; rather, idealization and pluralism are compatible with capturing mind-independent reality from specific scientific vantage points. We further supplement this account with the real pattern theory, arguing that FEP models are realist insofar as they track objective, large-scale patterns in neuronal dynamics at particular scales of resolution.

Naturalizing Sosa’s Virtue Epistemology: An Active Inference Perspective

Stephanie Chng

This paper draws on cognitive science—specifically, Karl Friston’s active inference framework as applied to cognition—to examine Ernest Sosa’s framework of virtue epistemology. I argue that Sosa’s framework is naturalistically implausible and lacks naturalistic utility; with both ultimately undermining his attempt to properly naturalize epistemology. The central problem of Sosa’s framework lies in his empirically tenuous, and normatively unhelpful, distinction between animal and reflective knowledge. First, it is inconsistent with predictive-processing theories about how the brain works, under which first- and second-order knowledge are governed by the same underlying inferential mechanism. Second, Sosa’s characterization of reflective knowledge as requiring coherence-based internalism introduces first-person perspective considerations that elude the scientific standards demanded by a fully-fledged naturalism. I argue that Sosa’s problem stems from an inverted methodological strategy, in which insights from cognitive science are treated as a subsidiary consideration, rather than an *ex ante* design constraint, on his epistemological framework.

Oral Session 3

Seminar Room 8: Philosophy of Technology and AI: Meaning, Automation, and Discovery

Materializing Meaningful Technology

Farooq Alvi

Until when will we rely on technology producers to balance the benefits of technology with its ethical considerations? This approach has not only failed to deliver meaningful change, it overlooks how technology's impact is shaped by systemic adopters, organizations that adopt it internally and translate it into products. I argue that meaningful impact on technology's uneven benefits and harms requires intervention where systemic adopters operationalize it by critically engaging with the assumptions shaping technology, rather than relying solely on producers, whose limited engagement with these assumptions leaves outcomes largely unchanged. I illustrate the approach with an organizational technology strategy framework for interrogating technology in context, using applied examples from leading contemporary cases. This reframes the challenge from accepting uneven outcomes and inaction to a practical orientation toward resolution.

Staying Human: Meaning in Life in the Age of Abundant Intelligence

Minji Jang, Ilia Tsetlin

Advances in artificial intelligence raise the redundancy threat: once superefficient AIs produce knowledge, art, and valued outcomes faster and better than humans can, human engagement may seem pointless. Drawing on Wolf's (2010) hybrid account, on which meaning requires subjective fulfillment in objectively valuable activities, we distinguish a pursuit's contributory value (non-redundant contribution to valuable outcomes) from participatory value (a person's own engagement) and argue that AI may threaten the former without eliminating the latter. This motivates a revised hybrid account that insulates many pursuits from the threat: a person's relationship to a project is not merely a source of subjective satisfaction but part of what makes the pursuit objectively valuable when it consists in the exercise of self-authorship. AI may further expand opportunities for meaning by redistributing what Rawls (1999) calls "the social bases of self-respect," provided that it scaffolds rather than substitutes for self-authorship and institutions distribute access broadly.

Artificial Intelligence and the Problem of Unexplainable Discovery

Tarun Menon and Sumeet Agarwal

There has been considerable debate about the extent to which we can automate scientific explanation with AI. Often, humans cannot understand how an AI model arrives at its outputs, which seems inconsistent with the explanatory project of science. One response to this concern is that building AI models is part of the context of discovery, while explanation and understanding belong to the context of justification.

We argue for two reasons why the context of discovery cannot be separated from the goal of constructing scientific explanations: because explanation is typically not a property of just one model in isolation, but of a larger theoretical framework; and because human-like constraints on the space of models can be essential for counterfactual robustness.

We suggest that better AI alignment with human inductive biases may be necessary to align prediction and explanation, and consider how to design AI systems that work within these constraints.

Oral Session 3

Seminar Room 9: General Philosophy of Science: Values, Responsibility, and Trust

Epistemic Projection and Value-Free Science: A Failed Reconciliation

Eunhyeong Kim

This paper examines Wendy Parker's Epistemic Projection Approach (EPA), an attempt to reconcile proponents and opponents of the value-free ideal in science. I argue that EPA's proposed reconciliation does not succeed and explore broader implications of this failure. I first maintain that EPA cannot satisfy traditional supporters of the value-free ideal, which creates pressure to identify the moderate supporters Parker aims to satisfy. I then explore whether a pluralist approach that distinguishes multiple formulations of the value-free ideal can specify such moderate positions and thereby rescue EPA's reconciliation project. I argue that this pluralist approach likewise fails by identifying the most plausible moderate positions within this framework and demonstrating that even these positions permit precisely the problematic value influences that the value-free ideal was designed to prevent. Finally, I suggest that EPA's failure invites us to reconsider what counts as "core science" worthy of protection from values.

Trust in Experts, Values in Science, and Risk Preferences

Tomasz Żuradzki

Debates about trust in science increasingly recognize that values play substantive roles within scientific inquiry, particularly in setting evidential thresholds for accepting hypotheses or issuing recommendations. This insight is central to the argument from inductive risk, according to which empirical evidence often underdetermines acceptance or rejection, requiring scientists to weigh the consequences of false positives and false negatives. Acknowledging this value-ladenness has prompted proposals emphasizing transparency, shared methodological standards, alignment between scientific and public values, or the democratic grounding of scientific decision-making.

