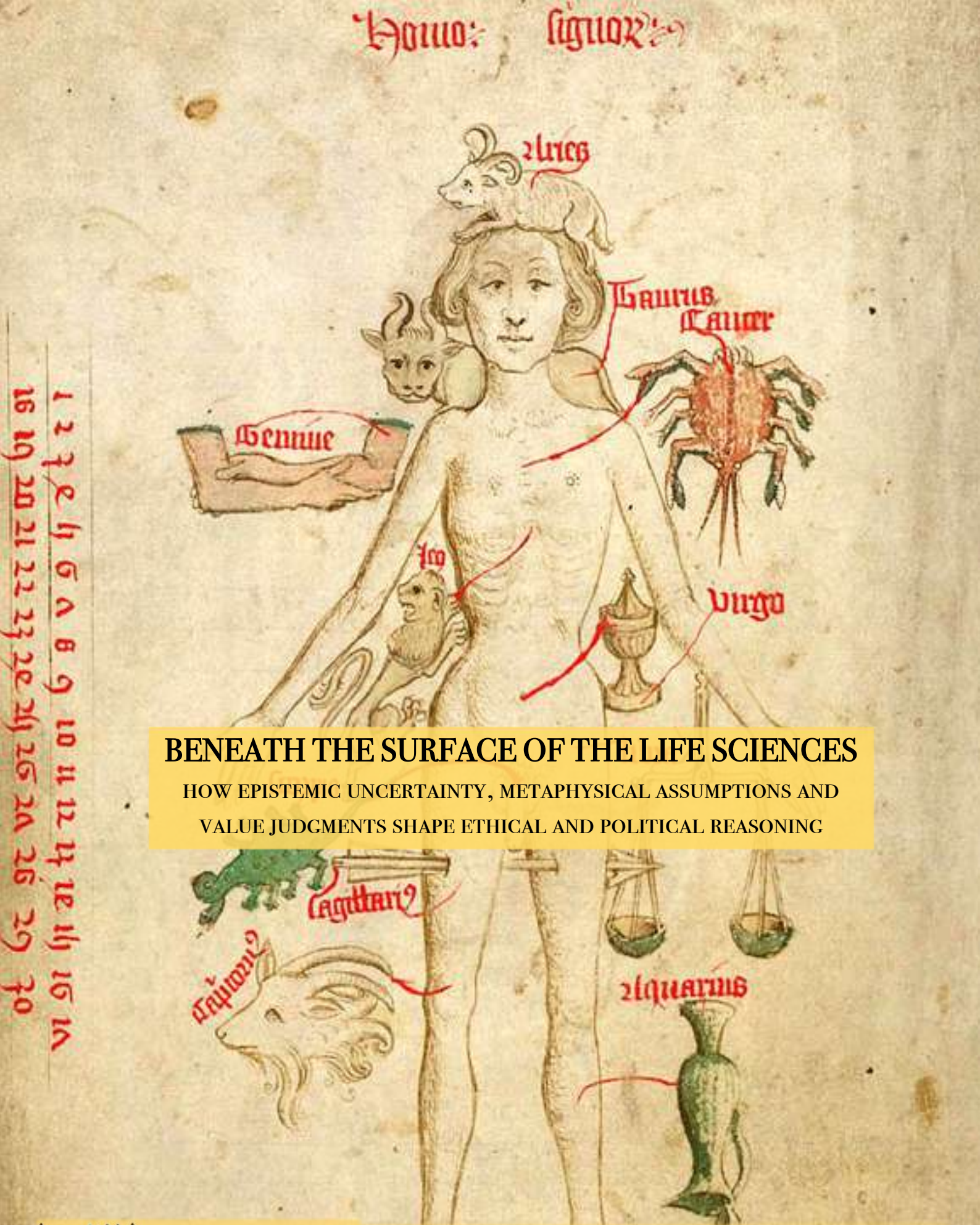

BENEATH THE SURFACE OF THE LIFE SCIENCES

HOW EPISTEMIC UNCERTAINTY, METAPHYSICAL ASSUMPTIONS AND VALUE JUDGMENTS SHAPE ETHICAL AND POLITICAL REASONING

CEPS CENTRO DE ÉTICA, POLÍTICA E SOCIEDADE

Centre for Ethics, Politics and Society (CEPS)
Universidade do Minho, Braga
19-20 March 2026

fct Fundação para a Ciência e a Tecnologia
UID/04952/2025

Organizer

Centre for Ethics, Politics and Society (CEPS)
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Funding

