Guest-editorial

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This issue of *Foundations of chemistry* collects some contributions presented at the 23rd annual conference of the International Society for the Philosophy of Chemistry (ISPC) held in Turin (Italy) from 15 to 17 July 2019. The conference confirmed the international character of ISPC as it was attended by researchers from 18 different countries, from the United States to Latin America, from Europe to India and Japan. This wide range of nations was matched with a wide variety of topics and argumentative techniques.

The theme chosen by Nagamani Sukumar (Shiv Nadar University, Dadri, India) is clearly expressed by the title of his contribution: "Ontological Status of Time in Chemistry". Sukumar covered the topic in light of the anthropic principle and analysed the ontological and epistemological status of the concepts of chemical substances, molecular stability, molecular collisions, chemical reactions, reversible and irreversible reactions.

From Portugal comes the contribution of Davide Vecchi, Gil Santos (Universidade de Lisboa) and Gabriel Vallejos (Universidad de Chile) on the structure and function of proteins. The theme is addressed as part of a 'relational-construction-based potentialism'. The argument of the three authors is closely related to the assumption of a relational ontology.

The problem of structure–activity relationship and their quantitative modelling (QSAR) is at the heart of the contribution of Giuseppina Gini (Politecnico di Milano, Italy). Gini discusses the philosophical, and scientific problem of similarity, in light of Giere's statement that "Similarity is context dependent". This includes an analysis of the predictive tools offered by Deep Neural Networks and the connectionist perspective.

Klaus Ruthenberg (Coburg University of Applied Sciences, Germany) and Ave Mets (University of Tartu, Estonia) chose an extremely broad theme—the epistemological nature of chemistry—and treat it in reference to three fundamental concepts of chemistry: acidity, electronegativity and chemical elements. Ruthenberg and Mets express their viewpoint in a peremptory way, from the title of their contribution, by stating "Chemistry is pluralistic".

Cognitive pluralism is a value also defended by the physicist Antonino Drago (University of Napoli, Italy), who returns to the widely debated theme of the reduction of chemistry to physics by defending the epistemic autonomy of chemistry and supporting the intrinsically plural nature of science.

"The Underpinnings of Sciences" is the thematic title of the contribution of Sarah Hijmans (Université Paris-Diderot, France) and Jean-Pierre Llored (École Centrale of Casablanca, Morocco). The theme is developed by analyzing the debate on the nature of

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chlorine in the first decades of the nineteenth century, in a historical–critical way. Their epistemological analysis is based on the concept of ‘hinges’, taken from Wittgenstein and elaborated in recent years by Llored and the late Rom Harré.

The strangification technique is the argumentative techniques chosen by Hirofumi Ochiai (Nagoya Bunri University, Inazawa, Aichi, Japan) for his programmatic contribution "Understanding molecular structure requires constructive realism". This technique is due to the Austrian Fritz Wallner, and in Ochiai's words: "Strangification is a technique of intentionally taking an accepted proposition out of one scientific system and putting it into a completely different context".

The theme of molecular structure is also debated by Gabriela Garcia Zerecero (Universidad Panamericana, Guadalajara, Mexico), who observes that "dynamism and structuring are blended into a single reality". She concludes that "molecular modeling presupposes a realistic epistemology that recognizes the limits of scientific objectification".

Sergio Sereno (University of Torino, Italy) takes into account the evolution of the Periodic Table using the epistemic argumentative tools provided by the concepts of prediction, contraprediction, accommodation, use-novel. Sereno calls his epistemological point of view "a weak form of predictivism".

The argumentative instrumentation used by Clevis Ronald Headley (Florida Atlantic University, USA) is stated in the title of his contribution: "Philosophy, Natural Kinds, Microstructuralism and the (Mis)use of Chemical Examples: Intimacy versus Integrity as Orientations Towards Chemical Practice." 'Intimacy' and 'integrity' are interpretive categories of entire cultures, and were proposed by Thomas Kasulis in 2002 as part of comparative cultural studies. In his conclusions, Headley stresses the "importance of an intimate understanding of chemical practice when deploying chemical examples in the context of philosophical discussions about ontology and metaphysics".

The conference, held on the 150th anniversary of Mendeleev's Periodic Table that was celebrated by a lecture by Eric Scerri, hosted two events that were not strictly academic. Vanessa Seifert (University of Bristol, UK) presented a moving and documented memoir of Geoffrey Blumenthal, an active member of the ISPC who passed away after organising the 22nd conference of ISPC in Bristol. The second event concerned the centenary of the birth of Primo Levi, the great chemist writer and witness of the Shoah, who was born and lived in Turin. Paolo Giacobbe presented and screened a short film inspired by the chapter 'Iron' of Levi's Periodic System (Giacobbe and Porcu 2016).

We conclude this presentation of the special issue of FOCH with some thoughts on the philosophy of chemistry as a discipline. In 1996 Joachim Schummer published a volume entitled "Realism and Chemistry: Philosophical Research on the science of substances". The entire chapter 3 of that work was devoted to chemistry as a stepdaughter (*Stiefkind*) of philosophy (Schummer 1996). At the same time, Eric Scerri and Lee McIntyre edited a special issue of *Synthese* focused on the philosophy of chemistry. In the editorial introduction they defined the philosophy of chemistry "the neglected sibling of the philosophy of physics and the philosophy of biology" (Scerri and McIntyre 1997a). In their contribution to the special issue they wrote: "While the *quality* of the literature that has appeared so far has been very high, the *quantity* is out of all proportion to that of the philosophy of physics and the philosophy of biology, and what has appeared has not yet convinced most philosophers of science of the legitimacy of chemistry as an area of philosophical concern." (Scerri and McIntyre 1997b). Although the quantitative gap with other disciplinary philosophies has not yet been bridged, the quantitative and qualitative level of the scientific production in the sector has increased significantly in recent years. The work of the philosophers of chemistry is addressed to the entire community of chemists: only an increased

awareness of the value and significance of the epistemological reflection, achieved by chemistry practitioners and teachers, will allow the chemical discipline to fully affirm its cultural and cognitive value.

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