Facultad de **Filosofía y Humanidades**

# Workshop: Scientific Pluralism, Ontology, and Values

Sala 1A, Campus B (Av. Los Leones 1200, Providencia)
Universidad Alberto Hurtado

## Resúmenes

### One Race, Many Ontologies: Unity for Racial Pluralism

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Racial realists hold that races are real, tough they disagree on how exactly we should understand this claim. Racial pluralists believe that the nature and reality of race must be understood relative to specific local race ontologies. According to a racial pluralist, for example, the US ontology of race and the Brazilian one might disagree on whether an individual is Black. Racial pluralism claims to accommodate the manifest contextual variety of race talk and the wide diversity of goals that aim to be accomplished by theorizing about race. Yet racial pluralism faces the challenge of explaining similarities and dissimilarities across diverging race ontologies. David Ludwig (2019) addresses it by defending a shift from narrow core concepts of race to richer conceptions of it.

My goal is both critical and constructive: (1) I set out to argue that Ludwig's framework inadvertently licenses a permissive deflationist view that undermines the realist ambition of racial pluralism, and (2) I outline an ontologically beefy realist strategy to unify racial ontologies based on the hypothesis a set of constraints and enablements is constitutive of every race in all or most ontologies.

### The Dual Nature of Evidence: Justification, Decision and the Role of Values in Science

**Maribel Barroso** · Universidad Alberto Hurtado

After distinguishing between the context of justification (i) and the context of decision (ii) in scientific practice, this paper aims to elucidate the two types of evidence related to these contexts: (i) evidence as data that, once interpreted, serve as reasons to justify a hypothesis or theory and (ii) evidence as metadata that, once interpreted, serve as reasons to decide whether to accept or reject a scientific hypothesis or theory. I argue that this distinction is key to clarifying the role of evidence in the debate on values in science, as well as reconciling apparent contradictions in proposals that grant empirical evidence a privileged status as the source of scientific authority (e.g., Heather Douglas's work). To demonstrate this, I argue that evidence is not a natural kind, but an artefact. Therefore, the possibility of something being evidence is not restricted to its belonging to a particular kind of thing, such as sensorial data or specific facts. Other things, such as experiments, novel predictions, statistical analyses, phenomenological laws and — fundamentally for the purposes of this work — values, can also constitute evidence insofar as they require interpretation and, when so interpreted, help us to make decisions in scientific practice.

## Levels of organization as natural kinds

**Jorge Ignacio Fuentes** · Pontificia Universidad Católica de Chile

In co-authorship with Gualtiero Piccinini, University of Missouri, USA

We sketch an account of natural kinds suitable for an ontological approach to levels of organization. Putative levels include atoms, molecules, cells (including unicellular organisms), multicellular organisms, and so forth. Some objects are at the same level, others at different levels. Objects at higher levels decompose into objects at lower levels. Since objects, connections, and properties are objectively similar and dissimilar to one another to varying degrees, levels of organization fall into different natural kinds depending on the degree of objective similarity between their components, connections, and properties. We begin by aligning with a naturalistic attitude towards metaphysics, roughly in the spirit of Ladyman and Ross' (2007) Principle of Naturalistic Closure, and of what Schliesser (2019) calls synthetic philosophy. Both emphasize integrating scientific methods, hypotheses, knowledge, insights, and arguments across a wide range of sciences to enable philosophers to construe an overall picture of the world or some portion of it (cf. Godfrey-Smith 2013, p. 4). We then articulate an account of natural kinds based on objective degrees of similarity, allowing for inductive success. The possibility of inductive success is the hallmark of regularity and predictability (cf. Wimsatt 2007). We draw from Goodman's (1955) and Quine's (1969) work on projectibility and natural kinds, Lewis' (1983) work on natural properties, and Norton's (2003, 2021, 2024) work on induction. We demonstrate how our approach aligns well with natural kinds understood as homeostatic property clusters (e.g., Boyd 1991), while also encompassing more. ,

## Fruitful trading zones: material inequalities, scientific repertoires, and epistemic diversity in global science

**Juliana Gutiérrez Valderrama** · Universidad de los Andes (Colombia)

Epistemic diversity is widely regarded as a desirable feature of epistemic communities (Rolin et al., 2023). In alignment with this insight, the philosophical discussions on diversity at a global scale have focused on the value and challenges yielded by the encounter among scientific communities and (radically) different knowledge systems from distinct cultures (Harding, 2018). Unfortunately, the philosophical literature on diversity in science has widely neglected the differences that result from the inequalities in resources and infrastructure among geographically diverse scientific communities.

