## LIFE, EVOLUTION, SENTIENCE: A Philosophical Colloquium

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## UNED, Madrid, 8-9 February 2024

#### **Organizers and Funding**

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Illustration on the front page:

The elephant clock, from *The Book of Knowledge of Ingenious Mechanical Devices* by Ibn al-Razzaz Al-Jazari (1136–1206), translated and annotated by Donald Routledge Hill, Dordrecht/D. Reidel. (1974). Al-Jazari interprets its creation as a symbol of multiculturality: "The elephant represents the Indian and African cultures, the two dragons represent Chinese culture, the phoenix represents Persian culture, the water work represents Greek culture, and the turban represents Islamic culture."

## SCHEDULING

				Tuesday 8/2/2024
				MODULE 1 LIFE: MUTLIDISCIPLINARY VIEWPOINTS
morning	10:00	10:15		welcome and introduction to module 1
	10:15	П:00		<b>Maurizio Esposito</b> The evolutionary argument against "reality" (and realism)
	п:00	п:45		<b>Lorenzo Baravalle</b> Artificial Life, artificial sentience?
	п:45	12:15		coffee break
	12:15	13:00		<b>Santiago Ginnobili</b> The Metatheoretical Nature of the Violation of Expectation Paradigm
	13:00	13:15		Final discussion
	13:15	14:30		lunch

			Tuesday 8/2/2024
			MODULE 2 SENTIENCE: NEW PERSPECTIVES
	14:30	14:45	introduction to module 2
afternoon	14:45	15:30	<b>Davide Vecchi</b> Does biology provide good reasons to cut phylogeny sharply between sentient and non-sentient organisms?
	15:30	16:15	<b>Gustavo Caponi</b> Sentience as a cognitive-behavioral ability
	16:15	16:45	coffee break
	16:45	17:30	<b>Gil Santos</b> Sentience – from a psychological and neuroscientific point of view (can a non-neuropsychological sentience exist?)
	17:30	17:45	Final discussion
	20:30	22:30	dinner

				Friday 9/ 2/ 2024
				MODULE <sub>3</sub> EVOLUTION: FORMAL AND METAPHYSICAL ISSUES
morning	10:00	10:15		introduction to module 3
	10:15	П:00		<b>Giorgio Airoldi</b> Sentience: trait or essence? The conundrum that adaptationism cannot solve
	П:00	п:45		<b>Victor Luque</b> A universal view of evolution
	п:45	12:15		coffee break
	12:15	13:00		Vanessa Triviño & Cristina Villegas Characterizing the relation between dispositions and types in evo-devo: a metaphysical approach
	13:00	13:15		Final discussion & End of workshop

## ABSTRACTS

#### MODULE ONE

#### LIFE: MUTLIDISCIPLINARY VIEWPOINTS

#### Maurizio Esposito

#### The evolutionary argument against "reality" (and realism)

In the Introduction of his Creative Evolution, Bergson argues that our perceptive and cognitive systems did not evolve to represent - and eventually understand - "reality" but they evolved to deal with the circumstantial challenges of our environments. Accordingly, as we do not expect hammers to be fit for writing novels, we should not expect our brains to provide "accurate" representations of the external world (and, more particularly, living processes). Our brains - Bergson claimed - evolved for grasping generally static, synchronic, and simple geometrical structures, not for speculating over highly complex, dynamic, and diachronic systems. In short, our brains have been shaped by evolution to provide purposely inaccurate, although useful and functional, pictures of the environment. In this talk, I address, analyze, and criticize what I call the "evolutionary argument against reality", which, as far as I know, has never been properly settled. Drawing on more recent studies addressing it (i.e., Donald Hoffman), I show that, while the argument is itself self-defeating, we cannot easily reject it either.

Maurizio Esposito is currently a Senior Research Fellow at the Interuniversity Center for History of Science and Technology at the University of Lisbon (Portugal). He studied philosophy at the University of Biology (Italy) and earned a Ph.D. at the University of Leeds (UK) in History and Philosophy of Science in 2012. He has taught at UNAM, Mexico, at the University of Santiago of Chile, and at the Federal University of ABC in Brazil. He has published widely in the area of History and Philosophy of Life Sciences.

#### Lorenzo Baravalle

#### Artificial Life, artificial sentience?

In this talk, I shall critically review recent literature on the possibility of building conscious machines, starting from our knowledge of the evolutionary origins of sentience. In particular, I shall draw on Ginsburg and Jablonka's (2019) Unlimited Associative Learning (UAL) framework, Bronfman et al.'s (2021) extension of the UAL framework to robotic devices, and Man and Damasio's (2019) work on soft robotics. These accounts point to promising directions for future research in Artificial Life. However, I shall argue

that the actual realisation of robotic devices that exhibit UAL would ultimately pose a challenge to the UAL framework itself.

