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Philosophy of the Physical Sciences, Biology and Health in Milan

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Abstract

This feature reports on the philosophy of the Physical Science, Biology and Health session of the first Milan Logic and Philosophy of Science Network workshop (12th March 2025). The six contributions presented by the authors are summarized, spanning epistemic cohesion, temporality, food, cognition, medical practice and the relationship between organisms and machines.

Keywords

Philosophy of the Physical Sciences; Philosophy of Biology; Philosophy of Medicine.

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The inaugural meeting of the Milano Logic and Philosophy of Science Network brought together scholars working in the Milan area at the intersection of logic, philosophy of science and the life and health sciences. Hosted at Politecnico, the event showcased the breadth and depth of contemporary research within, among the other areas, philosophy of the physical and biological sciences. From the dynamics of epistemic cohesion in nuclear fusion research, to the historical entanglements of organisms and machines, to the epistemological implications of food, the contributions shared during this first meeting reflect the growing importance of interdisciplinary perspectives in philosophical inquiry. Together, they invite us to rethink how knowledge is shaped – not only through formal reasoning and theoretical constructs but also through collaborative practices, historical metaphors, and cultural forms of life.

Concerning physical sciences, Luca Guzzardi (Università degli Studi di Milano) presented FusEUrope, a PRIN PNRR interdisciplinary project investigating the historical, epis-

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temic, scientific, and political dimensions of European cooperation in (peaceful) nuclear fusion energy research. Within this context, the project's social-epistemological strand seeks to develop an operational approach to the joint commitment model in scientific communities. Drawing on Margaret Gilbert's theory of collective belief, alongside critiques by Brad Wray and others, Guzzardi proposes a reframing of the model around shared goals rather than beliefs. This goal-based interpretation better captures the formal and informal structures that shape scientific collaboration – from contractual arrangements to tacit knowledge and institutional constraints – and more accurately reflects the dynamics of large-scale research projects. To test this framework, the project employs a mixed-method approach combining social network analysis and keyword analysis of co-authorship data in nuclear fusion research from 1979 to 2001. Preliminary results reveal both the continuity and internal differentiation of the field over time, and suggest that small but persistent groups of researchers may have played a key role in shaping long-term epistemic agendas. More broadly, the project aims to show how co-authorship clusters and their evolving thematic profiles can be interpreted as instantiations of joint commitments to specific research goals. In doing so, it provides a method for making joint commitments empirically tractable and offers a concrete framework for analyzing the formation and evolution of collective epistemic agents in science.

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A second contribution by Giuliano Torrengo (Università degli Studi di Milano) described the research activities carried out by the Lab LEMMings (Language, Epistemology, Mind, Metaphysics) at the State University of Milan, coordinated by Daniel Dohrn. LEMMings integrates resources from *Center for Philosophy of Time*, currently coordinated by Giuliano Torrengo himself, and *Culinary Mind: Center for the Philosophy of Food*, directed by Andrea Borghini.

The *Center for Philosophy of Time* (CPT) deals with the metaphysical discussion about the nature of time, within the fields of Philosophy of Science, Mind and Language. Past projects at PCT included *Timemethod*s, concerning the definition of common methodology in various areas of philosophy; *Timeframe*, that addresses common currency of conceptual resources in various disciplines; *Chrono*s, that deals with the common core of shared competences. Currently, the focus is on Temporal Experience and Social Cognition, whose Principal Investigators are Giuliano Torrengo and J. Michael. This project investigates the nature of temporal experience by combining philosophical analysis with experimental methods. It examines different interpretations of the belief that "time passes," ranging from metaphysically rich claims about the world's constant updating to more modest views centered on the continuous updating of conscious experience. Central questions include whether the feeling that time passes corresponds to a specific phenomenological content, or whether it reflects how we tend to describe

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our sensory experience. The project also draws on experimental philosophy to explore how people interpret temporal concepts and how cognitive biases, such as sunk cost effects and future bias, shape our experience and understanding of time.