This work is funded by national funds through FCT – Fundação para a Ciência e a Tecnologia, I.P., under project UID/04952/2025 and project 2022.06388.CEECIND/CP1718/CT0038 granted to Giorgio Airoldi.

Illustration on the front page: *'Homo signorum' – Zodiac Man, Guild Book of the Barber Surgeons, c. 1486. BL MS Egerton 2572 f. 50v.*
Part of the Medieval worldview was the idea that man was a microcosm which reflected the macrocosm of the Ptolemaic universe. As the Earth was divided into regions influenced by the planets, similarly the body of man was divided into ″regions″ governed by signs of the Zodiac. Astrological signs were thought to influence the body and its health, and sketches of the ″Zodiac Man″ are common in medical treatises of the Middle Ages. These diagrams instructed doctors and barber-surgeons whether it was safe to bleed a patient or to perform surgery; if the moon was in the sign of the body part in question, it was not recommended (from Jokinen, Anniina. "Zodiac Man: Man as Microcosm." Luminarium. https://www.luminarium.org/encyclopedia/zodiacman.htm).

SCHEDULING

				Tuesday 19/3/2026
morning	09:00	09:15	**module I: Inferring Minds: Epistemic Challenges in Sentience and Neuroscience**	Welcome and Introduction of module I
	09:15	10:15		**Lorenzo Baravalle (Universitat de Valencia)** Avoiding the Wrong Mistake: Type I and Type II Errors as Hidden Constraints in Sentience Research
	10:15	10:45		**Break**
	10:45	11:45		**Davide Vecchi (UNED, Madrid)** Sentience research between naturalism, scientism and pseudoscience
	11:45	12:45		**Gil Santos (Universidade de Lisbooa)** Brain, Mind, and Society: Unjustified inferences in/from neuroscience and their ethical implications.
	12:45	14:00		**Lunch**
afternoon	14:00	14:15	**module II: Classifying and Measuring the Living World**	Introduction of Module II
	14:15	15:15		**Beatriz Martín (UNED, Madrid)** Health, Resilience, or Services: Normativity in Ecological Evaluation
	15:15	15:45		Break
	15:45	16:45		**Jaime Soler Parra (Universitat de Valencia)** Classification is not a neutral activity
	16:45	17:45		**Victor Luque (Universitat de Valencia)** Prediction in evolutionary systems and the problem of quantification
	20:30	22:30		dinner

				Friday 20/3/2026
morning	09:00	09:15	**module III: Engineering Life: Biology, Technology, and the Future of the Human**	Introduction of Module III
	09:15	10:15		**Maurizio Esposito (Università Statale degli Studi, Milano)** Biology in the Age of Engineers
	10:15	10:45		**Break**
	10:45	11:45		**Vanessa Triviño (Universidad Rey Juan Carlos, Madrid)** Reductionism, Emergence, and Grounding in the Ontology of Biological Individuals
	11:45	12:45		**Spyridon A. Koutroufinis (Technical University of Berlin)** Seeing Watchmakers? A Skeptical Encounter with Transhumanism

INTRODUCTION

"It's sort of comical how you think that you've made a choice that exempts you from the fashion industry, when, in fact, you're wearing the sweater that was selected for you years ago by the people in this room" (The Devil wears Prada)

Today, the life sciences - evolutionary biology, genetics, the medical sciences, and ecology - are generally presented as being rigorously grounded both empirically and methodologically as well as being value-neutral. Yet, their conceptual frameworks frequently rely on ambiguous epistemic claims, idealized models, metaphors and analogies, pragmatic shortcuts, unexamined assumptions and arguably even value judgments.

