

Guest Editorial

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This special issue of *Foundations of Chemistry* brings together, in two parts, selected papers presented at 2016 symposium of the International Society for the Philosophy of Chemistry, which was held August 1–4 in Boca Raton, Florida (USA). The symposium was sponsored by Florida Atlantic University and organized by Marina P. Banchetti-Robino and Clevis R. Headley. This 20th annual symposium of the ISPC included 24 lectures by participants from 11 countries and featured keynote addresses by Manuel DeLanda (USA and Switzerland) and Eric Scerri (USA). The topics discussed included the history of chemistry, as well ontological, epistemological, pedagogical, ethical, and environmental issues that arise from the theory and practice of chemistry.

The complete list of speakers and their abstracts are found at: <https://sites.google.com/site/ispc2016/>.

In this first part of the special issue, we offer contributions by Manuel DeLanda, Grant Fisher, Robert Prentner, Sebastian Fortin, Olimpia Lombardi, Juan Camilo Martínez González, and Klaus Runthenberg.

In his contribution titled “Realism and the History of Chemistry”, Manuel DeLanda presents a model of a scientific field that serves as an alternative to the holistic model presented by Thomas Kuhn. For DeLanda, a scientific field is constituted by several elements that are interrelated. These are the domain of objective phenomena, the community of practitioners, and the instrumentation and practices that are employed in the laboratory. Because, for DeLanda, the relations between these various elements do not determine the identity of what they relate, this model of scientific practice does not fall prey to many of the problems associated with Kuhn’s holistic model of scientific paradigm.

Grant Fisher’s essay, “Content, Design, and Representation in Chemistry”, addresses the epistemic consequences of the interplay between content and design in chemical representations. Fisher argues that, while practitioners make specific commitments to represent certain properties or to choose to leave them out, sometimes representing a target

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as possessing a certain property can involuntarily rule out the representation of others. As a result, representational occlusions arise that are features of our representational practices. Thus, Fisher concludes that designs are representational schemes that go beyond merely conveying content by also determining the content that cognitive agents can represent. The generativity of design practices creates the conditions for manipulating constraints on representational content and knowledge of target systems in chemistry.

Robert Prentner's contribution, "Chemistry, Context and the Objects of Thought", examines the conceptual obstacles that must be overcome if future theories of mind are to be successful in helping us understand the nature of consciousness. To this end, Prentner defends the idea that philosophy of mind can seriously profit from insights generated in the philosophy of chemistry. More specifically, Prentner challenges the artificial demarcation between the mental as a productive domain and the material as a non-productive domain should be undermined in favor of the idea that material nature is necessarily productive. He brings to bear to his discussion insights from phenomenology, process thought, and decompositional mereology to argue against a substantialist theory of mind and in favor of a contextualist and relationalist conception of consciousness.

In their essay "The Relationship Between Chemistry and Physics from the Perspective of Bohmian Mechanics", Sebastian Fortin, Olimpia Lombardi, and Juan Camilo Martínez González challenge the orthodox idea that the only thing standing in the way of a successful reduction of chemistry to quantum mechanics is the complexity of the equations. In practice, physicists have introduced approximations to simplify the equations. However, such approximations have been controversial due to the assumptions that are introduced and due to the problematic nature of some quantum mechanical descriptions of basic elements of chemistry. Fortin, Lombardi, and Martínez González propose that Bohm's quantum theory of motion may offer a more adequate theory for quantum chemistry since it may help to clarify and even dissolve some of the problems encountered by other approaches.

Finally, Juan Camilo Martínez González and Klaus Ruthenberg's essay "Electronegativity and Its Multiple Faces: Persistence and Measurement" focuses on electronegativity as a concept that is used to explain many aspects of reactivity. Although electronegativity is one of chemistry's most relevant concepts, it is far from being precisely determined because electronegativity cannot be measured by direct means. This essay discusses electronegativity with respect to its main conceptual and operational continuities and discontinuities. The authors attempt to analyze the epistemological status of electronegativity as a typical example from the chemical sciences. This analysis focuses on the question of the reference of electronegativity, on its historical persistence, and on the relation between empirical measurements and theoretical quantification.