Culinary Mind: Center for the Philosophy of Food was then presented by Sahar Tavakoli (Università degli Studi di Milano). Blending philosophical inquiry with cultural analysis, *Culinary Mind* explores food not merely as a matter of taste or nutrition, but as a site of knowledge production, aesthetic judgment, and cultural meaning. Tavakoli outlined the group's evolving role in the Horizon Europe-funded RELISH project, which seeks to reframe European culinary heritage through new philosophical and epistemological lenses. Culinary Mind has emerged as a dynamic platform for public engagement and interdisciplinary research, hosting workshops, lectures, and events that foreground food as a boundary object connecting the sciences, humanities, and everyday life. Through initiatives like the *Half Baked* colloquium and the *Crumble* newsletter, the group extends the reach of philosophical discourse beyond the academy, bridging logic, epistemology, and the philosophy of science.

Dealing with philosophy of biology and health, Maria Raffa (IULM University Milan) presented research conducted with Luisa Damiano, Antonio Fleres, and Sergio Rubin on the philosophy of cognitive biology, adopting a transdisciplinary perspective that integrates philosophical analysis,

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theoretical modeling, and computational simulations. Their work conceptualizes cognition as a biological phenomenon emerging from the dynamic interaction between brain, organism, and environment. Key research directions include modeling minimal cognition, exploring theoretical and computational models of the cognitive mind, simulating sustainable cognitive processes using the Free Energy Principle (particularly in AI systems), and advancing third-order cybernetics to understand human-technology-environment interactions and adaptive agency in complex systems. The research benefits from international collaborations (e.g., with Paul Dumouchel) and national projects such as PRIN 2022 (Org-SB-AI) and IULM's "Third-Order Cybernetics" initiative.

Thomas Bonnin (Politecnico di Milano) presented the research projects about contemporary approaches to health promotion held by Stefano Canali, Daniele Chiffi, Viola Schiaffonati, Giovanni Valente and himself, within the META research group. The core of their research is exploring and improving the basic building blocks of medical and clinical practice, whose epistemological underpinnings are often unexplored. Their works examine core practices like diagnosis, prognosis, and clinical reasoning, alongside emerging developments in medical datafication – from omics and AI to predictive models and synthetic data. These trends raise key questions about scientific change, reductionism, predictability and reliability and the philosoph-

ical reorientation of health concepts. Moreover, they also explore the rise of digital health as both an epistemic and ethical innovation, with attention to inclusivity, data ambiguity, and compatibility with evidence-based frameworks. Further areas of focus include exposome research, which integrates biological and social factors in public health, and evidence-based design, seen as a case of scientific expansion of evidence-based medicine into architecture and urban planning.

In conclusion, Maurizio Esposito (Università degli Studi di Milano) revisited the long-standing analogy between machines and organisms. Indeed, since the early modern period, philosophers, naturalists, and physicians have speculated on the extent to which the organic body might be identified with, or meaningfully compared to, machines such as automata, clocks, and other mechanical artefacts. Esposito examined some of the assumptions underlying these comparisons, exploring the origins and historical development of the perceived relationships between organisms and artificial constructs. He briefly explored when, why, and how people began linking human-made devices to the living world. He argued that the debate has been shaped by two dominant conceptions of technological artefacts: anthropocentric and non-anthropocentric conceptions. By tracing their historical emergence, he suggested that this distinction is key to understanding possible continuities and differences between organic life and machines.

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The first meeting of the Milan Logic and Philosophy of Science Network highlighted the diverse ways in which philosophical research can illuminate, and be transformed by, its engagement with scientific practice, historical inquiry, and cultural critique. Whether rethinking the epistemic foundations of scientific collaboration, challenging inherited metaphors in biology, or redefining what counts as an object of philosophical reflection, the contributions shared a commitment to critical interdisciplinarity. This event offered not only a snapshot of current research in Milan, but also a compelling vision for how philosophy can remain relevant in a rapidly changing intellectual and technological landscape.

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