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Introduction
Narratives, Frontier Technologies, and the Law

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Abstract

The symposium *Narratives, Frontier Technologies, and the Law* discusses how narratives influence the governance of frontier technologies such as artificial intelligence, quantum computing, bioprinting, and neurotechnology. The authors argue that the law does more than just respond to these innovations; it actively creates and reshapes the narratives that define their paths. They claim that lawyers act as storytellers, using the law to legitimise specific technological paths while challenging or reinforcing existing power structures; as a result, the law both reflects and creates cultural anxieties. The authors hope that this symposium helps clarify the dynamic relationship between storytelling, legal regulation, and technological progress.

1. Profiles of the Future

Humans are storytellers. Long before the invention of writing, storytelling was already an important part of human culture. Archaeological evidence suggests that narratives have been a part of human experience for tens of thousands of years. Prehistoric cave paintings, such as those found in Kimberley in Australia,[1] Chauvet in France,[2] and Karampuang in Indonesia,[3] date back approximately 17, 30, and 50 thousand years, and depict vivid scenes of animals, hunting, and abstract symbols. These images reveal that the artists of the Palaeolithic had sophisticated cognitive processes, which they used to share myths, reinforce group identity, and teach survival skills.[4] In this light, we can view cave art as an early form of storytelling, capturing communal histories, transmitting cultural values, or communicating spiritual beliefs.[5]

The pictorial narratives etched into stone and painted on cave walls laid the groundwork for humanity's written storytelling tradition.[6] However, we cannot overstate the significance of oral storytelling. Indigenous cultures around the world have rich oral histories, some of which coincide with scientific accounts of ancient geological events. For instance, the oral traditions of Australian First Nations describe the submergence of coastal lands after the last Ice Age, which geological data suggests dates these narratives back more than ten thousand years.[7] In this respect, the continuous storytelling practices of Australian First Nations peoples exemplify how oral narratives sustain complex systems of ancestral law, cultural identity, and ecological knowledge across thousands of generations.[8] Similarly, but emerging much later within written traditions, narratives such as

[1] Finch, "Ages for Australia's Oldest Rock Paintings."
[2] Clottes, Chauvet Cave; Leroi-Gourhan, "The Archaeology of Lascaux Cave."
[3] Oktaviana, "Narrative Cave Art in Indonesia by 51,200 Years Ago."
[4] Clottes, What Is Paleolithic Art?
[5] See generally Clottes, Return to Chauvet Cave.
[6] Hurlburt, "Storytelling."
[7] Nunn, "Aboriginal Memories of Inundation of the Australian Coast Dating from More than 7000 Years Ago."
[8] See generally Langton, First Knowledges Law.

the *Epic of Gilgamesh* (circa 2100 BCE) and the *Homeric epics* (circa 800 BCE) captured human struggles, aspirations, and realities, providing valuable insights into the ethics and cultural identities of ancient societies.[9] Despite millennia and countless new narratives, the structure of our stories has largely remained unchanged, demonstrating the enduring power of storytelling in reflecting and shaping human experience.[10]

Storytelling is fundamental to human nature and deeply ingrained in our cognitive architecture.[11] Humans instinctively create narratives to organise the chaos of life, essentially creating simulations for social and moral decision-making.[12] Some cognitive scientists believe that narrative thinking is the primary mode of thought that shapes both individual identity and cultural belief systems.[13] From an evolutionary standpoint, narratives aid survival by allowing us to mentally rehearse social situations, solve problems, and form collective identities.[14] Stories can also increase empathy by allowing audiences to feel the emotions of fictional characters, which promotes cooperation and understanding.[15]

Frontier technologies, such as artificial intelligence (AI), big data, and virtual reality, have dramatically altered storytelling.[16] AI, for example, enables new forms of generative storytelling in which algorithms can create plotlines, characters, and adapt narratives in real time based on user feedback.[17] Transmedia storytelling now exists across multiple platforms, encouraging active audience participation and collaborative narrative building.[18] Big data analytics enables creators to tailor content to individual preferences, fine-tuning story arcs based on real-time feedback and engagement metrics.[19] Meanwhile, virtual reality promotes immersive narrative experiences, bridging the physical and the digital.[20]

Despite all of these technological advancements, storytelling continues to be an important tool for understanding and shaping our social reality—the ancient human impulse to make sense of the world through stories persists. As **Karen Schultz** explores in her article, ***Utopia and Intellectual Humility: More, Bacon, and Swift Appraising Law and Technology***, narratives about legal and technological advancement are not only descriptive but also deeply formative, shaping how societies perceive progress. Schultz advocates for intellectual humility, acknowledging the limitations of human judgement when dealing with new technologies. She looks at how classic utopian literature, such as More's *Utopia*, Bacon's *New Atlantis*, and Swift's *Gulliver's Travels*, employs storytelling to question legal and technological paradigms. Her choice of literature reminds us that legal and technological imaginaries are not new; rather, they are part of a long-standing storytelling tradition that influences our expectations and fears about the future. Yet storytelling is more than just a cultural artefact; stories shape the social world, technology, and our shared future.