The debates have largely focused on two domains: (i) epistemic diversity within relatively homogeneous epistemic communities where their members share infrastructure and resources, have (or should have) equal intellectual authority, and share a large portion of epistemic standards and ontological and theoretical assumptions; and (ii) trading zones among epistemic communities that maximally differ in terms of infrastructure and resources, intellectual authority, and much of their epistemic standards and ontological and theoretical assumptions. Yet the middle ground between these two poles remains unaddressed. Here, we find communities that share epistemic standards and theoretical and ontological assumptions but differ substantially in resources, infrastructure, and intellectual authority. This space encompasses the uncanny valley of "almost the same, but not quite" (Bhabha, 1984, p. 22), where variances risk being assessed as "bad" science and privileged parties are normally set as the standard of "the best practice." Interestingly, this is the case of geographically diverse scientific communities that belong to a world-system characterized by power relations and inequality. In my presentation, I argue there are reasons to find epistemic and social value in these differences.

First, drawing on Leonelli and Ankeny's (2016) concept of scientific repertoires, I offer a framework for understanding how structural inequalities shape distinct yet epistemically fruitful ways of doing science. Differences in resources and infrastructure can give room to locally adapted practices and toolkits to address specific needs while remaining continuous with mainstream scientific standards.

Second, I illustrate this claim through a case study: the development of the Kangaroo Mother Care Method

(KMC) in Bogotá, Colombia, during the 1970s. The KMC was developed in response to the high mortality, morbidity, and abandonment rates in premature and low birth weight infants at a local hospital that faced severe resource constraints. Health professionals, together with the families, designed a method that did not rely on the use of expensive and high-technology equipment and did not require long periods of hospitalization and isolation. This solution radically decreased mortality, morbidity, and abandonment rates, reduced costs, and allowed the provision of adequate standard intensive care in incubators to those who truly needed it (Rey Sanabria & Martínez Gómez, 1986). Today the method is recommended as a safe, low-cost, efficient, and "more humane" procedure for the care of these infants (WHO, 2022).

Despite the KMC's current recognition, the Colombian medical community had to face multiple barriers and epistemic injustices. With these obstacles in mind, I conclude by suggesting ways to foster more equitable collaborations among epistemically close but materially different scientific communities.

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## Ontological choices in affective science

**Juan Raúl Loaiza** · Universidad Alberto Hurtado

How should we classify emotions? Affective science has explored this question from various angles, such as whether emotions form distinct categories or whether they differ in a contiuum along two or more dimensions. One central problem in this regard, however, deals with how to decide between conflicting taxonomies of emotion across cultures and languages. For example, questions about the possible categorical differences between *shame* and *embarrassment* are motivated by the fact that English speakers talk about each of these emotions as distinct, whereas Spanish speakers classify these as types of the same emotion of *vergüenza*. Should we embrace questions that privilege understanding *shame* and *embarrassment* as types of *vergüenza*? Or should we think of *vergüenza* as a category that covers two presumably distinct emotions? How do we decide when two emotions are distinct and deserve their own category, or when they are types of the same emotion and must be lumped together, in light of such cultural and linguistic backgrounds?

In this talk, I examine the role of various background assumptions in how affective scientists make ontological choices concerning emotions. I claim that scientists should be wary about the taxonomies employed, the ontological choices they make, and how their background assumptions and values shape their research questions and methodologies, since these assumptions often bias their research in favor of arbitrary and imperialistic classifications of emotions. Hence, if affective science aims for a globalized, objective, and culturally responsible science of emotion, they should implement mechanisms that control and make these biases explicit. To do this, I analyze various cases of intercultural classificatory conflicts in emotion research and suggest some mechanisms to overcome these challenges.

