FACULTAD DE FILOSOFÍA Y HUMANIDADES
UNIVERSIDAD DE CHILE

UNIVERSIDAD DE CHILE 183 AÑOS
EXCELENCIA AL SERVICIO DEL PAÍS

7TH WORKSHOP ON PHILOSOPHY OF SCIENCE: MATHEMATICS, MODELS, AND LAWS

Fecha y lugar:
02 & 03 julio 2026, 15.00 – 18.30 horas
Auditorio del Centro de Estudios Árabes
Facultad de Filosofía y Humanidades
Universidad de Chile

Organización y contacto:
Grupo de Estudios de Filosofía de las Ciencias de la Universidad de Chile
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Exponen:

DR. OTÁVIO BUENO, Filosofía, Miami, EE. UU / Tohoku, Japón

DR. ALDO FILOMENO, Filosofía, PUC de Valparaíso, Chile

DR. JOAQUIM GIANNOTTI, NACSA, Universidad Mayor, Chile

DR. DIEGO MALTRANA, Física, PUC de Valparaíso, Chile

DR. JUAN REDMOND, FILOSOFÍA, Universidad de Valparaíso, Chile

DR. CRISTIÁN SOTO, Filosofía, Universidad de Chile

Programa

	02 julio 2026
15.00 – 15.45	**Aldo Filomeno** Filosofía, PUC de Valparaíso *The second law of thermodynamics from an astronomical perspective*
15.45 – 16.30	**Juan Redmond** Universidad de Valparaíso *A pragmatic proposal on the distinction between the target system and phenomena*
16.30 – 17.00	**Café**
17.00 – 17.45	**Cristián Soto** Filosofía, Universidad de Chile *Wigner on laws and the effectiveness of mathematics*
17.45 – 18.30	**Otávio Bueno** Filosofía, Miami, EE. UU. / Tohoku, Japón *Laws of nature and the application of mathematics: an inferential conception*
	03 July 2026
15.00 – 15.45	**Diego Maltrana** PUC de Valparaíso *From symmetries to interactions: conserved quantities, causes, and a dual metaphysics of laws*
15.45 – 16.30	**Joaquim Giannotti** NACSA, Universidad Mayor *Grounding the ungovernable laws*
16.30 – 17.00	**Café**
17.00 – 17.45	**Cristián Soto** Filosofía, Universidad de Chile *Modalist empiricism, laws, and the structure of the world*
17.45 – 18.30	**Otávio Bueno** Filosofía, Miami, EE. UU. / Tohoku, Japón *Models, idealization, and surplus structure: the inferential conception at work*

Abstracts

Otávio Bueno

Filosofía, Miami, EE. UU. & Tohoku, Japón

Laws of nature and the application of mathematics: an inferential conception

A significant issue in the application of mathematics concerns the role played by (suitably understood) laws of nature in this process. In this paper, I examine how the inferential conception of the application of mathematics accounts for this role. This conception characterizes the application process in terms of suitable mappings between (aspects of) an empirical set up and the corresponding mathematical models, identifying three key steps: immersion, inference and interpretation. I examine the different contributions made by laws and modality in each of these steps. What emerges is a deflationary account of the use of laws in the application of mathematics.

Otávio Bueno

Filosofía, Miami, EE. UU. & Tohoku, Japón

Models, idealization, and surplus structure: the inferential conception at work

Three important issues need to be addressed to consider the role of (suitably understood) laws of nature in the application of mathematics: the status of models, the function of idealizations, and the contribution from surplus structure. In this paper, I examine each of these issues indicating how the inferential conception of the application of mathematics provides an account of them. As will become clear, this conception accommodates them without increasing ontological costs.