2. The Truth of Fact, The Truth of Feeling

As explained above, stories do more than reflect reality; they actively shape how we perceive and interact with the world. Narratives help us bring order to complexity by assisting us in interpreting events, creating meaning, and making decisions. However, the power of storytelling is two-sided: while narratives help us make sense of the world, they can also obscure it by blending myth and reality in ways that distort our perspectives.[21] When we make decisions based on compelling but flawed narratives, we risk creating a world built on false assumptions. This is particularly evident in techno-optimistic narratives, in which the promise of technological progress is frequently taken at face value, resulting in regulatory frameworks that assume innovation will solve societal problems while ignoring underlying structural issues.[22]

As **Henrique Marcos** explains in his article, ***Tech Won't Save Us: Climate Crisis, Techno-Optimism, and International Law***, techno-optimism is the belief that technological advancements lead to progress by addressing social, political, and environmental issues without requiring major structural changes. This viewpoint holds that technology is neutral, self-correcting, and capable of overcoming the constraints of human decision-making. Marcos argues that this narrative is deeply

[9] George, "The Epic of Gilgamesh"; Osborne, "Homer's Society."
[10] Holmberg, "The Creation of the Ancient Greek Epic Cycle."; Kim, "Deeply Nested Structure of Mythological Traditions Worldwide."
[11] Fisher, "Narration as a Human Communication Paradigm."
[12] Beach, The Psychology of Narrative Thought.
[13] Beach, The Structure of Conscious Experience.
[14] Carroll, Evolution and Literary Theory.
[15] See, for example, Ferchaud, "It's My Choice."
[16] Pawar, "Immersive Storytelling."
[17] Cavazza, "Characters in Search of an Author."
[18] Hayati, "Transmedia Storytelling."
[19] Okorie, "Leveraging Big Data for Personalized Marketing Campaigns."
[20] Rose, 'The Immersive Turn."
[21] We have only to think of how conspiracy theories and fake news spread online. Vosoughi, "The Spread of True and False News Online."
[22] Morozov, To Save Everything, Click Here.

embedded in current climate policy. He criticises the assumptions of techno-optimism, arguing that international environmental law's reliance on technological solutions frequently ignores deeper systemic issues. The promotion of electric vehicles (EVs) as a climate solution is one of the examples he uses to discuss this misdirected optimism. While EVs reduce direct tailpipe emissions, they do not address the broader environmental costs of battery production, resource extraction, and energy consumption.

Another area where techno-optimism influences legal frameworks is judicial decision-making, specifically the belief in AI's potential to reduce human bias in adjudication. The assumption that AI can serve as an impartial tool, free of the cognitive and social biases that affect human judges, has resulted in a growing use of AI-assisted decision-making tools in courts. However, as **Giovana Peluso Lopes** points out in ***Bias in Adjudication and the Promise of AI: Challenges to Procedural Fairness***, this assumption is fundamentally flawed. While some regard AI as a neutral actor, it is actually shaped by the data it is trained on, the biases of its developers, and the socio-legal contexts in which it operates. Lopes demonstrates how, far from eliminating bias, AI can exacerbate existing disparities in legal decision-making, particularly in risk assessments, sentencing recommendations, and predictive policing. As a result, the techno-optimist belief in AI as a solution to judicial bias may inadvertently introduce new and more pernicious forms of prejudice into the law.

While techno-optimism frequently results in an overestimation of technology's ability to solve complex problems, lawmaking in frontier technologies is also influenced by negative emotions, particularly fear and suspicion. This is especially evident in the regulation of quantum technologies, where the law is shaped not only by expectations of future breakthroughs, but also by geopolitical fears and security concerns that far outweigh current technological realities. **Anh Nguyen's** article, ***Export Controls as Innovation Marketing? Sociotechnical Imaginaries in the Ringfencing of Quantum Technologies***, investigates how fear, rather than technological necessity, motivates restrictive policies on quantum computing and encryption. Governments around the world have imposed export controls and national security restrictions on quantum technologies, despite the fact that fully operational quantum computers do not exist. It would seem that the idea of restricting non-existent technology is based on the belief that whoever masters quantum computing first will dominate global security, finance, and cybersecurity. However, Nguyen claims that these restrictions are motivated by geopolitical positioning rather than actual technological threats. This is not an isolated phenomenon; the law is frequently motivated by speculative fears about future risks rather than reality.[23]

3. The Lathe of Heaven

The law does more than just respond to technological change; it actively influences how technology is perceived, regulated, and integrated into society. Optimistic narratives, on the one hand, encourage funding, innovation, and deregulation, reinforcing the belief that technology will solve society's most pressing issues. Fear-driven narratives, on the other, justify control and restriction, which are frequently based on speculative rather than actual threats. Both narratives influence the law in ways that go beyond technological reality, demonstrating that the law is not only reactive but also active in shaping how we understand, anticipate, and regulate new technologies.[24]

