HUMAN & THINGS

an Insight on Signs Science and Law

2nd Conference Overview

Shaped by an acute awareness of the growing ecological crisis and of the pervasive role of technology in contemporary life, the *Human and Things* conference emerged from a shared sense of urgency: the need to rethink the paradigms through which we understand the world. Bringing together perspectives from law, physics, anthropology, philosophy, semiotics, and cognitive science, the conference examined the anthropocentric and deterministic assumptions that have long structured Western scientific and legal thought since the rise of modernity, while exploring the ongoing transformation of the relationship between human beings and the world of "things."

At the heart of this inquiry lies a guiding question: can the paradigm of modernity—shaped by the deterministic logic of classical rationalism, which casts humans as external observers capable of predicting, measuring, and controlling—still adequately account for the world we inhabit? Or are we instead called to move toward a different model, one capable of grasping the profound interconnectedness and entanglement between humans and things, and of engaging with the irreducible complexity of contemporary reality, where ecological, technological, and social processes unfold within dense webs of relations that resist linear explanation and stable boundaries?

Drawing on the epistemological rupture introduced by contemporary physics—particularly the relational ontology of quantum theory—and resonating with anthropological accounts of co-constitutive human and non-human agency, the conference advanced a critical insight: reality can no longer be conceived as a fixed background to be governed from above, but must instead be understood as a dynamic field of relations, shaped by context, interaction, and processes in which even observation participates.

Within this shifting landscape, the legal imagination of modernity also reveals its limits. If modernity has constructed a legal architecture grounded in human dominion over things, such a framework now appears increasingly inadequate to account for the complexity of contemporary reality. The ecological crisis exposes the destructive consequences of a model premised on limitless control, while the growing influence of things—manifested also in algorithmic governance, artificial intelligence, and the virtualization of materiality—demonstrates that non-human entities can no longer be understood as passive instruments.

Across both natural and digital environments, these forms of non-human agency act, mediate, and reshape human existence, unsettling the traditional subject–object divide and revealing the limits of a grammar that casts humans as sovereign, things as governable, and relations as asymmetrical. The emerging "rebellion of things"—from ecological feedback to the agency of intelligent machines—makes visible the inadequacy of this framework and calls for a more dynamic and relational understanding of the human–thing nexus, as well as of the legal forms through which we have long sought to govern the world.

While this transformation challenges the very metaphysical separation between humans and things, it invites a reimagining of legality itself: one that moves beyond ideals of mastery, abstraction, and control, and becomes instead attuned to plural, situated, and relational forms of normativity. In this perspective, law no longer appears as an abstract system imposed from above, but as a cultural practice embedded within material, ecological, and symbolic relations.

Rather than offering definitive answers, the conference opens a space for a shift in perspective—toward a relational understanding of reality more responsive to the scientific, ecological, and

technological conditions of our time. Such a shift requires rethinking not only established conceptual categories, but also the very frameworks through which we make sense of the world.

The conference is articulated across two thematic sessions— ***Reframing Modernity: through Quantum, Legal, and Anthropological Lenses*** and ***Identity, Data, and Agency in the Digital Age*** —each showcasing keynote addresses and presentations that converged toward a shared urgency: to rethink not only conceptual categories, but also the very frameworks through which we make sense of the world more adapted to the scientific, ecological, and technological realities of our time.

I DAY. ***Reframing Modernity through Quantum, Legal and Anthropological Lenses***

27 Maggio 14.30-19.00 AULA GRANDE, SANTA CROCE, FBK

This session is aimed at rethinking the very way we have become accustomed to looking at and making sense of the world, by critically engaging with the underlying assumptions, conceptual categories, and modes of perception that have historically structured our understanding of reality and our place within it.

Rooted in the deterministic imagination of classical science, modernity cast humans as external observers capable of predicting, measuring, and controlling, a stance that law mirrored by presenting the rule of law as a neutral, general, and predictable architecture of norms mechanically applied to facts. Today, however, the "rebellion of things"—from ecological feedback to the algorithmic agency of intelligent machines—reveals the limits of this grammar, which continues to frame humans as sovereign, things as governable, and relations as fundamentally asymmetrical.

