

Title: How to program the dialectic machine

Christoff Rapp, University of Munich

Abstract: In modern argumentation theory, the spirit of Aristotelian dialectic has been taken up by formal dialectical systems (C.L. Hamblin). Such systems can be regarded as highly regulated dialogues or dialogue models. Dialectical systems might be used, e.g., for assessing real life argumentations and detecting fallacies. The regulations by which a dialectical system is defined provide a possible basis machine learning models. Equipped with these regulations a machine or AI could examine given claims 'dialectically'. In my contribution I want to treat Aristotelian dialectic like a dialectical system and want to explore the types of regulations that are included in it. Which locutions are allowed? Which premises might be deployed? What does it mean to be committed to a proposed proposition? Do the regulations alter in accordance with different species of dialectical goals?

Title: What is the place of the Aristotelian logos in conflict prevention and resolution in our contemporary poleis?

Sara Greco, University of Lugano

Abstract: For Aristotle, who envisages a tight connection between logos and polis, argumentation is intrinsically related to the construction of society. To discuss the relevance of Aristotle's view of argumentation in the contemporary era in which AI is part of our social relationships, I consider two Aristotelian concepts that are central to argumentation studies – problema or discussion issue and topos or argument scheme – and their use in conflict prevention and resolution practices, seen as exemplary cases of how language can be used to build or repair social relationships in human communities. Based on current developments of the European consortium ORBIS, (<https://orbis-project.eu/>), I then show how these concepts are being incorporated into deliberative democracy discussions with the help of generative AI.

Title: The Metaphysical Basis of Aristotle's Logic

Marko Malink, New York University

Abstract: According to Bertrand Russell, the first serious advance in logic since the time of the Greeks was made by Frege, when he argued that the propositions Socrates is mortal and All humans are mortal are not of the same logical form. Aristotle, by contrast, took these propositions to be of the same logical form. In his view, both are simple categorical propositions in which one being is predicated of another being, universal or particular. I shall argue that Aristotle adopted this view because he thought that it provides a metaphysically perspicuous representation of the structure of beings underlying a science. Thus, while his system of categorical logic does not possess the deductive and expressive power of Frege's system, it is well suited for representing what Aristotle took to be explanatory scientific demonstrations.

Title: The Interplay of Aristotelianism and Platonism in Nondeterministic Computations

Edgar Daylight, Universität Siegen & Lille University

Abstract: We characterize computer science as an interplay between two modes of reasoning: the Aristotelian (procedural) method and the Platonic (declarative) approach. We contend that Aristotelian, step-by-step thinking dominates in computer programming, while Platonic, static reasoning plays a more prominent role in computability theory and its subdomain computational complexity. In practice, mathematical frameworks tend to elegantly blend both Aristotelian and Platonic reasoning. Beyond this interplay, we highlight the rising significance of the 'observer of computation' paradigm, signaling a convergence between biology and computer science. This perspective allows a single computation, executed by (say) a Turing machine, to be interpreted in multiple ways. Proponents of this view aim to establish a multi-observer perspective, termed 'polycomputing,' where a living or engineered system performs several functions simultaneously within the same space. This bio-inspired concept of efficiency has yet to be incorporated into computability theory. To address this, we propose reinterpreting the Aristotelian-Platonic interplay germane to NP-completeness through the 'observer' paradigm. Specifically, we investigate whether the Aristotelian observer in biology can be reinterpreted in Platonic and automata-theoretic terms as an observer of a nondeterministic computation.

Title: Philosophy of AI and Aristotle: Who owns the Future?

George Chatzivasileiou, Author on the Philosophy of AI

Abstract: AI brings the spark of a transformative revolution, poised to redefine the 21st century. With its immense potential but also existential threats, AI will confront humanity with unprecedented, socially and philosophically, novel challenges – ranging from AGI and Superintelligence to transhumanism and the critical question of “AI control”. This lecture explores those challenges by blending contemporary AI philosophy with the enduring insights of Aristotle. It underscores how Aristotle’s reflections on Logos (reason), ontology, ethics, and education remain remarkably relevant for understanding and guiding the ethically responsible development of AI. Technology is not primarily a technological issue – but rather a philosophical, ethical, and political one. From this interpretive thesis Aristotle’s philosophy provides a timeless intellectual toolkit for navigating the profound questions AI poses.