This paper argues that these debates overlook a further and distinct dimension of scientific judgment: scientists' risk preferences. I argue that such rationally permissible differences pose an additional challenge for accounts of public trust in science that focus exclusively on values, and that existing approaches must be revised to accommodate the role of risk preferences in expert judgment.

The Philosophical Foundations of Statistical Testing: Fisherian and Neyman–Pearson Approaches Reconsidered

Ryota Morimoto

Statistical inference is often treated as a mathematically grounded methodology whose philosophical interpretation is secondary. This paper argues that statistical testing, particularly in the form of Null Hypothesis Significance Testing (NHST), cannot be properly understood without reference to underlying philosophies of science. Persistent controversies surrounding NHST arise not only from technical issues, but from a conflict between Fisherian significance testing and the Neyman–Pearson theory of hypothesis testing. Fisher conceived significance testing as an inductive method aimed at eliminating error and rejected the acceptance of hypotheses whose truth is not established as incompatible with the aims of natural science. By contrast, Neyman and Pearson framed hypothesis testing as a rule-governed procedure for scientific decision-making under uncertainty, justified by long-run error control rather than claims about truth. The paper concludes by exploring the possibility of a philosophically coherent hybrid of these approaches.

Towards the Epistemology of Evidence-Gathering

Yiwen Zhan

I develop a framework for the epistemology of evidence-gathering. While epistemic decision theory typically evaluates which attitudes one should adopt given a fixed body of evidence, it has little to say about which acts of evidence-gathering one ought to perform. This reflects a deeper tendency to treat updating as a passive state transition rather than an epistemic act. Drawing on recent work in externalist Bayesianism, I argue that agents' updating plans can be extended to include plans for gathering evidence. This yields a two-level decision structure: at the object level, agents maximize expected accuracy given their evidence and methods; at the meta-level, they determine which evidence-gathering method to undertake. The resulting framework offers a purely epistemic account of the value of evidence-gathering acts, grounded in the way they shape both the accuracy and the reliability of one's doxastic changes.

Peircean Pragmatism about Probability

Miguel Ohnesorge

C.S. Peirce's philosophy of probability has been broadly misunderstood as defending frequentism on a priori grounds. Rather, he sought to determine which definitions of probability enable successful applications of statistics in progressive, scientific inquiry. Peirce settled on two criteria, which he developed when applying least-squares regression to problems in gravitational geophysics. First, probability needs to be understood factually, i.e., probability distributions aim to represent objective facts about processes (usually measurements). Second, probabilistic reasoning needs to aid us in learning new facts about these processes, usually by indicating the presence of systematic perturbations. For Peirce, his mature frequentism was the contemporary contender, but not the only theory of probability fitting these desiderata. Peirce's contribution is not a specific metaphysics of probability, but a pragmatist theory of what any concept of probability ought to do for scientists. That theory remains relevant for philosophy and statistics; however one feels about his frequentism.

Making sense of modal reasoning in developmental biology

Marco Casali

In this paper, I outline an epistemology of developmental trajectories in order to make sense of the use of possibility and modal reasoning in biological developmental practice. I argue that the notion of possibility has an important epistemic utility in understanding developmental processes. By analyzing how the notion of possibility is employed in the description and explanation of developmental processes, I argue that biological practice frequently relies on modal reasoning—particularly in the comparison of potential developmental trajectories. Building on Waddington's visual metaphor of the epigenetic landscape, I show how this mode of reasoning enables biologists to carry out specific epistemic tasks, such as investigating the role of stochasticity in development. My conclusion is that the use of possibility and modal reasoning is not merely an incomplete epistemic element waiting to be refined; rather, it is a methodology that plays an essential role in understanding of developmental processes.

Mechanism vs. Cascade: Explanatory Pluralism without Ontological Pluralism

Vito Balorda

This paper examines whether cascade explanations in the life sciences are ontologically distinct from mechanistic explanations. Cascades are typically characterized as causal structures in which an initial trigger produces a large outcome (e.g., blood coagulation), whereas mechanisms are usually characterized as causal structures consisting of entities and activities organized so as to produce a phenomenon (e.g., protein synthesis). Recent debates on biological explanation challenge the dominant mechanistic view by appealing to explanatory pluralism, according to which there are other causal structures besides mechanisms with distinct explanatory features, such as cascades. I argue that, while cascades and mechanisms differ in their methodological and explanatory strategies, these differences do not correspond to an ontological distinction. Cascades, like mechanisms, consist of organized entities and activities responsible for the phenomenon in question. Consequently, cascades do not undermine the mechanistic framework; rather they instantiate it under different discovery practices and representational strategies.

Beyond Decomposition in Mechanistic Explanation: Organization through Structural Dimensions, Methodological Strategies, and Categorical Foundations

Jinyeong Gim

Mechanistic explanation aims to account for how biological phenomena are produced by underlying mechanisms. While much attention has been given to identifying constitutively relevant components through decomposition based on mutual manipulability, this paper argues that organization of these components is equally indispensable. In particular, I distinguish between two dimensions of organization—constitutive and sequential—and then examine their interdependence and explanatory significance. Drawing on Darden's reasoning strategies of productive continuity and modular assembly, I propose that these strategies serve as methodological tools for constructing sequential organization. However, they require normative support comparable to that which mutual manipulability provides for decomposition. I introduce a framework grounded in category-theoretic compositionality, offering three formal conditions that clarify how organized components collectively produce the phenomenon. Using the case of protein synthesis, the paper demonstrates how categorical compositionality provides a theoretical foundation for representing, assessing, and normatively guiding the organization of mechanisms in biological explanation.