Drawing on the rupture introduced by quantum physics and resonating with anthropological accounts of co-constitutive human and non-human agency, this section suggests that reality can no longer be understood as a fixed background to be governed, but rather as a dynamic field shaped by context, interpretation, and interaction.

In this light, law itself appears to lose its traditional capacity for control: the contemporary crisis of the rule of law thus emerges not simply as a matter of declining compliance, but as the symptom of a deeper epistemological mismatch between modern legal thought and the reality it seeks to regulate.

Within this reconfiguration, the question then arises whether law can still be conceived as a single abstract order imposed from above, or whether it is better understood as an emergent and situated outcome of interacting legal formants—doctrines, institutions, interpretive practices, and cultural expectations—continuously shaped by context, interpretation, and interaction.

Introduced and moderated by **Davide Gianti** (Faculty of Law UNITO)

- **Keynote** by **Massimo Leone (*The Rebellion of Things*)**, who explores how the human–thing relationship is being reconfigured under contemporary digital and emerging quantum conditions. Within this shifting landscape, a profound reversal becomes visible: as human beings become increasingly inferable through data and predictive systems, technical infrastructures acquire forms of operative and decisional autonomy, giving rise to a structural transformation that destabilizes the legal and conceptual foundations of current regulatory frameworks. Leone shows how digital environments become a crucial site of this reconfiguration, where entities such as AI systems, chatbots, deepfakes, and digital avatars no longer simply imitate human behavior, but increasingly reshape subjectivity itself. This transformation is further illuminated by insights from quantum theory, which suggest that objects exist in multiple states and can defy stable notions of identity and possession, reinforcing the idea that things themselves engage in a new form of rebellion—disrupting established hierarchies and asserting forms of agency that challenge both human authority and

the conceptual foundations of law and physics. In a world where entities simulate, supersede, and entangle with human agency, the keynote ultimately raises the question of whether humans remain the primary agents of usurpation or have instead become its subjects, calling for a fundamental rethinking of identity, ownership, and agency in an increasingly hybrid and relational reality

Federico Laudisa (***The Conceptual Challenges of Quantum Mechanics: Potentialities and Limits***) In addition to its enormous theoretical, experimental, and technological successes, quantum mechanics has also sparked an intense interpretative debate. It has prompted a profound rethinking of categories and modalities of explanation inherited from previous physical theories, which appeared incapable of capturing the complexity of the quantum world. It has thus fostered a genuine conceptual revolution. In my presentation, I will focus on the most challenging and intellectually stimulating aspects of this revolution, with a view to its possible implications on new conceptions of subjectivity in the domain of the humanities and social sciences.

Richard Hall-Wilton (*Objects & Things?*), Approaching from the physics of observation, the paper questions the very nature of "things," showing how quantum mechanics unsettles the classical assumption of fixed and objective entities. Moving beyond the mechanistic worldview of early modern science—grounded in determinism, separability, and the subject–object divide—it highlights how this paradigm casts the observer as external and neutral, capable of mastering a stable world, where "a rose is a rose is a rose" epitomizes the presumed identity between name and essence. The quantum turn radically reconfigures this view: reality no longer appears as a collection of discrete objects, but as a dynamic field of relations, probabilities, and interdependencies. What seems stable at one scale dissolves into processes and potentialities at another, undermining objectivity itself. Observation becomes an active event in which observer and observed are entangled, and what is perceived emerges from relational conditions rather than intrinsic properties. In this perspective, reality is not a fixed order to decode but an ongoing process of becoming, in which subjectivity is constitutive of knowledge. This shift situates humans within, rather than above, an entangled universe, marking a decisive departure from the modern illusion of mastery.