Aldo Filomeno

Filosofía, PUC de Valparaíso

The second law of thermodynamics from an astronomical perspective

The classical foundations of thermodynamics are facing an increasing number of contexts to address. One of them involves scenarios with long-range interactions, such as gravity (a case that, at first sight, might seem a mere technical complication). Our analysis aims to generalize the lesson from these exotic scenarios to support the understanding of the second law not as a fundamental law, but as a law emergent from underlying dynamics and constraints. The second law is thus best understood as a 'nomological machine', as defended by Cartwright (1999), holding only so long as certain conditions (including conditions on the underlying dynamics) obtain. This is to emphasize that its universal applicability must not be taken for granted a priori; it is an empirical issue that may fail at other scales — depending on the underlying dynamics of each effective theory in each scale/regime. While our arguments support certain approaches in the foundations literature, they challenge a widely held present-day consensus within the physics community—dating back to Einstein, Eddington, Planck, and others (Kragh, 2002)— that treats the second law as a globally inviolable truth, never to be overthrown, and according to which entropy decrease can occur only through improbable fluctuations.

Joaquim Giannotti

NACSA, Universidad Mayor

Grounding the ungovernable laws

According to the governing conception, the laws of nature determine or produce specific outputs or particular states of affairs. The idea that we can make sense of lawful governing in terms of the notion of *grounding* has gained traction in the metaphysics of laws. Maecham (2026) has recently argued that we should distinguish between two kinds of governing grounding—production and constraining—and argued in favour the latter. This paper argues that this distinction should be complemented by a distinction between qualitative and individualistic outputs of the law. It defends that the recognition of such a distinction clears the path toward a more promising grounding-based conception of governance. To make this case, it is explained how the proposed view meets plausible desiderata of governance and escapes certain pressing objections without adopting a constraining conception.

Diego Maltrana

Física, PUC de Valparaíso

From symmetries to interactions: conserved quantities, causes, and a dual metaphysics of laws

The metaphysics of laws of nature has traditionally emphasized the role of symmetries and structural principles in contemporary physics. In this paper, I argue that a closer examination of the relationship between symmetries, conserved quantities, and causation points toward a different metaphysical framework. While Noether's theorem establishes a deep connection between symmetries and conservation laws, several considerations motivate treating conserved quantities as ontologically prior to symmetries. Building on the conserved-quantity tradition in the philosophy of causation, I argue that causal processes are grounded in interactions through which conserved quantities are exchanged, transformed, and constrained. Extending this perspective beyond physics, I draw on mechanistic accounts of explanation to characterize causation across scientific domains in terms of organized patterns of interaction. This interaction-based approach supports a dual metaphysics of laws: at one level, interactions are grounded in dispositional properties or causal powers; at another, structural principles such as symmetries emerge as higher-order descriptions that organize and systematize patterns of interaction. The resulting framework provides a unified account of laws, causation, and scientific explanation.

Juaan Redmond

Filosofía, Universidad de Valparaíso

A pragmatic proposal on the distinction between the target system and phenomena

In this talk, I will propose a way to distinguish between the target system and the phenomenic portion based on the notions of 'statement of a problem' and 'statement of a solution' associated with model construction.

Cristián Soto

Filosofía, Universidad de Chile

Wigner, laws, and the effectiveness of mathematics

Various strategies are available to address the effectiveness of mathematics in the formulation of physical laws. Wigner's arguments for the purported unreasonableness of mathematics' effectiveness occupy a center stage. We revisit Wigner's philosophical views highlighting that he delivers reasons to mitigate the air of mysteries and miracles surrounding the effectiveness of mathematics. Then we examine proposals at the intertwining of the philosophy of mathematics and the philosophy of laws of nature. We set out the task of identifying and systematizing key philosophical problems resulting from these debates, and we argue for a deflationary, empiricist account of the contributions of mathematics to the formulation of laws.

Cristián Soto

Filosofía, Universidad de Chile

Modalist empiricism and the law-and-order tradition

We develop modalist empiricism in view of the relationship between laws and the structure of the world. Modalist empiricism maintains that we should remain agnostic about whether the world has a structure, while at once adopting a deflationary conception of laws understood as empirical hypotheses routinely formulated in mathematical terms and expressing our current best generalizations about various domains. This approach proves to be fruitful if compared to, on the one hand, nomological structuralism, which suggests that the world has a structure that we uncover investigating the laws of nature; and on the other, subjective structuralism, which maintains that we project any structure we find useful onto physical domains so long as it saves phenomena. Throughout our argument, we shall resort to the Feynman-Frisch's distinction between Euclidean and Babylonian understanding of laws, hence contributing to undermine the law-and-order tradition underpinning the imaginary of the laws of nature.