Oral Session 4

Seminar Room 7: History and Philosophy of Science: Geosciences, Physics, and Chemistry

The Problem of Gaining Access and the Inversion Schema

Teru Miyake

The Earth's interior is inaccessible, yet we know a great deal about it. Almost everything we know is an inference from observations of seismic waves made at its surface. This is a particular case of a more general problem that I call the problem of gaining access: the problem of obtaining knowledge about an inaccessible target phenomenon, such as the Earth's interior, from observations of accessible phenomena, such as seismic waves at the Earth's surface. This talk presents a framework for understanding the problem of gaining access. The framework involves a representation that I call the inversion schema. Using the inversion schema, I will show what the challenges are for solving the problem of gaining access. I will then discuss how scientists have historically dealt with these challenges by taking advantage of a number of features of the use of inversion for gaining access: convergent access, modularity, and interdependence.

The Reconstruction of Scientific Knowledge through Instruments: A Case Study of the Instrumental Revolution in Modern Chemistry

Wonho Jung

This paper proposes a framework to account for the "instrumental revolution" in mid-20th-century chemistry. While traditional philosophy of science remains theory-centric, I argue that the rapid adoption of spectroscopic instruments (UV, IR, NMR)—which by the 1960s became standard in virtually every chemical study—fundamentally reconfigured the epistemic structure of the discipline. Building on C. Kenneth Waters' "Investigative Matrix" and Joachim Schummer's "Knowing through Making" (KTM), I extend Waters' framework by positioning instruments as dynamic variables that reconfigure procedural know-how and strategic approaches. I demonstrate that the instrumental revolution shifted chemical practice from direct sensory engagement to instrument-mediated interaction, thereby transforming the very mode of scientific "making." This study provides a generalized epistemic model for understanding how material mediation reshapes the investigative matrix and extends the epistemic horizon of instrument-intensive sciences.

Oral Session 4

Seminar Room 9: General Philosophy of Science: Empirical Adequacy, Theory-Ladenness, and Vagueness

Empirical adequacy as a kind of truth-as-correspondence

Jonathon Hricko

I defend an understanding of empirical adequacy as a kind of truth-as-correspondence. My starting point is van Fraassen's constructive empiricism. Although van Fraassen presents the idea of empirical adequacy as 'truth about observables,' he hasn't shown which view of truth is most suitable for constructive empiricism. I suggest that a kind of truth-as-correspondence can be read off of van Fraassen's view that theories 'save' phenomena when data models that we use to represent phenomena are isomorphic to parts of theoretical models: Those parts of theoretical models are true when they correspond to data models. I defend this kind of truth-as-correspondence from objections to the correspondence theory of truth. However, I argue that the way to avoid these objections conflicts with van Fraassen's understanding of empirical adequacy, which requires 'saving' observable-but-forever-unobserved phenomena. I conclude that we should understand empirical adequacy in a way that requires 'saving' only the actually observed phenomena.

Underdetermination and the Case for Methodological Localism

Seyyadali Najeeb

This paper reassesses the epistemic force of underdetermination (UD) within the framework of methodological localism, the meta-philosophical view that debates about scientific realism should be conducted on a discipline-by-discipline basis rather than on a wholesale global basis. While UD does not disappear under localism, its implications are significantly reshaped: it no longer justifies wholesale anti-realism but instead constrains epistemic commitment relative to local evidential and methodological conditions. The paper argues that global underdetermination arguments rely on illegitimate generalisations from historically and disciplinarily specific failures of theorisations. Focusing on Stanford's problem of unconceived alternatives as a paradigmatic UD argument, it is shown why such arguments cannot support global scepticism under a local realism. A case study from galactic dynamics, contrasting MOND and Λ CDM, illustrates how genuine local underdetermination can warrant suspended realist commitment in a specific domain without threatening realism elsewhere in science.

Antifragility in Scientific Modeling

Ryan O'Loughlin

While robustness has been extensively debated in philosophy of science, its conceptual neighbor, antifragility, has received comparatively little attention. Introduced by Nassim Taleb, antifragility characterizes systems that benefit from volatility, error, or stress. This paper extends antifragility to scientific modeling, arguing that model failure, sensitivity, and disagreement can play positive roles rather than merely indicating deficiency. Building on work on the value of error in experimental science and evolutionary epistemology, I analyze how modeling practices can succeed because of their vulnerabilities. I distinguish three varieties of antifragility in modeling: mechanistic, where error-driven feedback is integral to model construction; epistemic, where discrepancies between models and data spur discovery; and social, where navigating failure contributes to scientific credibility and trust. I also examine a potential confirmatory role for antifragility in climate modeling, where structured disagreement can strengthen confidence in shared causal cores. The paper concludes by outlining normative implications for scientific modeling.

Oral Session 5

Seminar Room 4: Philosophy of the Life Sciences: Populations, Sex, and Biological Norms

Effective Population Size: Misconceptions, Modelling Strategies, and Non-Causal Explanations Zhixiang Cheng

This article tentatively explores some philosophical issues concerning ‘effective population size’ (EPS), an important but widely misinterpreted concept (or a family of concepts). I summarize four relatively common misconceptions about EPS among non-population-geneticists. Then, I argue that there are two competing general views among population geneticists regarding the nature of EPS: the monist-dynamic view and the pluralist-kinematic view. According to the monist-dynamic view, EPS represents or captures (the effects of) genetic drift, but I contend that this simplistic understanding is untenable. I also argue that assigning an EPS to a natural population exemplifies an unusual modelling strategy, which may substantially distort or misrepresent the causal structure or causal features of the target natural population. This anti-realistic modelling strategy makes it possible for EPS—together with an ideal Wright-Fisher model—to provide non-causal explanations in evolutionary biology.