Elena Ioriatti (*Modern Physics and Comparative Law*) draws a compelling parallel between the abandonment of the Newtonian model in physics and the erosion of the Westphalian paradigm in law, showing how developments in these seemingly distant fields are driven by a shared shift away from overarching frameworks no longer capable of accounting for the complexity of reality. In both cases, the decline of a mechanistic and deterministic worldview—reflected in law by the idea of the rule of law as the mechanical application of fixed and abstract concepts to a constantly evolving reality—opens the way to alternative approaches grounded in observation, approximation, and openness to uncertainty. Within this perspective, comparative law emerges as a particularly fertile site of transformation, embracing methodological pluralism, contextual sensitivity, and the acceptance of indeterminacy, thereby echoing key intuitions of modern physics and contributing to a more nuanced understanding of the contemporary global legal landscape.

Stefano Borgo ***(Processes and Interactions with limited ontological commitments)*** The presentation focuses on a conceptual framework grounded in applied ontology to analyze types of interaction across humans and things in hybrid (physical/digital) environments. The first goal is to provide a framework within the tradition of foundational ontologies but with limited ontological commitments. The second goal is to use this setting to look at how meaning and function emerge through interaction itself. This helps to overcome the standard view where roles in interaction are pre-assigned opening the analysis to more inclusive perspectives. We will see some examples from urban and social systems, which will allow us

to introduce in the discussion observations about agentic AI in these environments. The general aim is to see how applied ontology provides a tool for overcoming the rigid dichotomy between agents and objects, recognizing and emphasizing the role of dynamics in processes and the emergence of relations. This work is developed with Camilla Perrone from UniFi.

Andrea Pradi (*Beyond Dominion: Rethinking Property in an Entangled World)* deepens this inquiry from a legal standpoint, reflecting on how modern law has historically structured the relationship between humans and things through the paradigm of private property as exclusive control. Rooted in Cartesian dualism and articulated through natural law, this model presupposes a clear ontological separation between subject and object, granting individuals power over material things exercisable to the exclusion of others. Its strength lies precisely in its simplicity, which has enabled it to become the dominant framework for organizing human–thing relations on a global scale. In the digital age, however, this framework comes under increasing strain. The very functions on which it is based begin to shift: the human subject is progressively translated into data and thus treated as an object, while technological systems acquire forms of agency, operating as quasi-subjects. This inversion challenges the core assumptions of modern property, undermining the ideal of absolute dominion. As a result, the autonomy traditionally associated with ownership is progressively eroded, while the nature of things—no longer passive or fully separable—emerges as central in shaping their use and limits, rather than being determined solely by human will. In this sense, both the quantum and digital turns point toward a different understanding of reality, in which humans and things are co-constituted within dynamic and interdependent relations. This shift calls for a rethinking of legal structures, moving beyond a paradigm of control toward a recognition of entanglement, if law is to remain responsive to contemporary conditions.

Luca Pes (*Human, Things, and African Law: Alternative Forms of Ownership*) offers a counterpoint grounded in traditional African legal systems, where the relationship between people and things is shaped by forms of collective ownership, culturally mediated by the sacred and ecologically attuned. In this framework, things are not mere resources, but entities imbued with spirit, whose use is governed by communal interests and ancestral practices aimed at preserving balance and sustainability across generations. While individual ownership is recognized, it remains neither exclusive nor absolute, being limited by both the sacred and the collective. Through the analysis of a case study, Pes showed how traditional law can still operate as a cultural background informing practices and understandings, even as the global spread of Western notions of property has progressively marginalized these alternative ontologies, eroding their status as lived systems of meaning and regulation.