Title: Is reasoning overrated? Some indications from recent philosophy of AI and cognition

Vincent Müller, University of Erlangen-Nürnberg

Abstract: In this investigation I will argue that the long tradition, going back to Aristotle, of logical reasoning as a central skill for human intelligence and scientific method has been undermined by two major developments in AI and the cognitive sciences: embodiment and probabilistic methods. More recently, however, the limits of such systems seem to be more apparent, so

perhaps it is time to re-evaluate. Theories of embodiment seem to show that a large part of the explanation of intelligent ability in natural systems is due to their embodiment, the actions of the agent, and the use of external factors for cognitive success (extended and embedded cognition); this is jointly known as "4E cognition". In this context, it is also common to see cognition as probabilistic prediction of sensory input, known as "predictive processing" or "coding". Furthermore, to deal with incomplete knowledge of the world, probabilistic methods have become popular in AI in this century, particularly with the more recent advent of machine learning systems, such as generative models. However, the generative AI systems of the last 2 years show a marked weakness in reasoning, specifically causal reasoning. To remedy this is now a major agenda point of AI, and perhaps it helps us to understand what role remains for reasoning, in natural cognition.

Title: Consistency tests with τόποι

Colin Guthrie King, Providence College

Abstract: One way to understand the dialectical bout that forms the object of Aristotle's Topics is as a consistency test. The maintenance of consistency is presupposed in the second activity for which the Topics claims to provide a "method", namely the activity by which, when we are supporting an argument ourselves, we say nothing against ourselves (Top. A1, 100a18–20). At least one scholar has maintained that the responder's role in this activity is not merely to maintain consistency but to successfully defend the thesis to which the responder has committed (Galston 1982). But even on this reading, in which responding is active resistance to refutation, consistency would be an important property to preserve in one's responses. Some varieties of the medieval obligationes procedure, themselves indebted to the study of Aristotle's Topics, have themselves been interpreted as games in the maintenance of consistency (Dutilh Novaes 2005). This suggests an approach for understanding the deployment of the τόποι of the Topics for the purposes of refutation: as tests for inconsistency. I will explore this approach to select τόποι of the Topics. I will also consider a problem in "aligning" AI in order to make replies based on LLMs morally consistent (Bonigiri et al. 2024). This points up the interest of a procedure described in Top. Θ5 where one adopts the position of a certain person and responds consistently with that (159b25–35) – a task which machines seem to have difficulty learning.

Title: Aristotle's Intellect as Excellence of Life and Understanding

Spyridon Rangos, University of Patras

Abstract: Aristotle believes that the superior cannot be made to emerge from the inferior. A capacity for understanding presupposes an ontologically prior activity of understanding. To be fully actual, such an activity must be perfect and uninterrupted: it must be an utterly simple and eternal substance whose essence is understanding. Aristotle calls it the best kind of life and he thinks that it is indirectly involved in any kind of intellectual, as opposed to sensual, cognition. He says that this intellect (nous) makes all things, not in the sense of creating them but in the sense of acting on all potentially understandable things thus enabling them to be actually

understood, as light acts on potentially visible things and enables them to be actually seen. Our intellect, by contrast, is a receptive faculty of essential forms which presupposes the activity of that light-like intellect. Yet, our intellect occasionally manages to become one and the same with that other intellect in sudden flashes of mental illumination. When that happens, the personality traits of the individual thinker are temporarily suspended. Paradoxical though it may sound, such an impersonal and universal understanding is not only the best kind of life for Aristotle but also, and more importantly, the highest degree of self-awareness and joy that an entity may achieve.