A Proximate-Ultimate Framework for Understanding Biological Sex Min OuYang

Broadly speaking, two main approaches to biological sex can be distinguished: a physiological approach and an evolutionary approach. These correspond to Mayr’s well-known distinction between proximate and ultimate explanations in biology. The former, grounded in functional biology, has tended to dominate discussions of sex and gender, particularly in contemporary debates. By contrast, the latter—despite its deeper philosophical significance—has received comparatively little attention outside evolutionary biology and remains underexplored in philosophical analysis. The central aim of this paper is to provide a systematic meta-analysis of the concept of biological sex by explicitly drawing on and developing this proximate–ultimate distinction.

The Bell-Curve Continuum: Bridging Typological and Population Thinking through Idealization Shichao Wen

This paper, building on Sober (1980), reframes typological and population thinking as two statistical readings of normality under idealization. On the typological (wheel-of-fortune/error-law) view, average represents the causal center and deviations are disturbances; on the population (Galton’s quincunx/variation-law) view, the bell shape emerges from aggregation of many small, near-independent elements, making variance explanatory. I develop a bell-curve continuum that treats these as two endpoints rather than rivals. Two buffer zones—structured type cases and grouped/mixture subtypes cases—show how stable “types” can decompose into structured types, and into multiple subtypes, and then into near-independent components. This yields a clear picture of explanatory role reassignment across the continuum: what counts as “constant” vs “random” can switch under explicit assumptions. The framework clarifies when evo-devo’s focus on conserved structure and population genetics’ focus on sources of variation can be bridged without conflation.

Oral Session 5

Seminar Room 6: History, Chemistry, and Philosophy of Science

Transforming Philosophy into Logical Analysis of Science: A Historico-Critical Study

Bohang Chen

This talk starts by telling a new story about the history of philosophy and science in the 19th and 20th centuries, by focusing on a proposal to transform philosophy. The central thesis is that some members from several philosophical schools/movements (logical empiricism, neo-Kantianism, pragmatism, British analysis, French historical epistemology, and even phenomenology) in philosophy in the early 20th century advocated the transformation of philosophy into logical analysis of science, driven by their uniform awareness of the Great Differentiation of the sciences from philosophy in the 19th century. Relevant evidence will be provided to support the historical thesis, and further clarifications will be offered to deepen the story. The rest of this talk assesses critically the transformation proposal and argues that it remains methodologically viable after taking a historical turn in the contemporary era of science, although it remains a minority and is not wholeheartedly practiced in current academic philosophy.

How can an integrated history and philosophy of science help in the context of the debate between new mechanism and processual ontology? The relevance of the other biological synthesis of Julian S. Huxley (1887-1975)

Yihan Jiang and Stefan Bernhardt-Radu

This paper employs an integrated history and philosophy of science (iHPS) to intervene in the debate between processual and new-mechanist ontologies in biology. We challenge the claim that revised mechanism can fully subsume processual insights, arguing that mechanisms are themselves products of temporal dynamics. Focusing on evolutionary biologist Julian S. Huxley, we demonstrate that he seriously considered contextualized mechanisms akin to those defended by contemporary new mechanists. However, drawing on unpublished materials and process-philosophical influences, Huxley ultimately viewed the active, historical engagement of organisms with their environments as the foundational process from which mechanisms emerge. Thus, a historical re-examination of Huxley's synthesis reveals a perspective where mechanisms are not merely embedded in contexts but are genuinely constituted by evolutionary and developmental processes.

Principlism and Compositionism as the Explanation for the Chemical Revolution

Qiyue Zhang

I argue that Hasok Chang's use of the distinction between principlism and compositionism to explain the Chemical Revolution is problematic. First, I introduce Chang's account of the Chemical Revolution in *Is Water H₂O?* and his argument that the progress of chemistry was a transition from principlism to compositionism, with Lavoisier's victory attributed to his compositionist approach. Then, I challenge this interpretation from two perspectives: first, the two traditions were often intertwined in the works of chemists at the time, thus cannot serve as the primary explanation for the Revolution; second, Chang underestimates the role of atomism, which further blurs the distinction between principlism and compositionism. Finally, I propose that the key progress lay in chemists such as Lavoisier undermining the fixed status of a predetermined set of elements or principles, thereby enabling the integration of newly discovered substances into chemical theory.

Oral Session 5

Seminar Room 7: Philosophy of Technology and AI: Governance, Responsibility, and Agency

The Philippines as a Petri Dish: Examining the Fragmentation of AI in Digital Governance under Surveillance Capitalism -- Implications for Democracy and Public Administration

Carlos Bryan Nolido

Christopher Wylie described the Philippines as a “testing ground” for surveillance capitalism, showing how the country’s hyperconnected yet weakly regulated digital environment enabled the refinement of data extraction, algorithmic manipulation, and political influence by global platforms. This paper discusses how fragmented AI and digital governance-informed by outdated and incoherent policies such as the Data Privacy Act of 2012, the E-Commerce Act, and the E-Governance Act of 2023-fail to provide a coherent national AI framework. The paper draws on Zuboff’s surveillance capitalism, Milan’s data justice, and Brillantes and Fernandez’s ethical public administration to argue that incoherent policy reflects deeper institutional vulnerabilities, limited regulatory capacity, and bureaucratic silos that enable private platforms to overpower democratic controls. As surveillance capitalism grows, it depletes public trust, weakens administrative sovereignty, and threatens democratic accountability. The paper calls for an integrated, ethical, and democratically anchored AI governance framework to reclaim public control over digital infrastructures.