Lorenzo Baravalle research interest ranges from the philosophy of evolutionary biology (with particular emphasis on the extensions of evolutionary models to epistemology, cultural dynamics and computation) to the philosophy of computer sciences (with particular emphasis on engineering perspectives and physical realisations of computational systems). His research in the last years has been focused on 3 main topics: 1) The mathematical modelling of evolutionary processes; 2) the causal structure of evolutionary explanations; 3) Computational ontology and computational explanations.

#### Santiago Ginnobili

#### The Metatheoretical Nature of the Violation of Expectation Paradigm

The violation of expectation paradigm is a commonly used procedure for non-human animals or pre-linguistic humans. Surprisingly, there is little discussion about it in philosophical literature. The objective of this presentation will be to provide a first approach to the metatheoretical nature of the assumptions behind the procedure that appeals to the violation of expectation, and to extract some consequences. I will show that there is an empirical principle behind it that affirms that violating the expectation of certain mental rules produces surprise. Next, I will discuss the nature of these "mental rules." Theoretical concepts proposed by theories, such as mental rules, do not have a fixed interpretation, as is often the case. This will allow me to show that the usual relationship found in the developmental literature between this experimental paradigm and cognitive approaches (which interpret experimental results in terms of higher-level mental activities) is not necessary. Finally, I will explore the intertheoretical relationships between this experimental design, the mark test, and the inequity aversion test.

Santiago Ginnobili's field is the philosophy of science, especially the philosophy of biology. His Ph.D. thesis was on the theory of natural selection. He presented a reconstruction of the theory of natural selection using the tools of metatheoretical structuralism. He has also worked on the metatheoretical nature of functional language and on various aspects of the Darwinian revolution. Finally, he is interested in how work in philosophy of science can have implications for didactics and science communication.

## <u>MODULE TWO</u> <u>SENTIENCE: NEW PERSPECTIVES</u>

#### Davide Vecchi

#### Does biology provide good reasons to cut phylogeny sharply between sentient and nonsentient organisms?

In this talk, I shall try to identify what kinds of empirical evidence and theoretical considerations should be used to support specific hypotheses concerning the evolutionary origin of sentience. This is a demanding endeavour, as various phylogenetic, cognitive and behavioural lines of evidence and criteria are required to make sense of sentience ascription hypotheses. The solution seems to require a philosophical axe of some kind.

Davide Vecchi studied philosophy of science at the University of Bologna (Italy) and the London School of Economics and Political Science (United Kingdom). Before joining the Centro de Filosofia das Ciências (CFCUL) of the University of Lisbon (Portugal), Davide had been Postdoctoral Research Fellow at the Konrad Lorenz Institute for Evolution and Cognition Research (Austria) and Lecturer at the Department of Philosophy of the Universidad de Santiago (Chile). Davide is interested in theoretical issues in biochemistry, molecular biology, developmental biology and evolutionary biology. Currently he is working on the evolution of sentience, on alternative approaches to protein folding and on the conceptual basis of molecular evolution.

#### Gustavo Caponi

#### Sentience as a cognitive-behavioral ability

Cognitions are the records that a living being has of the functional adjustment of the patterns that guide some of its reactions and that make possible the optimization of these patterns in future occurrences of these same reactions. Accordingly, sentience can be thought of as a set of records that a living being has of its internal states and that allow it to react behaviorally to these states. This makes the existence of this sentience, and the forms it adopts, accessible to observation. We can attribute a syntentional register to a certain living being, to the extent that we can also attribute to it behavioral reactions that can be considered as responses guided by that cognition.

Gustavo Caponi attained his Philosophy degree at the National University of Rosario (Argentina) in 1984; and, in 1992, he obtained his Ph.D. in Logic & Philosophy of Science at the State University of Campinas (Brazil). Since 1993, he has been a professor at the Federal University of Santa Catarina (Brazil); at this moment, he is Full Professor in the philosophy department. He is also scholar of the Brazilian Research Council. His publications, mainly concentrated in Philosophy and History of Biology, include several

books; the tenth of which, Linajes: Esas Cosas que Evolucionan, has been recently published in Colombia.

#### **Gil Santos**

Sentience – from a psychological and neuroscientific point of view (can a nonneuropsychological sentience exist?)

If sentience is to be understood in terms of "subjective, valenced experiences", "minimal consciousness", or "feelings" that a system may have about its own internal states, then sentience is, by definition, a psychological phenomenon. In this sense, the question of what types of structures can instantiate psychological properties can only be adequately addressed by taking human and comparative psychology into consideration.

Gil Santos works as an assistant researcher at the Faculty of Sciences of the University of Lisbon. His research primarily focuses on developing a relational-transformational theory of emergence, a structural-relational account of downward causation, and a neo-mechanist model of interlevel integrative explanation.