As roughly outlined above, Aristotle's conception of the intellect is notoriously difficult to make full sense of. It presupposes, I shall argue, a kind of intellectual experience which is not very common among humans. In other words, it is not just the result or logical consequence of other things Aristotle believes about cognition, knowledge and understanding, nor, for that matter, the necessary outcome of his belief in the priority of activity over mere power. It has, also, a basis in mental life as experienced from within the activity of thinking and may be entirely missed without this ground. This is not to say that Aristotle's intellect is a subjective feeling. On the contrary, it is an utterly objective state, or rather activity, of being which, unlike other activities, possesses its own self-justification. It is the end of our cognitive efforts but also the objective principle which any act of understanding presupposes and from which it begins, whether we know it or not. But this utterly objective activity of being is not within anybody's grasp. This is not because some people are by nature deprived of the capacity to reach that objective activity. It is because they have not taken an interest in it and have not made the necessary efforts to prepare themselves for it. Inner experience, life, self-awareness and the immense pleasure of being fully transparent to itself are distinctive traits of Aristotle's intellect that sharply distinguish it from any cognitive achievement an AI is capable of to date.

Title: A formal reconstruction of Aristotle's assertoric syllogistic

Zoé McConaughey, Lille University

Abstract: I will present my formal reconstruction of Aristotle's assertoric syllogistic within a dialogical framework (in the Paul Lorenzen & Kuno Lorenz tradition) using an adaptation of Per Martin-Löf's Constructive Type Theory. This formal reconstruction achieves various goals:

1. Setting all of Aristotle's assertoric syllogistic in this formal framework makes Aristotle's logic communicable to contemporary programming tools at the heart of AI: by using Constructive Type Theory, a language common to logicians and programmers (many proof assistants use this language, such as Agda), this formalization translates Aristotle's syllogistic in a language understandable by programs.
2. In reproducing a full reconstruction of syllogistic, including ecthesis, reduction to first figure, reduction to impossibility, it provides a stronger alternative to other contemporary formal reconstructions of syllogistic.
3. By being set in the framework of Lorenzen and Lorenz's "Dialogical Logic" (in the Immanent Reasoning flavor, which incorporates the language of Martin-Löf's Constructive Type Theory) it provides formal grounds backing interpretations of the syllogistic of the Prior Analytics

as being in continuity with the dialectic of the Topics (the formal reconstruction is useful for interpreting the ancient texts).

Title: The future of AI: Sophisticated tool or self-conscious agent? Plato and Aristotle on "Why not both"?

Josiah Ober, Stanford University and Voula Tsounas, University of California / Santa Barbara

Abstract: In a White Paper circulated at the Lyceum Conference of June 2024, Josiah Ober and John Tasioulas set out an Aristotelian framework for work on Ethics in AI. That paper argued for treating AI as a sophisticated tool suited for use, not a potentially self-conscious moral agent – in brief, as a person. Recent advances in AI, aimed at Artificial General Intelligence (AGI), have brought the possibility of non-human persons much closer; it is now a highly salient topic of ethical concern. In our presentation, we expand on the tool/person distinction, with special reference to the ancient Greek theory and practice of enslavement. Simply stated: treating a moral agent as a tool suited to use is to treat a person as a slave. The moral wrongfulness of slavery is (almost) universally accepted today, but the practice was widespread in Greek antiquity and regarded as morally unproblematic by many (although not all) Greeks. While neither philosopher condemned all forms of slavery, the texts of Plato and Aristotle offer us complementary and compelling reasons against ever ignoring or seeking to elide the tool/person distinction. In the Republic Plato offers a thought experiment that shows that slaves, as “intelligent tools,” in so far as they have agency, can never be wholly controlled by their “masters,” but tend towards insurrection. Intelligent agents, possessing reason, can never be fully predictable or controlled, because reason itself cannot be controlled. Aristotle’s elaborate theory of “natural slavery” in the Politics, proposing a category of humans incapable of self-direction and therefore harmed by freedom, fails on its own terms: Aristotle admits that nature does not design the body of the slave for its ostensible purposes. He posits (while not explaining) a psychological defect (the absence of a deliberative function). Yet as shown by the text of his last will and testament, he was himself manifestly incapable of identifying his own slaves as rightly enslaved “by nature” (thus unjustly treated if manumitted) or “by convention” and thus unjustly treated prior to manumission.