Reinventing AI Responsibility

Hyungrae Noh, Ijin Kim, Jiyoung Park, Garam Kim, Dongwoo Kim

The growing autonomy of contemporary AI systems challenges traditional conceptions of responsibility. The key concerns are with: (i) whether AI systems themselves are considered as bearers of responsibility, alongside human actors such as developers and users; and (ii) what factors structure the attribution of responsibility among them. We present two experimental vignette studies examining lay responsibility judgments in professional contexts where AI use leads to harm. Our finding is that participants do indeed treat AI systems as loci of responsibility, but in a different sense from human actors.

Beyond Rules: Social Norms, Agency, and the Ethics of AI

Xiao Tan, Chunxi Liu

This paper critiques the dominant rule-based approach in AI ethics, arguing that it rests on an impoverished understanding of ethical life and mistakenly treats AI as an industrial product whose behavior can be fully predetermined by moral rules. Drawing on Bicchieri’s theory of norms and insights from new materialism, it argues that AI ethics is primarily a matter of social norm coordination rather than moral rule enforcement. AI, as a technology with distributed agency, reshapes ethical life through its embedding in infrastructures and networks.

Oral Session 5

Seminar Room 8: Philosophy of the Cognitive Sciences: The Extended Mind, Intelligence, and Memory

Resonance as a Challenge to the Extended Mind Theory: An Unresolved Dilemma

Young E. Rhee

The Extended Mind Theory (EMT), pioneered by Clark and Chalmers, has evolved from simple functionalism into a complex framework integrating Predictive Processing (PP) and consciousness. While a pillar of the 4E cognition paradigm (Embodied, Embedded, Extended, Enactive), EMT faces a significant theoretical hurdle: explaining resonance. Resonance describes the deep, bidirectional synchronization and mutual sense-making between an agent and its environment. While enactivism excels here through “normative co-regulation,” EMT’s functionalist roots often view the world as a resource to be “recruited,” struggling to account for such reciprocal autonomy. This creates a dilemma for Clark: align with non-representational enactivism or stick to representational models. For physical AI, achieving resonance serves as a vital benchmark for true sentience, moving beyond mere data processing toward shared meaning.

Explaining Swarm Intelligence: A Hybrid Model of Ant Colony Path Optimization

Yian Chen

As a frontier of complexity science, swarm intelligence calls for a new mode of explanation. Through a case study of ant colony path optimization, I show that successful explanations rely on a hybrid model integrating five elements: system-level constraints, positive feedback loops, functional noise, information-based interactions, and mathematical dependency relations. On this basis, I argue that: (1) those elements by themselves challenge a narrow notion of mechanistic explanation, which emphasizes reductionism, fine-grained detail, decomposition & localization, mechanical interactions, and causal dependency relations; (2) in the explanatory practice of swarm intelligence, those elements are intertwined rather than linearly separated as independent modules. Consequently, this case supports a pluralistic and practice-oriented approach of explanation that better captures the heterogeneity of complexity science.

Memory and Morality: Examining the Knobe Effect in Attributions of Episodic Memory

Kiichi Inarimori, Tamaki Kodama, Kengo Miyazono

This study explores whether moral considerations influence attributions of episodic memory, testing whether the Knobe effect extends to memory ascription. Using online vignette experiments, the authors examine whether people ascribe episodic memory when a mental representation is not causally linked to the agent’s past experience, and whether moral blameworthiness affects such judgments. The study contributes to debates between the causal theory of memory, which requires a causal connection, and simulationism, which denies this necessity. The authors predict that episodic memory is generally denied in causally deficient cases, but more readily attributed when the agent is morally blameworthy. To explain this, they propose the Causal Attribution Hypothesis, according to which moral judgments bias causal judgments, leading people to relax causal requirements in blameworthy cases. The results suggest that while moral effects undermine the evidential value of folk intuitions, they ultimately support the causal theory of memory.

Oral Session 5

Seminar Room 9: General Philosophy of Science: Thought Experiments, Worldmaking, and Theory-Ladenness

This Is Water: A Naturalistic Principle for Metaphysical Thought Experiments

Michael Veldman

Many assume metaphysics must be naturalistic, underwriting its procedures by reference to science and scientific rationality. However, many metaphysicians' conceptions of scientific method appear to be deeply mistaken, which risks providing false assurances of the rational security of their methods, which are explicitly modeled off those conceptions. I focus on the thought experiment, and argue for a naturalistic methodological principle: metaphysical theorizing ought to be required to derive models of the facts constituting its thought experiments from our best science. I show it has teeth by application, in conjunction with chemical theory and paleoclimatology, to Putnam's famous argument for 'semantic externalism' from his Twin Earth thought experiment.

Rereading Nelson Goodman's "Worldmaking": A Defense from the Philosophy of Scientific Practice

Yutong Zhou

Nelson Goodman's doctrine of worldmaking has often been dismissed as a form of radical relativism or as inapplicable beyond the domain of art. Against this view, this paper argues that Goodman's worldmaking constitutes a defensible stance within the general philosophy of science. Drawing on Ian Hacking's insight that Goodman's position uniquely addresses the epistemological challenges raised by laboratory studies, the paper situates worldmaking within the contemporary philosophy of science in practice. It first shows that Goodman's theories of exemplification and the new riddle of induction reveal a pre-Humean problem of predicate underdetermination, highlighting the role of historically situated practices in stabilizing predicates. It then argues that standard realist and anti-realist critiques by Putnam and Boghossian mislocate Goodman's position. Finally, through discussion of scientific controversies and the experimenter's regress, the paper defends a practice-based version of worldmaking, denying the existence of a neutral, external standpoint for adjudicating competing scientific worlds.