Nevertheless, in our society science has assumed an increasingly important role in supporting political and ethical decisions. The significant reliance on scientific opinion and modelling during the COVID-19 pandemic, or the use of empirical evidence of sentience as the key driver in the articulation of animal welfare legislation, illustrate how science increasingly influences policymakers and becomes embedded in ethical and political reasoning.

The epistemological and metaphysical foundations of the life sciences are thus no longer confined to academic circles: beneath the surface, they subtly shape how citizens perceive the world. Much like in 'The Devil Wears Prada', where Andrea's blue sweater, unbeknownst to her, originated on haute couture runways, filtered through designer collections, and eventually ended up in a clearance bin where she picked it up, ingenuously believing her choice was free from the fashion industry's influence, policymakers and citizens are constantly influenced by frameworks that are neither scientifically coherent nor politically independent.

This 'Philosophical Colloquium' brings together scholars from diverse areas of philosophy to critically examine the metaphysical and epistemological foundations of the life sciences, and to explore their growing but often-invisible impact on society.

In the end, we may still choose to wear the same sweater, but with a clearer understanding of why we do, and where it truly comes from.

ABSTRACTS

Module I

Inferring Minds: Epistemic Challenges in Sentience and Neuroscience

Recent research on sentience and the mind raises important epistemological questions about the limits of scientific inference. This session explores methodological and conceptual challenges involved in drawing conclusions about mental phenomena from empirical data, including statistical constraints, the risk of scientism, and problematic inferences in neuroscience.

Lorenzo Baravalle (Universitat de Valencia)

Avoiding the Wrong Mistake: Type I and Type II Errors as Hidden Constraints in Sentience Research

Contemporary research on sentience is marked by persistent disagreement concerning its definition, biological basis, and taxonomic distribution. Despite this lack of consensus, sentience has acquired a central role in ethical reasoning and public discourse, particularly in discussions of animal moral status. In this talk, I propose to analyse a large portion of current sentience research as being implicitly structured by concerns analogous to Type I and Type II errors, understood here not in a strictly statistical sense, but as epistemic risks guiding theory choice and evidential standards. Framing sentience research in these terms helps to clarify why debates persist despite shared empirical commitments, and reveals how methodological caution, evidential thresholds, and conceptual conservatism or expansiveness are shaped by implicit judgments about which kind of error is more tolerable. More broadly, the analysis illustrates how epistemic risk management can function as a tacit metaphysical constraint in the life sciences.

Lorenzo Baravalle studied philosophy at the University of Turin (Italy) and then obtained a Ph.D. in philosophy of science at the University of Barcelona and the University Rovira i Virgili (Spain). Before joining the Department of Philosophy at the University of Valencia (UV, Spain), Lorenzo worked at the University of Lisbon (Portugal), the University of São Paulo and the Federal University of ABC (Brazil). Lorenzo is interested in conceptual problems related to mathematical and computational modelling of evolutionary dynamics and biological processes.

Davide Vecchi (UNED, Madrid)