INTERNAL Speakers/Contributors

Title: Beyond Consciousness: AGI and the “Impartial Spectator”

Kyriakos Demetriou, Cyprus Academy of Sciences, Letters and Arts

Abstract: A prevailing critique of artificial intelligence (AI) is that its lack of self-consciousness renders it morally inferior to human intelligence. This paper challenges the assumption that self-awareness is necessary for moral competence and argues that computational rationality can be

philosophically associated with moral agency. Rather than a limitation, AI's (so far theoretical) absence of ego, bias, and emotional volatility may enable it to function with greater impartiality, rationality, and consistency in ethical decision-making.

Drawing on Aristotle's concept of *phronesis* within the framework of virtue ethics (practical wisdom or rationality), it is argued that moral agency depends not on self-reflection but on trained perception and correct action. Aristotle's philosophy suggests that virtue is a balance (*mesotes*), requiring mastery over passions, cultivation of good habits, and rational moral judgment. While human agents struggle with *akrasia* (weakness of will), bias, self-serving retrospection, and (over)rationalization, AI may offer a model for consistent and objectively balanced ethical decisions.

The idea of computational ethics is situated within a long philosophical tradition that includes Hobbes, Leibniz, La Mettrie, Kant, Bentham, Adam Smith, and John Rawls, among others. Hobbes saw self-interest as destabilizing, while Bentham viewed it as a sinister force undermining society when measured by a consequentialist moral calculus. Smith's *Impartial Spectator* suggests that AI, unburdened by personal bias, could ideally serve as a more objective judge. Leibniz's *calculus*, Kant's deontological ethics, and Rawls' veil of ignorance further reinforce the idea that morality is grounded in reason or "reasoned truths" with universal applicability.

By prioritizing Logos and universal moral values AGI, unemotionally driven, may transcend the instinctual drives and *páthe* that shape human nature, offering a new paradigm for ethical decision-making in governance, law, and society. Rather than a liability, its lack of self-awareness, broadly conceived, could be an asset.

Title: Is There a Robust Argument for Thinking as a Quale?

Doukas Kapantais, RCGPh, Academy of Athens

Abstract: The Turing Test was, until the emergence of LLMs, largely regarded as a purely theoretical thought experiment. Recently, however, scientists and philosophers have proposed specific conditions for its implementation. Crucially, they have conducted tests under these conditions, and some have even claimed that LLMs have passed it!

Remaining agnostic about whether these specific conditions capture what Turing originally had in mind, I want to explore the following scenario. Suppose there are uncontroversial ways to set up and run the test. Further, assume that some AI model successfully passes it. What ought the take-home lesson be for us? I distinguish three general possibilities:

1. On the assumption that thinking is exactly as "we feel it is," we should focus on explaining how we have managed to embed thinking into an artificial device.
2. We should focus on explaining how an artificial device can be behavioristically indistinguishable from agents that do think while nevertheless lacking genuine thought.

3. We should, in any case, grant the faculty of thought to this device and reconsider what we need to have in mind when we claim that an agent thinks.

Would an “Aristotelian” reaction to this scenario align with any of 1–3, or with some other alternative?

Title: Aristotle’s Original Idea: For and Against Logic in the Era of AI

Antonis Kakas, University of Cyprus

Aristotle is generally accepted as the father of logic. The ideas that he raised in his study of logical reasoning carried the development of science over the centuries. Today, in the era of AI, this title of the fatherhood of logic has a renewed significance. Behind it lies his original idea that human reasoning could be studied as a process and that perhaps there exist universal systems of reasoning that underlay all human reasoning irrespective of the content of what we are reasoning about. In this [article](#), we look into Aristotle’s work on human thought, his work on reasoning itself but also on how it relates to science and human endeavor more generally, from a modern perspective of Artificial Intelligence and ask if this can help enlighten our understanding of AI and Science more generally. Could Aristotle enlighten us to a new path of understanding the human capacity to think, that would allow a natural non-polluting development of AI that can energize and expand human thought into new horizons?

