# Philosophy, history and science. Interdisciplinary paths on multiple faces of nature

**Davide Pietrini**

*Il Saggiatore* (1623) by Galileo Galilei was one of the most influential books of the 17th century. In recent years, many authors have written about *Il Saggiatore* and its context, explaining its content and the reasons for its publication. In the book, based on arguments, partially based on empirical observations and always elaborated within epistemic remarks, against his opponent's syllogistic arguments, Galileo confronts Orazio Grassi's views on the origin of comets. The title, indeed, recalls the precision balance, known as the *saggiatore*, with which goldsmiths weighed gold. Although *Il Saggiatore* contains some inaccurate statements by Galileo about the nature of comets, the book is a milestone in the history of scientific thought, as it declares the way nature should be investigated with the famous statement:

> La filosofia [della natura] è scritta in questo grandissimo libro che continuamente ci sta aperto dinanzi a gli occhi (io dico l'universo), ma non si può intendere se prima non s'impara a intender la lingua, e conoscere i caratteri ne' quali è scritto. Egli è scritto in lingua matematica, e i caratteri son triangoli, cerchi, ed altre figure geometriche, senza i quali mezi [sic] è impossibile a intenderne umanamente parola; senza questi è un aggirarsi vanamente per un oscuro laberinto[1].

1 Galileo Galilei, *Il saggiatore*, in *Le opere di Galileo Galilei. Ristampa della Edizione Nazionale*, Antonio Favaro (ed.), vol. VI, Firenze, Tipografia di Barbera, 1933, p. 232.


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From a literary point of view, the work is considered highly effervescent. Galileo uses multiple linguistic registers and explanatory devices from different disciplines, such as rhetorical figures, images from the world of art, philosophical quotations, physical and thought experiments.

To celebrate the 400th anniversary of Galilei's *Il Saggiatore*, the councils of SFI (Italian Society of Philosophy), SILFS (Italian Society for Logic and Philosophy of Science) and SISS (Italian Society for the History of Science), under the auspices of the Museo Galileo - Istituto e Museo di Storia della Scienza, The Department of Humanities and Philosophy (DILEF) of the University of Florence and World Congress Philosophy Rome 2024, organized a conference entirely devoted to young researchers with the participation of three invited speakers: the philosopher of science Luciano Boi, the historian of science Flavia Marcacci and the logician Massimo Mugnai. The conference was held at Museo Galileo in Florence from the 28th to 30th of June 2023 (https://sites.google.com/uniurb.it/sfi-silfs-siss-conference/home?authuser=0). On behalf of the organising committee, I would like to thank Museo Galileo, which hosted the event and enabled us to organise this initiative in an evocative setting.

The conference aimed to gather young researchers working in philosophy, philosophy of science and history of science and offer them the opportunity to present and discuss their papers in an informal and stimulating environment. The papers were followed by a lively debate and interesting insights enriched by the participation of members of the organising societies and Museo Galileo: Ferdinando Abbri, Francesco Bianchini, Filippo Camerota, Elena Canadelli, Gustavo Cevolani, Natacha Fabbri, Vincenzo Fano, Roberto Ferrari, Matteo Galletti, Paolo Galluzzi, Pierluigi Graziani, Alessandra Lenzi, Matteo Martelli, Stefano Poggi, Gaspare Polizzi and Fiorenza Toccafondi.

Like Galileo's work, the conference was also strongly interdisciplinary, giving voice to the most important research by young scholars and currently characterising the scientific disciplinary field of philosophy and the history of science.

In this volume, we publish some lectures of the conference. The filrouge is the evolution of knowledge and the scientific thought without

neglecting their relation to nature, techniques and technology. Different approaches are analysed.

In *Heaven is a Space on Earth: Geometry in sacred spaces in early modern Europe and Japan* Antonia Karaisl shows that not only the practical problems precipitated mathematical advances in diverse technical fields that fostered the progress of mathematics in the Early Modern context, but also Wasan, a mathematical tradition developed in Japan as an intellectual pursuit with a social dimension. In *Dis-robing the Guardaroba: The Arctic as viewed from Florence* Elisa Palomino and John Cloud examine the representation of the Arctic region, as depicted in the four 'Polar Lands' maps in Palazzo Vecchio's *Guardaroba*, inspired by Mercator's azimuthal projection of the North Pole, and the circulation of objects during the early modern period as trade goods and diplomatic gifts. In *Mathematics, Language Games, and Black Boxes from Galileo to Wittgenstein* Giovanni Galli explores the conceptual implications of language modelling in artificial intelligence, particularly the role of mathematics in natural language processing systems and Large Language Models (LLMs). It juxtaposes the perspectives of Galileo and Wittgenstein on the nature of mathematics and its connection to the ability of LLMs to understand language. In *Galilei's Strategy of Subjectivisation* Mario Schärli explicates and critically examines the Strategy of Subjectivisation, interpreted as transition from metaphysical thesis that things have no sensory qualities to the thesis that sensory qualities are located in the experiencing subject in Galilei's *Il Saggiatore*. In *Galileo Galilei: non solo scienza. Per una rivisitazione della lettura husserliana* Sara Drioli reviews the interpretation provided by Husserl on the figure of Galileo that emerges also and above all in his last work. In *"Tutto è Dao". Una riformulazione delle nostre idee e del nostro approccio nei confronti dell'ambiente attraverso una prospettiva daoista* Sara Francescato reformulates the traditional conceptions of nature through a comparison with ideas developed within the different frame of the Chinese culture, analysing the human-nature relationship from a daoist perpective. In *Più largo campo di filosofare: John Wheeler, il Liber Naturae e l'ingegneria* Stefano Furlan examines the methodological analysis by John A. Wheeler on the engineering and the more practical dimension of science, giving

particular attention to the Galilean celebrations of 1964 and contextualizing some Wheeler's reflections inspired by that anniversary.

At the end of the volume, essays by two invited speakers are published. In *Sul concetto di simmetria, da Galileo alla teoria quantistica dei campi* Luciano Boi offers an in-depth historical and philosophical excursus on the development of the concept of relativity, starting from the scientific revolution of the seventeenth century up to Einstein's theory of general relativity. He examines the contributions of scientists and philosophers who have shaped our current way of understanding space, time and the laws of physics. In *Historians of Science, Creators. Philosophical Perspectives on the History of Science on the light of The Assayer by Galileo Galilei* Flavia Marcacci offers an interpretation of Galileo's *Il Saggiatore*, emphasizing its literary and narrative dimensions, the role of scientific instruments and the rhetorical-dialogical dispute. Her analysis highlights the enduring relevance of Galileo's work and underscores the value of interdisciplinarity in philosophical and historiographical inquiry.

All essays of this volume focus on a particular field of knowledge and highlight the complex relationship between history, philosophy and science, to investigate the evolution of knowledge and its relationship with the many faces of nature.

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