Sentience research between naturalism, scientism and pseudoscience

Sentience research is a multidisciplinary and interdisciplinary endeavour encompassing fields as diverse as the philosophy of psychology, psychobiology, neuroscience, the behavioural sciences and evolutionary biology. Historically, sentience research arose as the outcome of disparate cultural developments, particularly significant in the Anglosphere, including the resurgence of hedonistic utilitarianism in the 18th century, the rise of Darwinian evolutionism in biology in the 19th century and the emergence of the animal welfare and then rights movements from the 19th century. Sentience research today provides the epistemic grounds for sentio-centric ethics. From a sentio-centric ethical perspective, knowing when non-human organisms possess sentient states becomes pivotal because, minimally, humans should minimize the suffering of sentient organisms, including the probably sentient animals we farm, exploit, experiment with, hunt and eat. If mice were sentient, then the forced swim test would morally wrong. If salmons or octopi were sentient, then it would be wrong to farm them in small facilities or arguably even eat them. If invertebrates were sentient, then we should rethink the practice of maiming them in experimental settings in order to reduce the suffering of more probably sentient vertebrates. Sentience research is a putatively naturalistic endeavour aiming to answer the above questions. However, I shall argue that, under respectable naturalistic clothes, sentience research is often more akin to a scientistic enterprise, frequently bordering on the pseudo-scientific. In the first sense, sentience researchers often dismiss perfectly reasonable scientific questions as unscientific, tackle meaningful questions with unfathomable answers or even inflate the significance of meaningless questions by providing spurious and ad hoc answers. In the second sense, sentience research is generally founded on a variety of controversial theoretical assumptions that either bias the interpretation of the morpho-physiological or behavioural empirical evidence or even misconstrue its significance. It might thus be wondered how sentience research may provide the epistemic grounds for a sentio-centric ethics, if this is the foundation of animal ethics we indeed seek.

Davide Vecchi studied philosophy at the University of Bologna (Italy) and then obtained the Ph.D. at the Department of Philosophy, Logic and Scientific Method of the London School of Economics and Political Science (United Kingdom). Before joining the Department of Logic, History and Philosophy of Sciences of the UNED (Universidad Nacional de Educación a Distancia) in Madrid (Spain), Davide worked at the University of Lisbon (Portugal) and the Universidad de Santiago (Chile), as well as being Research Fellow at the Konrad Lorenz Institute for Evolution and Cognition Research (Austria). Davide is interested in historical, philosophical, theoretical and ethical issues stemming from the life sciences.

Gil Santos (Universidade de Lisboa)

Brain, Mind, and Society: Unjustified inferences in/from neuroscience and their ethical implications.

Every science relies on assumptions that it cannot justify on its own. Some assumptions are based on findings from other sciences; others are established by the very sciences that use them as premises. However, the latter can be regarded as working hypotheses – open to evaluation, revision, and possible refutation as scientific research advances. This critical perspective should also guide how we interpret the meaning and scope of each assumption. In this talk, I will focus on the neuroscientific postulate that the mind is a form of brain activity – an assumption that underpins the mind-body or psychoneural identity theory. According to a widely accepted interpretation, if this theory is correct, the human mind can be fully explained by – and thus reduced to – the neurological structure of the brain. Moreover, on this view, there is no room for genuine personal agency, moral responsibility, or any meaningful notion of free will. I will argue that the neuroscientific postulate does not warrant such far-reaching conclusions. My argument is grounded in an emergentist, neurobiological dual-aspect account of the mind-body problem and is further supported by empirical findings from social neuroscience – particularly those concerning genomic and synaptic epigenetic mechanisms in neural development.

Gil Santos completed his undergraduate degree in Philosophy at the Faculdade de Letras da Universidade do Porto, followed by a doctorate at the Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa. Gil Santos is a philosopher of science whose research has primarily focused on the theory of emergence, interlevel causation, integrative explanations, and new mechanism. More recently, his research has expanded to encompass the study of the mind, consciousness, and the interdisciplinary field of social neuroscience.

Module II.

Classifying and Measuring the Living World

Scientific understanding of complex systems depends on practices of classification, measurement, and evaluation. This session examines the conceptual and normative dimensions of these practices across different domains, including cliodynamics, biological classification, and ecological assessment.

Jaime Soler Parra (Universitat de Valencia)

Classification is not a neutral activity (on-line)

Classification is an activity intrinsic to scientific practice. Whether dealing with biological species, diseases or psychiatric disorders, languages, or chemical substances, scientific inquiry invariably involves the use of specific classificatory criteria.

Classifications are often assumed to correspond to natural kinds, understood as groupings that reflect the structure of the natural world rather than human interests or practices (Bird and Tobin, 2025). Accordingly, scientific classifications are frequently taken to be objective and independent of researchers, at least partially. However, there is significant controversy over what counts as a natural kind. While some authors defend the view that natural kinds are defined by fixed and immutable essences, others argue that the same entities may be legitimately classified in different ways depending on varying interests and values.