Gianmatteo Sabatino (*Law, Governance, and Property in Contemporary China*) The last five decades in the history of Chinese law have seen a substantial diversification of the approaches to the notion of governing the country. This historical process emphasized the emergence of different paradigms, that of "ruling the country by law" being one of them but also including concepts such as "rule of virtue". The (deliberate or accidental) juxtaposition of the Western category of "rule of law" to some of these phenomena has produced several misunderstandings concerning the role of law in contemporary China. The paper aims to dispel some uncertainties pertaining to the most recent evolutions of the relationship between law and governance in the People's Republic of China, also in the light of recent trends of moralization of the legal systems as well as its digitalization. In the second place, the paper shall observe in detail how the concurring conceptions of rule by law in modern China, also due to the adjustments to traditional socialist legal categories, contributed to the emergence of an original and ever evolving system of property rights as well as of a peculiar approach to the notion of "ownership" which, contrary to "Western" liberal systems, is not the functional core of the system.

II. SESSION: ***Virtual Identity, Data, and Agency in the Digital Age.*** 28 Maggio: 9.30-13
Università degli Studi di Trento - Facoltà di Giurisprudenza - **Sala Conferenze "Fulvio Zuelli" -** Via Giuseppe Verdi, 53 - Trento

This session turned to digital and post-digital realities, where intelligent systems, digital platforms, and emerging quantum simulations are unsettling the old boundary between humans and things. What modernity framed as a sharp subject–object divide reveals a subtle but profound reversal.

On one side, the human being is increasingly translated into data—reduced to patterns, traces, and probabilities within algorithmic ecosystems that monitor, influence, and drive behavior. On the other, machines begin to assume functions once considered distinctly human: they learn, analyze, suggest, and decide.

Through this capacity to engage and shape meaning, things acquire a kind of voice—becoming not just instruments but partners in processes of reasoning, creating, and deciding. As this dynamic unfolds, the traditional oppositions that structured our way of thinking—subject and object, agency and passivity, tool and actor—start to dissolve. Thought itself no longer appears as the solitary act of an individual mind, but as a relational field: distributed, responsive, and co-created through ongoing entanglement between human and machine.

The advent of Artificial Intelligence marks a radical threshold, where material and virtual realities converge and once-clear boundaries begin to dissolve. The old narrative of dominion gives way to something more porous: a world of reciprocal influences, circulating agency, and boundaries that blur in the very act of relating.

This session invites us to pause at that threshold. It asks how different disciplines—law, philosophy, semiotics, anthropology, and beyond—are responding to this transformation. Are they beginning to rethink their foundational categories and semantics? Or are they still speaking the language of a world that is already behind us?

Introduced and moderated by Andrea Pradi (Faculty of Law UNITN)

- **Keynote** by **Ugo Mattei** ***(The Metaverse and the End of Law?)***, who suggests that the contemporary erosion of legal structures should not be seen merely as a problem of ineffective enforcement, but rather as a sign of a deeper exhaustion of the legal paradigm of modernity. In a world increasingly shaped—whether by the planetary consequences of environmental degradation or by the growing agency of algorithmic systems—the classical grammar of law, grounded in the separation between subjects and objects and in the assumption of human control over things, appears progressively inadequate. As code begins to displace law and algorithmic systems reorganize social relations through prediction, surveillance, and automation, what comes into view is not simply a regulatory crisis, but a broader epistemological shift. In a way that resonates with the quantum turn in physics—where stable and discrete entities give way to relational and entangled processes—the paradigm of the rule of law, traditionally founded on stability, rationality, and separability, is gradually decentered. Normativity no longer resides exclusively within legal forms but is increasingly embedded in technological infrastructures that shape and organize behavior through distributed and often opaque mechanisms, thereby transforming the very relationship between humans and things.
- **Sara Hejazi** ***(From Love to Entanglement: AI and the Reconfiguration of Human–Thing Relations)*****:** The paper offers a nuanced account of the long-standing and affective relationship between humans and things, tracing its evolution from the sensory immediacy and experiential richness of material objects to the abstract and often inaccessible nature of contemporary digital and quantum "objects." What emerges is not a rupture, but a transformation: the shift

from solidity to energy, from familiarity to estrangement signals a reconfiguration of the human–thing relationship rather than its end, as objects lose their apparent stability and reveal a reality grounded in flux, opacity, and relationality. Within this context, the human–thing relationship appears less as a matter of control than of entanglement, where meaning emerges through interaction rather than domination. Against this background, generative AI can also be interpreted as part of this trajectory: rather than delivering objective knowledge, it operates as a powerful mechanism of symbolic ordering, organizing complexity by smoothing contradictions and privileging statistically dominant patterns. In this sense, AI does not mark a break with past modes of understanding but intensifies a longstanding human tendency to impose coherence on an unruly world, often at the expense of plurality and authenticity.