## Epistemology of the State: The Linear Model and the Erosion of Technological Capabilities in Chilean Mining (1971–2024)

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**Cecilia Ibarra** · Universidad de Chile
**Juan F. Espinosa Cristia** · Utrecht University (Países Bajos)
**Nicolás A. Trujillo Osorio** · Universidad Alberto Hurtado

Despite ongoing technological efforts, Chile faces a structural stagnation in its Total Factor Productivity (TFP). Existing diagnoses usually attribute this phenomenon to a low capacity to generate technological knowledge, highlighting a meager investment in R&D—0.39% of GDP compared to the OECD average of 2.7% (Balbotín et al., 2018; CNEP, 2024). We argue, however, that this stagnation is also driven by a metric blindness regarding the compensatory technological adaptations deployed merely to sustain operations against natural depletion, and the subsequent dismantling of the infrastructure needed for long-term process engineering. Because standard state economic metrics evaluate efficiency without accounting for the physical depletion of natural resources, the massive engineering efforts deployed to counteract geological entropy in extractive sectors—such as the severe decline in ore grades in mining—are wrongly measured as a drop in efficiency. This distortion arises because "la función de producción no incorpora directamente el stock de recursos naturales“ (CNEP, 2025). We define this unmeasured technological effort to manage material complexity as an invisible Total Factor Productivity (Invisible TFP).To explain the root of this phenomenon, we propose to audit the epistemology of the Chilean State regarding science and technology policy. We argue that public policy suffers from an “epistemological blindness” due to the institutional naturalization of the linear model of innovation, explicitly codified in legislation such as Law 21.105, which restricts the State’s mandate to fostering “innovación derivada de la investigación científico-tecnológica”. While the linear model serves as a necessary rhetorical and statistical taxonomy for negotiating academic autonomy and organizing public budgets despite its empirical inaccuracies (Garrido et al., 2022; Godin, 2017; Kaldewey & Schauz, 2018; Kaldewey & Schauz, 2018; Schauz, 2014), the Chilean State commits a categorical error by legally naturalizing it to an extreme degree. It assumes technology is a universal and neutral commodity, rooted in the flawed premise that scientific discoveries will seamlessly and naturally translate into industrial applications. Consequently, this framework drives the “des-sedimentation” of local technological capabilities by funding short-term “applied science” while ignoring the actual complexities of industrial learning. A fundamental transversal property of technological knowledge is that its complexity is not determined by the final product or the export basket, but rather by the production process. Technological knowledge is intrinsically situated and cumulative; it cannot be simply imported as a “black box,” but requires a long-term “sedimentation” of active learning to adapt tools to specific local, biological, and geological conditions. Because technological systems must be co-constructed within specific territories, they require the active participation and representation of local users and communities to be socially sustainable. The State’s failure to recognize this situated nature creates a severe deficit of social representation. We conclude that for these technological capabilities to successfully sediment, they must be governed and legitimized as a “common good,” (Radder, 2019) rather than being treated solely as a commodified private asset. We will explore the plausibility of our hypotheses through a proposed case study of hydrometallurgy in the Chilean public copper mining sector, illustrating how this industry requires complex, situated engineering to maintain production levels and avoid collapse.

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## When Regulatory Competence Becomes Invisible. Astronomical matters and the Governance of Big Science in the Global South

**Nicolás Trujillo Osorio** · Universidad Alberto Hurtado

On December 20, 2024, AES Andes, a U.S.-based energy company, submitted to the Chilean state a ten-billion-dollar green hydrogen project to be built in the Atacama Desert — five and twelve kilometers from two of the most significant next-generation astronomical observatories in the world. Within days, the submission provoked open letters signed by more than three thousand scientists, diplomatic notes from an intergovernmental organization, and international media coverage characterizing Chile as institutionally unprepared to protect its own scientific heritage. Yet Chile's environmental institutions were doing precisely what they were legally designed to do. This talk begins with that paradox.