Arguments for the Diachronic Theory-Ladenness of Observation

Khyutae Kang

I present arguments for "diachronic theory-ladenness of observation", focusing on perceptual changes resulting from neural plasticity. Raftopoulos (2009, 2015) argues that long-term perceptual changes due to neural plasticity must not be counted as a genuine case of theory-ladenness. It is because the changes resulting from neural plasticity arise not from the influence of higher-level cognitive states per se, but from the influence of the sensorimotor tasks. I provide two counterarguments against him. First, scientific theory acceptance is not mere change in beliefs but involves the acquisition of embodied skills, practices, and tacit knowledge, often accompanied by lasting neural changes. The second is a consequentialist argument: perceptual changes due to neural plasticity generate the same implications—such as theory-relative observation and disagreement—that originally motivated the theory-ladenness thesis. Therefore, such changes should be recognized as a legitimate form of theory-ladenness.

Oral Session 6

Seminar Room 4: Philosophy of the Physical Sciences: Metaphysics of Physics

Seeing from Somewhere: The Metaphysics of Frame Dependence

Sebastian Murgueitio Ramirez, Eugene Chua

Many quantities central to physics are frame-dependent: one and the same object can be correctly assigned different values of the same general quantity (speed, length, momentum) in different inertial frames. Yet this feature has been largely neglected in the metaphysics of quantities, and it sits uneasily with the familiar single value principle according to which an object cannot have different values of a general quantity at a given time. We begin by isolating the physicist's account of frame-variance and frame-invariance. We then argue that a natural metaphysical reconstruction of frame-variance fails. Finally, we develop an alternative metaphysical account that we call "Relative Truth." According to this view, propositions about physical quantities are not just true or false simpliciter, but true or false relative to both times and frames. We close by drawing connections to perspectivism in philosophy of physics and to the debate around the alleged metaphysical priority of invariants.

Being and becoming in quantum gravity

Natalja Deng

One philosophical issue that interacts in interesting ways with research at the current frontiers of physics is that of whether our world includes becoming (as opposed to merely being). This talk examines that issue in the light of (i) classical sequential growth models in causal set theory, and (ii) loop quantum gravity. In particular, it responds to philosophical responses to physicists' glosses on the metaphysical upshots of these approaches, which on the surface similarly defend being (B/eternalism) over becoming (A/presentism or growing block) for both (i) and (ii). The contention will be that there is an unresolved tension in these responses that renders especially the response to (ii) problematic and threatens to mask interesting metaphysical differences between physicists' glosses on (i) and (ii). The talk will also draw out implications of this issue for putative empirical incoherence and spatiotemporal gap problems in quantum gravity.

Newton–Cartan Lessons for the Metaphysics of Time

Lorenzo Lorenzetti, Enrico Cinti, Marco Sanchioni

We challenge the prevailing view that A-theoretic views of time are well-secured within pre-relativistic physics and are threatened only by relativity. We show that a particularly significant class of models of Newtonian gravitation fails to sustain an absolute simultaneity relation, which is a condition for A-theories. To establish this, we propose a general criterion that any spacetime theory must satisfy in order to admit absolute simultaneity, and we demonstrate that torsional Newton-Cartan spacetimes typically fail to meet it. Given the centrality of the Newton-Cartan formulation of Newtonian gravitation, this result strongly undermines the received contrast between the metaphysical implications of Newtonian and relativistic physics. Moreover, the result extends beyond Newtonian physics: it challenges potential strategies that seek to defend A-theoretic views by turning to quantum gravity, in particular to approaches based on Newton-Cartan spacetimes. Hence even frameworks more fundamental than relativity prove less hospitable to the A-theory than it seems.

Oral Session 6

Seminar Room 6: Philosophy of the Life Sciences: Swarm Intelligence, Inference, and Selection

Towards an Active Philosophy of Animal

Xiaotao Liu

The past few decades have witnessed rapid growth in the literature on animal minds, animal cognition, animal ethics, and animal welfare. We contend that it is necessary to establish a field of study, called animal philosophy or philosophy of animal (动物哲学). We shall clarify three senses of philosophy of animal, and argue how an active philosophy of animal might shed new light on many important philosophical issues.

The Outsourcing of Inference vs. Individual Model Construction: The Distinct Social Structures of Clinical and Basic Medical Research

Tatsuyuki Sato

Values and causality have each been extensively studied in the philosophy of science; however, mainly in isolation from one another. In this paper, I argue that evidential pluralism in causality gives rise to distinct social epistemological structures for managing the value-laden nature of knowledge production. Drawing on examples from clinical and basic medical research, I propose that the locus of inductive inference varies with the type of evidence. Causal inference from statistical evidence is outsourced to the community to manage inductive risks. In contrast, causal inference from mechanistic evidence remains at the level of individual researchers, thereby facilitating the construction of a mechanistic model. I further propose that this divergence in social epistemological structures arises from the fundamental difference in the direction of inference required to draw causal claims from each type of evidence. I characterize this difference by drawing on Psillos's accounts of "horizontal" and "vertical" modes of inference.