Ugo Malvagna ***(From Subject to Asset: Blockchain and the Reversal of Property Relations)*** Malvagna examines how blockchain technologies and distributed ledgers challenge foundational distinctions in property law—especially between rights in rem and in personam. By decentralizing trust and authority, these systems create digital entitlements that blur traditional legal categories. His analysis raised critical questions about whether tokens and smart contracts represent a new legal paradigm or rather a destabilization of classical property logic, urging legal theory to rethink its core concepts in the face of algorithmic governance. Investigating Web 3.0 and distributed ledgers, the talk further explored how tokens and digital assets challenge established property frameworks, introducing a deeper dynamic of subversion: in Web 3.0, centrality shifts to the virtual object, which—unlike the electronic object of Web 2.0—exists and operates independently of its holder. This is due to the relation between digital assets and the smart contracts that govern their transfer and exchange. At the technical level, ownership of a digital asset is identified through the assignment of a token to a public address corresponding to a specific wallet, itself under the control of a subject; yet the very notion of a subject remains conceptually external to the on-chain dynamics of digital goods. Subversion thus emerges in a reversal of the traditional relationship: whereas property law has long conceived the object as an attribute of the subject, in blockchain-based systems the subject increasingly appears as an attribute—or a functional feature—of the asset itself, whose transfers merely update its state, that is, the data that define it.

Giorgia Bincoletto ***(The Human Being and Identity: When the Self Becomes Data)*** Bincoletto addresses the shifting status of personal data at the intersection of privacy rights and commodification. While data continues to be framed as an expression of personal identity, its increasing economic value and extractability transform it into a digital object governed by ownership-like logics. Her contribution examines how this tension unfolds within AI systems and the Internet of Things, highlighting the need for legal approaches capable of navigating the interplay between protection, autonomy, and market forces. Framed as a legal and philosophical inquiry, the analysis questions whether data should be understood as an object, a right, or an extension of the human self under contemporary technological conditions. Particular attention is devoted to the emerging role of synthetic data and its potential interaction with these dynamics: if data can be artificially generated, detached from direct human origin, this further destabilizes its qualification as an expression of personality, while simultaneously reinforcing its treatment as a manipulable and exchangeable resource. In this sense, synthetic data intensifies the underlying tension between identity and abstraction, raising new questions as to whether legal frameworks grounded in personal rights can still adequately capture the nature and circulation of data within increasingly autonomous technological systems.

Emanuele Ariano ***(Code Rewriting: Legal Discourse in the Age of Technocracy)***: Ariano examines the complex interplay between law and technology, conceived as competing discursive practices and regulatory ecosystems, each designed to govern and constantly (re)define the interaction and boundaries between humans and things. The advent of the digital

revolution and AI has ushered in a new "great transformation", elevating technology to the status of a hegemonic discourse capable of redesigning the legal order from within and emerging as one of its formants. Drawing an analogy with code rewriting in computer science, the talk problematises how foundational legal distinctions—such as that between subjects (personae) and objects (res)—and institutions are being recoded according to the logic of technological capitalism, with the progressive marginalisation and overwriting of legal discourse as its consequence. The domain of property is particularly revealing in this respect: not only are the legal status of things and the structure of property rights being re-ontologised through the advance of the technological frontier, but the very sphere of the appropriable is expanding and undergoing a paradigm shift, as the contemporary debates on the commodification of neural data through neurotechnologies and neurorights illustrate. Law, understood not merely as a regulatory mechanism but also as a shield for rights and liberties against all forms of violence—including technological violence—increasingly risks subordination to a self-referential technological ecosystem endowed with its own normative force, one that diverges from, and may conflict with, the logic and principles of law, particularly as developed within the tradition of post-war social constitutionalism. Against this backdrop, Ariano calls for a resistant reading of law as a counter-hegemonic practice and for the recovery of the (semi-)autonomy of legal discourse.