The presentation draws on a systematic documentary analysis of 93 legal and institutional instruments produced between 1963 and 2025 — spanning supreme decrees, international agreements, domestic legislation, and administrative resolutions — through which the Chilean state has constructed, layer by layer, its governance architecture for astronomical matters. This corpus reveals that responsibility for astronomical governance is distributed across eleven distinct domestic institutions and involves formal relationships with fifteen international scientific organizations representing twenty-four countries. Reconstructing this architecture methodologically — tracing which institution does what, under which legal mandate, and with which international counterpart — is itself an analytical act: it makes visible a system whose complexity is precisely what renders it illegible in moments of public controversy.

From this reconstruction, the talk identifies **three institutional tensions** that help explain why a legally competent state can nonetheless lose legitimacy in the governance of Big Science. The first is a classificatory tension: the category of "astronomical area" has been historically administered through mining regulation and only recently reclassified under an explicitly scientific rationale, a shift that the new environmental sensitivities of next-generation instruments — such as the Extremely Large Telescope and the Cherenkov Telescope Array Observatory — have made both urgent and contested.

The second is a valorative tension: the INNA controversy brought into open conflict at least three distinct evaluative frameworks — technical-regulatory, scientific-patrimonial, and economic-developmental — that produced different objects, attributed authority to different forms of knowledge, and generated incompatible accounts of what constituted a threat. The third is a circulatory tension: the regulatory knowledge produced by Chile's institutions reached the international spaces where legitimacy was being disputed only weakly, subordinated to a crisis narrative constructed largely from within.

Together, these tensions illuminate a broader challenge for science and technology policy in the Global South: governing the coexistence of multiple technological vocations in territories where the stakes — for science, for energy transition, and for diplomatic credibility — are simultaneously global and irreversible.

## Laws, Ontological Choices, and Values: Pluralism and the Nomic Stance

**Cristián Soto** · Universidad de Chile

With one nuance, this article largely agrees with Ludwig (2016) in claiming (i) that the truth value of scientific statements depends on ontological choices, and (ii) that the latter are motivated by non-epistemic values. Within this framework, from a pluralist perspective, I shall examine the nomic stance, which recommends positing laws in scientific ontology. The story goes as follows. First, the truth values of law-statements depend upon a crucial ontological choice concerning the reality of laws of nature. In turn, endorsing ontological commitments to laws of nature depend upon embracing one set or another of non-epistemic values, being the task of HPS on laws to determine which such non-epistemic values make us more inclined to assume an ontology of laws – where usually such non-epistemic values routenely escape considerations about experiments, evidence, and theoretical consilience. And the nuance mentioned above is just this. My argument differs from Ludwig's (2016) in that I strongly recommend conventionalism when it comes to laws of nature. Not only do I believe there aren't Plato's joints nor a single structure of the physical world for physics to discover, but I also think that an ontological choice that embraces laws is ultimately detrimental for the organisation of scientific practices in democratic societies. Throughout my analysis, I shall draw from the history of the nomic stance to substantiate this claims.

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## After the Natural/Non-Natural Divide. New Horizons for Classifying a Messy World

**David Ludwig** · Wageningen University and Research (Países Bajos)

Philosophical debates about classification have long been structured by the notion of "natural kinds," leading to a narrow focus on entities such as biological species and chemical elements that approximate philosophical ideals of naturalness. As a consequence of this tradition of natural kinds, analytic philosophy has often been deeply unhelpful for engaging with the complexity of our classificatory repertoires in navigating the world. In recent years, philosophers have made numerous attempts to address the constraints of narrowly conceived naturalness. While some philosophers—myself included—have suggested abandoning the notion of natural kinds altogether, others have proposed to broaden the notion to allow for engagement with diverse categories in (and beyond) science. While these debates often focus on the fate of the notion of natural kinds, the aim of this talk is to instead highlight commonalities of the competing proposals that all aim to overcome a strict natural/natural divide. I argue that these commonalities point towards new horizons for philosophical debates about classification and I briefly outline them across metaphysical, epistemological, and political dimensions.