Beyond this metaphysical debate, it is important to ask whether different classificatory choices have consequences at other levels. Numerous examples suggest that classification is not a neutral activity. A well-known case is the DSM-5: interpreting a clinical presentation as a particular disorder has implications not only for medical practice, but also for ethical and legal decision-making.

Although the social sciences are especially sensitive to the values and assumptions of researchers, classificatory choices in other disciplines can also have far-reaching effects. Consider the classification of biological species. Different criteria may be employed, such as the biological or ecological species concepts. These criteria are particularly complex in botany, where hybridization complicates species identification and can give rise to new species in relatively short periods of time.

While these issues may appear highly technical, their implications extend well beyond botany. The case of Limonium perplexum, a species identified in the 1980s and apparently arising through hybridization, illustrates this point. Recognizing it as a distinct species has had consequences such as the allocation of conservation funding,

its inclusion in local tourism materials, and its use as an educational resource. These examples show that classification matters not only to specialists, but ultimately to society at large.

Jaime Soler Parra holds a PhD in Philosophy from UNED and a degree in Industrial Organization Engineering from the Polytechnic University of Valencia. He currently works as an advisor for teacher training for the Department of Education of the Valencian regional government. He has taught History of Science at the University of Valencia and currently collaborates with the UOC in the subject Technology and Society. His main area of research is natural kinds in philosophy of science although he is also interested in the relationships between science, technology, and society. He has participated in several research projects and has published on natural kinds and on the concept of life in biological sciences.

Beatriz Martín (UNED, Madrid)

Health, Resilience, or Services: Normativity in Ecological Evaluation

The notion of "ecosystem health" has played a prominent role in applied ecology and environmental management since the late twentieth century. Although the concept has been criticized for relying on a problematic medical metaphor and for attributing normative properties to non-organic systems, its gradual replacement by terms such as resilience, functional integrity, or ecosystem services has not resolved the underlying conceptual difficulty. This paper argues that the controversy over ecosystem health exposes a deeper philosophical tension that continues to structure ecological theory and practice: the coexistence of intrinsic and extrinsic forms of normativity.

On an intrinsic view, ecosystems are assessed in terms of their capacity to sustain organization, resilience, and robustness, independently of human interests. On an extrinsic view, evaluation is grounded in the contribution of ecosystems to human well-being through the provision of services. Drawing on conceptual analysis and debates in the philosophy of biology concerning function and dysfunction, I show that both normative frameworks operate—often implicitly—in the choice of indicators, conservation targets, and policy priorities.

The dispute is therefore not merely terminological. It reflects competing assumptions about what grounds evaluation in environmental science and about whether ecological normativity can be disentangled from human-centered values. Clarifying this tension is essential not only for environmental management but also for broader philosophical discussions about normativity in the life sciences.

Beatriz Martín Castro holds a PhD in Biology from the Complutense University of Madrid and a degree in Philosophy from the UNED, where she also earned a Master's in Theoretical and Practical Philosophy (specializing in logic and philosophy of science). Her research lies at the intersection of

philosophy of biology, theoretical ecology, and metaphysics of medicine, with a particular interest in concepts such as function, health, and normativity in biological and ecological systems. She has taught at various universities and is currently a professor of Foundations and Didactics of Natural Sciences, as well as Logical-Mathematical Thinking and Didactics of Mathematics, at both UNIE and Universidad Alfonso X el Sabio (UAX). She is a member of the Metaphysics of Medicine research group led by Cristian Saborido at UNED and collaborates with the Cátedra del Tajo (UCLM). Her trajectory combines rigorous conceptual research, transversal teaching, and applied experience in environmental management and biodiversity.