Revamping the Additivity Criterion for Units of Selection: How Three Layers of Additivity Have Been Smooshed Together

Pierrick Bourrat, Elisabeth Lloyd

Additivity is a core concept in the evolutionary biologists' toolkit. In the 1980s, Wimsatt and Lloyd proposed additivity-based criteria for adjudicating units of selection. However, critics later claimed additivity is not relevant in this context. We argue that, properly understood, additivity is directly relevant to identifying units of selection, and that confusion stems from conflating distinct notions of additivity.

We start by presenting two forms of what we call additivity by substitution, which are classically used in evolutionary theory (e.g., population genetics), and argue that they are not the most relevant for units of selection. We then distinguish a third form—additivity by aggregation of components—which is relevant in this context since it permits us to assess the effect of combining lower-level entities to produce a higher-level one, compared with their independent effects. Building on this insight, we propose a new additivity criterion for units of selection.

Oral Session 6

Seminar Room 7: Philosophy of the Social Sciences: Evidence and Epistemic Communities

What is the Optimal Configuration for an Epistemic Community to Solve Complex Epistemic Problems

Shaokai Du

This research investigates the optimal structure of epistemic groups for solving complex epistemic problems. Using agent-based-modeling (ABM) and epistemic landscape model, I explore how individual collaboration scope influences group structure and performance across shareable epistemic outputs (e.g., new methods) and prioritized epistemic outputs (e.g., publications). Results reveal an optimal collaboration scope that maximizes performance by fostering a semi-clustered group structure—balancing dense intra-subgroup connections with sparse inter-subgroup links. This structure optimizes exploration-exploitation trade-offs for shareable outputs and balances focused-dispersed research pattern for prioritized outputs. Additionally, an inverse relationship between exploration density (researchers per unit research area) and optimal collaboration scope stabilizes subgroup sizes across varying community scales. These findings offer practical insights for organizing scientific research, suggesting that spontaneous subgroup formation with limited inter-subgroup communication enhances group epistemic performance.

What is the role of experiments in providing mechanistic evidence?

Mariusz Maziarz

Evidential Pluralism, a philosophical position that supports the use of both difference-making and mechanistic evidence, has been criticized by supporters of Evidence-Based Medicine on the ground that effective pharmaceutical treatments and non-pharmaceutical interventions were successfully used in clinical practice despite their mechanisms of action remaining unknown at the time of their introduction. To defend EP as descriptively adequate for establishing causality in medicine, Williamson rebutted that RCTs provide evidence for an unknown mechanism that accounts for the systematically observed positive results. This point of view contradicts Illari's analysis, which holds that mechanistic evidence provides evidence for a specific mechanism by indicating which entities, actions, and interactions constitute it. This poses the question of whether experiments can provide mechanistic evidence. I argue, using examples of clinical trials and randomized field experiments, that experiments can provide evidence for specific mechanisms in certain contexts when background knowledge suggests a few possible mechanisms.

Supporting the Variety of Evidence Thesis: Evidential pluralism in evidence-based management

Paride Del Grosso

The purpose of this paper is to support the (practical) validity of the (still contested) Variety of Evidence Thesis (VET), i.e. that, *ceteris paribus*, a more varied body of evidence (compared to a less varied one) confirms a hypothesis better, because evidential variety increases the robustness of the hypothesis. To do that, I focus on the interplay between source and type variety in evidence-based management (EBMgt), an evidence-based practice in which evidence plays a crucial role to support highly context-specific causal hypotheses. By considering a real example, I show that, although the orthodox approach to evidence for causation in EBMgt promotes source-variety, it does not promote type-variety, because it mainly prescribes the use of difference-making evidence. This limits hypothesis robustness. I argue that increasing type-variety by integrating difference-making evidence with mechanistic evidence – as prescribed by evidential pluralism – increases hypothesis robustness. This supports the validity of the VET.

Oral Session 6

Seminar Room 8: Metaphysics of Science: Grounding and Emergence

New Grounding Account of Governance

Wentao Ding

In this paper, I argue for a new grounding account of governance. According to this view, laws of nature govern in the sense that laws ground the explanatory fact that some event explains another event. This account is new in two senses. First, for all other accounts of governance in the literature, they are all based on the Input-Output Model of Governance. In this model, together with some input events, laws explain some output events. My account rejects this model. Instead, it is based on the Meta-explanatory Model of Governance, according to which laws meta-explain why first-order explanation happens between different events. Second, my account is new in the sense that it avoids two main objections challenging the grounding conception of governance. Besides these, my account is also compatible with constraint accounts of governance. It can accommodate key considerations that motivate constraint accounts while contributing a metaphysical analysis of constraint.

Emergence: Operational Definition

Kaamesh Singam

Denis Noble argues that, in the Hodgkin-Huxley model of the action potential, the global cell property of membrane potential has a downward causal (DC) influence on the gating behaviour of the ion channels. He argues that this DC in the form of structural constraints is present at each level in an organism and hence each level is an emergent level. This article aims to challenge Noble's arguments in support of emergence and DC and in turn provide a new operational definition of emergence by incorporating the claims into the new mechanist framework. Other accounts of emergence and DC such as those from Carl Gillett and James Woodward, specifically using the HH model as an example, are also analysed. This article emphasises the need for a concept of emergence that results in changes in scientific practice. Other potential examples of emergence and DC from spatial ecology and sociogenomics are also discussed.

Closure of Constraints and Emergence

Prakhar Manas

In this paper, I present a coherent idea of weak ontological emergence to support the Closure of Constraints model of biological organisation. The account of weak emergence presented will be based on complex system dynamics, and reduction, restriction, and elimination of degrees of freedom (DoF). I aim to show that weak emergence, conceptualised in this way, is able to provide a coherent idea of configurations acting as constraints within the closure of constraints model; and additionally, help properly conceptualise the idea of biological function, redundancy, and robustness of biological organisations.