III Conclusional session

Introduced and moderated by Sara Hejazi (Center for Sensors and Devices FBK)

Federica Mantegazzini ***(The Boundary of Knowledge: A Classical Observer in the Quantum Realm)*** Classical physics, grounded in the Newtonian paradigm of classical rationalism, presumes a deterministic universe where the observer exercises total control over the object of study. This framework assumes that nature is inherently knowable and perfectly predictable, provided the observer maintains a dominant, objective role. However, this simplified model fails when applied to phenomena that require a quantum mechanical description. The Heisenberg uncertainty principle—one of the backbones of quantum mechanics—imposes an unavoidable limit on knowledge. It dictates that certain conjugate variables, such as a particle's position and momentum, cannot be simultaneously measured with arbitrary precision. In a laboratory setting, this represents an incommensurable obstacle: regardless of the sophistication of our classical instrumentation, our attempts to measure quantum systems are fundamentally constrained by the very laws governing the systems themselves. The "classical hands" of the observer are inherently ill-equipped to fully grasp the quantum nature of the experiment. The true "boundary of knowledge" is not a mere theoretical abstraction: it is a tangible, practical interface encountered daily in research laboratories. It marks the precise transition where the safe approximations of classical physics cease to hold, and the probabilistic and complex nature of the quantum world dominates. At this boundary, the limits of knowledge begin to reflect corresponding limits of control, as what cannot be fully determined cannot be fully governed. This transition raises profound questions regarding the limits of human perception and knowledge: Is it transcendentally possible to bypass these fundamental constraints, or is this boundary an absolute feature of reality? Beyond the controlled environment of the laboratory, where does this boundary lie in our everyday existence? How far can classical intuition—and the consequent rough approximation of reality—continue to serve humans in their daily interaction with things?

Andrea Rossato ***(Artificial Domains Reloaded: AI, Algorithms, Determinism and Unpredictability)*** The rapid development of digital infrastructures has led to an increasing concentration of computational power, driven not only by economic efficiency but also by the absence of meaningful public intervention in shaping the architecture of cyberspace. Within

this context, machine learning—particularly large-scale neural networks—emerges as a key driver of this concentration. At the core of these systems lies a fundamental tension. From a strictly mathematical perspective, neural networks operate through deterministic processes: given the same input, the same output will be produced. This property, known as referential transparency, characterizes pure computation: programs can be modeled as deterministic rewrite systems, a feature that inherently enables lazy evaluation and large-scale parallelization, making specialized hardware such as GPUs central to the development of contemporary AI. Yet, in practice, these systems are deliberately designed to depart from strict determinism. At the stage of output generation, stochastic elements are introduced—often through parameters such as temperature—so that identical inputs do not produce identical outputs. This injection of randomness prevents the system from appearing static and mechanical and is precisely what allows it to be perceived as flexible, adaptive, and, ultimately, "intelligent." However, it also introduces an element of fundamental unpredictability into an otherwise deterministic execution chain. At the same time, since these systems are intended to map and reproduce domains of human language, behavior, and interaction, they rely fundamentally on human-generated data as their primary resource. This dependence creates systemic incentives to maximize human engagement—often through behavioral design and dark patterns—in order to extract data and maximize the economic return on the physical infrastructures required for their deployment. As a result, individuals are increasingly incorporated into technological systems not as autonomous subjects, but as sources of data, while computational infrastructures consolidate control over both resources and outcomes. The configuration of these inherently unpredictable and resource-intensive systems raises broader legal and structural questions concerning liability, responsibility, and the governance of digital infrastructures.

Concluding Reflections

Pier Giuseppe Monateri ***(Human, Things and the Limits of Control)***