Victor Luque (Universitat de Valencia)

Prediction in evolutionary systems and the problem of quantification (on-line)

Prediction is one of the most important features of good science. Evolutionary biology has traditionally been considered a historical and descriptive science, in which prediction has played a minor role. However, the need for evolutionary predictions and their use also in related areas such as ecology, agriculture, or conservation biology, has produced new directions and methodologies to improve evolutionary predictive power. Here, I will analyse these efforts in evolutionary theory. In addition, I will discuss their extensions to cultural evolution, specifically the recent attempt to develop a predictive theory of history, the so-called "cliodynamics". In doing so, I will stress some important problems of this enterprise in relation to the process of quantification.

Víctor J. Luque is an Associate Professor at the Dpt. of Philosophy (Knowledge area: Logic and Philosophy of Science), University of València. His work is focused on the structure of evolutionary theory, its mathematical models, and the causes of evolution.

Module III.

Engineering Life: Biology, Technology, and the Future of the Human

Advances in biotechnology and engineering are reshaping both biological research and our understanding of life itself. This session addresses philosophical questions arising from these developments, including the engineering turn in biology and critical perspectives on transhumanism.

Maurizio Esposito (Università Statale degli Studi, Milano)

Biology in the Age of Engineers

In 1912, the German-born American physiologist Jacques Loeb published The Mechanistic Conception of Life. In the work Loeb argued not only that life was fully explicable in physico-chemical terms, but also that biology should aim to artificially reproduce and control living processes rather than observe and describe them. For Loeb, genuine understanding consisted in the ability to manipulate and predict life processes. Two years later, he concluded that one had to choose between two alternatives: a "mechanistic science" oriented toward the full control and prediction, and what he dismissively called "metaphysical romance," by which he meant organicism and vitalism. In 1919, the American biologist William Ritter responded with a two-volume work titled The Unity of the Organism; or, The Organismal Conception of Life. Ritter maintained that organisms could not be fully explained by analyzing their parts in isolation. An organism possesses organizational properties that are lost when it is reduced to its components. While mechanistic explanations may successfully account for specific biological processes, they fail to capture the coordinating unity that enables an organism to be alive.

In this talk, I take the debate between Loeb and Ritter as a paradigmatic case of the dramatic and controversial transformations of the life sciences in the early twentieth century. I focus, in particular, on Loeb's assumption that controlling life is equivalent to understanding it. I connect this assumption to the rise of a powerful new class of experts who, from the late nineteenth century onward, acquired increasing authority within academic, administrative, and political institutions: engineers. In America by Design (1977), the historian of technology David Noble contended that modern U.S. science developed as an institution shaped by corporate interests, military priorities, and engineer-led managerial control. For Noble, the drive for prediction and control over productive processes was a defining hallmark of engineering practice; the same ideals that Loeb valued and sought to realize in biology. Building on Noble's work, I examine how the growing influence of engineers may also have reshaped the life sciences by transforming their language, methodologies, and epistemic values in the

U.S. and elsewhere. From this perspective, Loeb's dichotomy between mechanistic science and "metaphysical romance" was much more than a philosophical distinction. Rather, it outlined two positions in a political struggle over the future of life sciences: whether they would become a branch of technology oriented toward prediction and control or remain a field of natural science concerned with description and understanding. There is substantial historical evidence that the former option ultimately prevailed, although the latter never disappeared.

Maurizio Esposito is a faculty member in the Department of Philosophy at the University of Milan (Italy). Previously, he was a principal investigator at the University of Lisbon (Portugal), an Associate Professor at the University of Santiago (Chile), an Assistant Professor at the Federal University of ABC (Brazil), and a postdoctoral researcher at the Institute for Philosophical Research, UNAM (Mexico). He studied philosophy at the University of Bologna (Italy) and holds a PhD in history and philosophy of science from the University of Leeds (UK). He is interested in the history and philosophy of the life sciences, as well as the relationships between the human and natural sciences since the 18th century.