Oral Session 6

Seminar Room 9: AI, Social Epistemology, and Trust

The Threat of Over-Simplification: An Investigation of The Online Environment for Information Processing

Qiantong Wu

In this paper, I am going to analyze how technology changes the environment for information processing online and how the online environment of information processing can bring the threat of oversimplification, causing significant epistemic consequences. I will first emphasize the importance of environmental factors in cognitive processing, not only in the sense of environmental factors being associated with the direct content for cognitive processing, but also in the sense of how the former influence the generation of cognitive content and the flexibility of cognitive content in the face of information against individual preconceptions. I will then demonstrate the special characteristics of the environment for information processing online and explain how these characteristics create changes that significantly differentiate the online from the offline environment for information processing, leading to oversimplification in cognitive processing online. Lastly, I will demonstrate the potential threat of over-simplification by interpreting empirical studies demonstrating real-life epistemic phenomena.

What Misinformation Science Could and Could Not Be

Adrian K. Yee

It remains unclear what counts as an adequate social scientific theory of misinformation. Contemporary misinformation theories should strive to meet three adequacy criteria given what is required of successful real-life applications: that theories employ reproducible methods, that similar verdicts are arrived at within a community concerning what is misinformation, and that they be justifiable via a process of idealized public reasoning. Misinformation science is shown to be an analogue of engineering, a teleological endeavor reflecting and testing the commitments of background theories while serving stakeholder goals. Broader lessons are drawn regarding contestable hierarchies of expertise in social science research.

Non-Causal Unificationist Explanation: A Philosophical Methodology for the Epistemology of Artificial Intelligence

Enrong Pan, Ziming Wang

The pervasive integration of artificial intelligence (AI) into scientific practice has raised questions about its epistemological legitimacy, particularly given the challenge of epistemic opacity. This paper examines algorithmic external epistemology, which justifies AI outputs using indicators external to the model, and algorithmic internal epistemology, which seeks explanations for the model's behavior. To challenge external epistemology, this paper constructs four types of knowledge about structure (what, how, where, and why) and analyzes how each contributes to the justification, understanding, and trust in model outputs. As for internal epistemology, existing explainable AI (XAI) techniques cannot fully explore these knowledge types, as they neglect the model itself as an explanans. Using AlphaFold as a case study, the paper proposes a non-causal unificationist explanation, arguing that unification provides explanatory power by integrating a fact into an existing unified Humean mosaic and successfully predicting it. This perspective serves as a supplement to algorithmic internal epistemology.

WHAT IS LIFE?

A satellite workshop on the origins of life, biological intelligence, and bio-inspired AI, in association with the APSA26 conference

THIS WORKSHOP EXPLORES
FOUNDATIONAL QUESTIONS
AT THE INTERSECTION OF
BIOLOGY, PHILOSOPHY, AND
ARTIFICIAL INTELLIGENCE :

How did living cells emerge from non-living matter?

How did intelligence emerge from cell-based organisms?

Can biological intelligence inform better AI systems?

We seek contributions that deepen our understanding of how intelligence emerges from biological systems.

ORGANISERS :

- Prof. Kumar Selvarajoo (Chief Scientist, Taizhou Research Institute, Zhejiang University)
- Dr. Melvin Chen (Senior Lecturer in Philosophy & Faculty Member of the NTU-USP, NTU)

SPEAKERS :

- Prof. Carlo Cannistraci, Tsinghua University
- Prof. Chew Lock Yue, Nanyang Technological University
- Prof. Chandra Verma, Bioinformatics Institute, A*STAR
- Dr. Uttam Surana, Institute of Molecular and Cell Biology, A*STAR

WORKSHOP DETAILS :

20 July 2026, Monday

09.30 - 15.15

LHS-TR+52 (Level 2)
UOB Innovation Hub,
52 Nanyang Ave
Singapore 639816

PROGRAMME, READINGS & REGISTRATION :

<http://soh.school/what-is-life-apsa>



Heart of Science Book Workshop

21 July 2026

Venue TBC



with *Heart of Science* author
Jacob Stegenga

Featuring guest commentators

Peter Vickers

Catarina Dutilh Novaes

Boaz Miller

Angela Potochnik

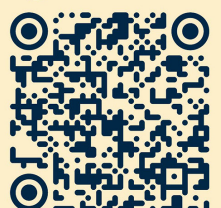
Axel Gelfert

Silvia De Toffoli

with graduate student commentators:

Yuang Chen, Anish Seal, Luca Molinari

Register here:



tinyurl.com/heartofscience

Organized by Eugene Y.S. Chua

FINDING BALANCE

FOUNDATIONS OF THERMODYNAMICS WORKSHOP 2026

27-28 July 2026

**Nanyang Technological University
Singapore Hokkien Huay Kuan Building
Sem Room 9**

Featuring

Sara Panteri
Miguel Ohnesorge
Michael Veldman
Wayne Myrvold
Aditya Jha
Diana Taschetto
Helen Meskhidze
Eugene Y. S. Chua
Yichen Luo
Denis Walsh
Jennifer Jhun

Register here:
tinyurl.com/findingbalance2026



NANYANG
TECHNOLOGICAL
UNIVERSITY
SINGAPORE



ORGANIZED BY
EUGENE Y. S. CHUA AND MIGUEL OHNESORGE