### <u>MODULE THREE</u> <u>EVOLUTION: FORMAL AND METAPHYSICAL ISSUES</u>

#### Giorgio Airoldi

#### Trait or essence? The unsolvable conundrum of sentience in evolutionary biology

Whether sentience is an evolutionary novelty appeared at some point in the history of life or a feature consubstantial to life is a main questions in evolutionary biology and philosophy. In this talk I analyse the following meta-question: can an adaptationism research program shed light on this issue? I suggest that adaptationist tools, either formal models or unformal narratives, cannot. This is due to the peculiar features of sentience, which can hardly be identified as a trait in evolutionary terms, and whose form and function are challenging to identify, define and formalise. I conclude with some examples of adaptationist accounts from recent literature that, in my view, confirm my suggestion.

Giorgio Airoldi got his PhD in philosophy of science with a thesis about pluralistic accounts of evolution. His research interests focus on adaptationism in evolutionary biology, philosophy of mind and philosophy of medicine, with special concern for the implicit and unrecognized ontological commitments in scientific theories.

#### Victor Luque

#### A universal view of evolution

Due to its high degree of complexity and its historical nature (Bartholomew 1986), evolutionary biology has been traditionally portrayed as a messy science (Tawfik 2010). According to this view, evolutionary biology would be unable to formulate laws and robust theories, instead just delivering coherent narratives and local models focused on terrestrial life (Pigliucci 2002, Waters 2011). However, evolution is a phenomenon that must occur in any part of the Universe, if conditions permit. In addition, evolution can occur to non-biological entities (e.g. cultural entities; Lewens 2015). Therefore, there is an ever-growing need for a universal view of evolution, connecting all possible evolutionary systems: biological evolution (including astrobiology and synthetic biology; Irwing and Schulze-Makuch 2011, Moya et al. 2009), cultural evolution (including the evolution of human societies; Turchin 2011), algorithmic evolution (Basset et al. 2005), chemical evolution (Pross 2011), etc. My aim is to challenge the traditional (local) view of evolution by showing how the formalism developed by George Price (1970, 1995), the Price equation, can work as the core of a universal theoretical framework for evolutionary phenomena.

Victor Luque is a Philosopher of Science, specializing in the philosophy of the biological sciences. I mainly work on the structure of evolutionary theory, its mathematical models, and the causes of evolution. I'm currently an Assistant Professor at the Dpt. of Philosophy (Knowledge area: Logic and Philosophy of Science), University of Valencia.

#### Vanessa Triviño & Cristina Villegas

# Characterizing the relation between dispositions and types in evo-devo: a metaphysical approach

Biological traits have been interpreted as natural kinds in the philosophical literature. Here, we argue that current theories cannot properly explain how traits evolve, and, following the evo-devo approach to evolution, we propose to characterize them as natural dispositional kinds instead. We further argue that this particular case study constitutes an example of a kind of interaction between metaphysics and biology that we label Metaphysics from Biology, where the specific demands of a complex reality such as evolution require the development of metaphysical notions that seem to go beyond those given in the literature.

Vanesa Triviño received her PhD from the University of Murcia with a thesis in Metaphysics of Biology (2019). She has carried out research stays at the Konrad Lorenz Institute (Klosterneuburg, Austria) and Egenis: the Centre for the Study of the Life Sciences (Exeter, England). She is currently an assistant professor at the UCM, focusing on issues of contemporary metaphysics, metaphysics of science and biology, and feminist metaphysics. Her work addresses the issues that arise in the interaction between metaphysics and science in general, and metaphysics and biology in particular, and she studies theories of the metaphysics of processes, properties and relations to explore their possible application and contribution to the philosophy of biology and the characterisation of categories for sexual differentiation.

Cristina Villegas is a philosopher of biology working on probabilities and the notion of chance in evolution. Her main approach is to apply some tools of the causalists-statisticalists debate in evolutionary explanations to shed light on the problem of phenotypic variation from an evo-devo perspective. As such, she is focused on a propensity understanding of evo-devo notions such as evolvability and modularity.

#### HOW TO GET TO THE VENUE

#### ADDRESS

UNED, Facultades de Humanidades Sala B Paseo Senda del Rey 7 28040 Madrid

#### **PUBLIC TRANSPORT**

From Moncloa:

Bus 46, stop: Puente de los Franceses

Bus 160, 161, stop: Avda. de Séneca

From Principe Pio:

Bus 46, stop: Parada Senda del Rey - Obispo Trejo



#### **CONFERENCE DINNER**

Restaurant O PULPO (Galician tradition) Calle de los Cañizares, 8

Closest Metro stations: SOL, Sevilla, Tirso de Molina, Antón Martín.

