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## **Organization beyond design: how biology may explain interacting whole systems**

Organizational and evolutionary views of living beings certainly emphasise different aspects of life and give way to different research lines in biological sciences: whereas organizational approaches sometimes avoid saying that inheritance or evolution have a role in the constitution or arrangement of living beings or their parts, evolutionary thinking seems to be more concerned with the selection of traits than with providing explanations of how they generate.

Ideally, both perspectives should be integrated. Organizational approaches aim to study system properties as wholes and/or emerging from the dynamics of parts, linked to considerations of homeostasis, self-organizing far-from-equilibrium dynamics, and/or autonomy. Philosophers of biology often appeal to Kant's third *Critique* to defend that, contrary to the evolutionary thinking developed as an answer to Paley's view --in which organisms and machines (watches) appear to be analogously designed starting with fixed parts (either by God or by natural selection)-- there is intrinsic teleology in life, and organisms should be considered and studied as natural purposes. In contrast, the evolutionary perspective focuses in the genealogical connection among living beings: their features do not arise and disappear due to their spontaneous physicochemical properties, or at least not only because of them, as many of their capacities have been shaped by their ancestors or in some other way (i.e. lateral transfer) *in-formed* by others, via design (natural selection) or opportunity (tinkering).

One important correction to overcome this dichotomy comes from interactive or ecological perspectives, according to which living beings have not only *intrinsic* properties --as those traditional evolutionary and organizational perspectives aim to explain--but also *relational* properties arising from environmental interactions among living entities or their constituents. The interactive perspective challenges both the classical evolutionary and organizational views, and may provide clues to find bridges among them.

My goal in this talk is to analyse some intuitions on materiality, teleology, design, autonomy and integrity motivating the two broad views. Then I intend to look specifically to biological perspectives focusing on how starting from a perspective based in the integration of individuals may shape evolutionary thought. Among those, developmental approaches to the generation of form and physiological approaches inspired by the 19<sup>th</sup> century model of homeostasis provide examples of alternatives both to the traditional view based on design (which equates organisms with machines), as well as to that based on self-organization (which has difficulties to explain how patterns achieve functions) by considering that form (or structure) and function cannot be separated in our explanations of living entities.

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