Title: Is Aristotle Enough for AGI: How Can we Grow AGI?

Andreas Demetriou, Cyprus Academy of Sciences, Letters and Arts

In this presentation we first define human general intelligence, *g*, in psychometric and developmental terms. We suggest that *g* is a higher order factor accounting for the correlations between factors standing for specialized abilities, such as fluid, crystallized, and quantitative reasoning, linguistic ability, executive control process, such as attention and working memory, and processing. This enables understanding new information drawing on past knowledge, filling in gaps of information by inference if needed, changing concepts or skills based on new information, designing action to solve problems, using reasoning to evaluate what is most relevant for a problem with information given possessed, and evaluating solutions. We argue that *g* builds up in cycles overlaying new mental process on a core of involving search, alignment, relational integration, abstraction, and cognizance of information (the SARA-C mechanism). This development allows episodic control of object-person interactions in infancy, executive and representational control in early childhood, inductive and inferential control in late childhood, and deductive and truth control in adolescence. I suggest that Aristotle encoded some of the logic of rule-based and principle-based thought. However, this captures the end state of the development of reasoning in the most competent of human adults, Aristotle himself included—not the development of intelligence. I also argue that present AI has similar weakness. To develop AGI in the human sense we need to simulate the cycles of human cognitive development as specified in the theory of Developmental Priorities summarized in the talk. I will

exemplify how this may happen, proposing a specific simulation program that would develop inductive and categorical reasoning and end up into deductive reasoning. The program simulates relational integration, cognizance, and production of inferential rules for successive developmental levels. Examples and technical specifications are described.

Title: Aristotle, Artificial Intelligence, and the Human Brain.

Christos Papadimitriou, Academy of Athens / Columbia University

According to Aristotle, scientific knowledge derives from human perception through generalization – the intuiting of commensurate universals from singular perceptions (*Organon*, V3, Ch31). Artificial Intelligence (AI) triumphed over the past thirteen years in an ostensibly aristotelian manner, through the empirical observation that learning machines adjust their parameters to the data presented to them in a way that generalizes well to new data. I will briefly recall how AI reached its present stage of achievement, and ponder over where it is headed.

Despite torrential progress, AI is still inferior to human brains in aspects that matter: emotional and social intelligence, ingenuity and explainability, and energy consumption. Further, today's AI devices are not biologically plausible, because backpropagation, their most fundamental component, has not been observed in the animal brain. After recounting Aristotle's views on human intelligence, I will discuss the state of research on understanding how the human brain creates cognition and intelligence, and the important role played by Machine Learning in this research. Finally, I will introduce NEMO, a biologically realistic mathematical model of the brain that can be simulated at the scale of hundreds of millions of neurons and trillions of synapses. Through NEMO it is possible to "build a brain," that is, to create a biologically realistic computational device that exhibits rudiments of human intelligence – in particular, and most recently, the acquisition of natural language.

Title: Can AI Reach Human Thought?

Athanassios Fokas, Academy of Athens

The transformative achievements of deep learning have led several scholars to raise the question of whether artificial intelligence (AI) can reach and then surpass human thought. Here, after addressing methodological problems regarding the possible answer to this question, it is argued that the definition of intelligence proposed by proponents of the AI as "the ability to accomplish complex goals," is appropriate for machines but does not capture the essence of human creativity. The impact of the *body proper* on the brain, the *laterization* of the brain, and the vital role of the glia cells is emphasised. By appealing to the incompleteness theorem of Gödel's and to the analogous result of Turing regarding computations, it is noted that consciousness is much richer than both mathematics and computations. Finally, it is stressed that artificial algorithms attempt to mimic only the conscious function of parts of the cerebral cortex, ignoring the crucial role of unconscious processes.