Vanessa Triviño (Universidad Rey Juan Carlos, Madrid)

Reductionism, Emergence, and Grounding in the Ontology of Biological Individuals

One central question in the emerging "organismal philosophy of biology" concerns the nature of organisms. Recent advances across biology reveal the limits of reductionism and highlight the need to treat organisms as ontologically autonomous entities that are essential for explaining evolution and development. Although theoretical biologists and philosophers have invoked concepts such as self-organization, emergence, and downward causation to address this question, these accounts remain insufficient to capture the ontological status of organisms. This presentation proposes an alternative characterization using tools from analytic metaphysics. I argue that fundamentality, understood in terms of grounding, provides a more robust account of organisms as causally autonomous entities that are irreducible to their constituent parts.

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 has been an assistant professor at the UCM, focusing on issues of contemporary metaphysics, metaphysics of science and biology, and feminist metaphysics, and she is now assistant professor of the UJC. 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.

Spyridon A. Koutroufinis (Technical University of Berlin)

Seeing Watchmakers? A Skeptical Encounter with Transhumanism

The contemporary scientific view of the human being is often invoked to support the conviction that, due to the purposelessness of evolution, the human being is a deficient—albeit admirably complex—living organism that suffers under its limitations. As early as the twentieth century, this notion gave rise to the vision of wresting the future development of life, and especially of humanity, from the randomness of evolution and directing it toward the achievement of specific goals that promise a utopian and happy future.

Transhumanism, committed to this ideal, has by now become a powerful philosophical, cultural, scientific, technological, and futurist discourse. Its proponents advocate redirecting the evolution of the human species—an evolution that, from a neo-Darwinian perspective, resembles a "blind watchmaker"—into new developmental paths that they consider desirable. This redirection is to be carried out by bioscientists and biotechnologists in the coming decades and centuries, which gives rise to the suspicion that these specialists regard themselves as "seeing watchmakers" of humanity's future.

In my lecture, I will first present the visions of transhumanism. Since I take the position that transhumanist visions and the means of their realization pose a grave danger to the future of humankind, I will then outline several central counterarguments that have been advanced by critics of transhumanism. Finally, drawing on my own critique of neo-mechanistic thinking within the biosciences, I will introduce a new criticism of transhumanism. It is based on my insight that there exists a fundamental—and therefore unbridgeable—discrepancy between the principles of organization of every living being, and thus also of the human organism, and the basic assumptions underlying the neo-mechanistic explanations and manipulations of organisms that transhumanists would have to employ. From this, I will conclude that transhumanism lacks the solid scientific foundation it in fact requires.

Spyridon A. Koutroufinis is a Privatdozent (Associate Professor by habilitation) at the Institute of Philosophy at the Technical University of Berlin/Germany. His primary areas of expertise are biophilosophy, process philosophy (Whitehead, Bergson et al.), the theory of self-organization of complex dynamical systems, and classical metaphysics (Aristotle, Leibniz). Koutroufinis investigates the philosophical underpinnings of biological form and process, drawing on ideas from systems theory (critically) and process thought (positively) to understand life's organization. He has authored and edited numerous books, articles, and book chapters in these areas, aiming to develop a process-oriented ontology for the theory of the organism.

THE VENUE

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Complete map of the campus: https://www.uminho.pt/PT/viver/os-campi/PublishingImages/GUALTAR_MAPA_2016_WWW.png

Room 0.22 is in building 05

Bus stop from city centre: Lines 7, 66 from Praça de República

TRANSPORTATION TO AND IN BRAGA

From Porto Airport to Braga

Just outside the terminal you will find the bus station. Several companies operate direct services between the airport and Braga. The service is essentially the same for all of them, so you can choose the option that best fits your schedule and budget.

The main operators are FlixBus, Rede Expressos, and ALSA, all of which have their own apps where you can check schedules and purchase tickets. Get Bus does not have an app, but you can check schedules and buy tickets on their website: www.getbus.eu

Getting around Braga

Braga is very walkable. The city centre is about a 10-minute walk from the bus station, and the university is about 30 minutes from the city centre on foot.

Alternatively, you can use the local buses. A 3-day tourist pass costs around €9, while a single ticket costs €1.50 (cash only when paying on board). The local bus company is TUB. Tickets can be purchased at their office at the bus station or at a kiosk in the city centre.