Lawyers are more than just characters in the narrative of technology; they are storytellers who create, challenge, and redefine the stories that shape the official policy and public perception of technological advancements. The way legal professionals frame issues – whether positioning AI as a tool for justice, portraying quantum technologies as national security threats, or embedding environmental regulations within techno-optimist frameworks – has a significant impact on how laws are structured and enforced. If the law is a tool for narrative construction, legal professionals must recognise their role as storytellers (and, perhaps more importantly, narrative builders), ensuring that the legal frameworks governing frontier technologies are founded on fact rather than myth and that they serve the public interest rather than simply reinforcing existing power structures.[25]

The regulation of biomedical technologies is a clear example of how lawyers construct narratives about technology. **Mirko Djukovic's** article, ***New Organs in Command: The Regulatory Prospects of 3D Bioprinting***, investigates how the law is actively shaping how bioprinting technology is perceived, classified, and integrated into regulatory frameworks. At the heart of the regulatory challenge is the dual nature of bioprinted products – they contain both biological and synthetic materials, making them difficult to classify under existing legal frameworks insofar as current regulations governing tissue engineering, pharmaceuticals, and medical devices do not fully account for the complexity of bioprinting. Yet Djukovic contends that the

[23] Calandrillo, "Terrified by Technology."
[24] On the reciprocal influence between society and technology, challenging the notion that technological development is solely a one-way process from technology to society, see: Feenberg, "Democratic Rationalization."
[25] Susskind, The Future of Law.

lack of clear categorisation is more than just a result of legal ambiguity; it reflects how the law constructs reality. In this respect, Djukovic highlights how bioprinting regulation is a deeply narrative-driven process, not at all a purely technical one. The dominant legal narratives surrounding medical innovation frequently portray regulatory frameworks as balancing two opposing interests: the promise of cutting-edge technology to save lives and the need for ethical oversight.

As lawyers construct and reinforce narratives on technology, one of their most important responsibilities is to define the boundaries of legal concepts such as personhood and agency. These concepts are not static; rather, they evolve in response to social, political, and technological changes, which are shaped by legal narratives. Nowhere is this more evident than in the legal treatment of AI and neurotechnology, where traditional legal categories are being challenged, redefined, and even eliminated. **Talya Deibel** and **Eric Deibel's** article, ***Forgotten Boundaries in Law: On AI and Neurotechnology***, investigates how law has long relied on the myth of the 'natural person,' creating the notion that there is an absolute divide between the human and the non-human. However, as AI and neurotechnologies blur the distinctions between human and machine, mind and data, autonomy and algorithm, the law is being forced to rethink its core categories. Deibel and Deibel argue that legal systems are not merely struggling to catch up with technological advancements – they influence how these technologies are understood and integrated into society. This is especially clear in the legal treatment of AI-generated decisions in healthcare and criminal justice, where regulatory frameworks frequently assume that human decision-making differs fundamentally from machine decision-making. However, the authors question this distinction, emphasising how law creates the very boundaries it claims to protect.

A central question in the debate over personhood and agency is whether AI should be viewed as a mere tool, similar to a paintbrush or a camera, or whether it plays a more autonomous role in the creative process. Should AI-created works be legally recognised as original work? **Xi Lin's** article, ***Protecting AI-Generated Images as Works of Fine Art in China***, looks at the issue through the lens of Chinese copyright law, specifically the landmark case *Li v. Liu*, in which a Chinese court ruled that an AI-generated image could be classified as a work of fine art. This decision is noteworthy for how it reinforces a specific narrative about AI, creativity, and human agency. The Chinese court ruled that the AI user, not the AI itself, was the legal author of the image because the user's input (the textual prompt) was deemed a 'original' creative contribution.

Regardless of whether the decision in *Li v. Liu* is correct, it is part of a larger trend in the governance of frontier technologies, in which the law not only regulates new developments but also creates the categories that define them. Just as regulatory frameworks for bioprinting determine whether printed tissues are considered human or synthetic and legal definitions struggle to maintain the notion of 'natural person', the legal system's approach to AI-generated content determines whether AI is treated as an agent, a tool, or somewhere in between. These are not just legal decisions; they are narrative choices that influence how society perceives and interacts with emerging technologies.

4. So Long, and Thanks for All the Fish

The stories we tell about technology shape not just how we understand innovation, but also whether we welcome or fear it. In storytelling, the law is not a passive element limited to reacting to technological developments; it is a dynamic force that shapes the boundaries of what is acceptable or forbidden, as well as what is possible. As such, lawyers are crucial in determining how frontier technologies are regulated, whether through techno-optimism or fear-based narratives. Lawyers are storytellers who create the narratives that will shape how technology is governed in our society. As legal scholars and practitioners, it is our responsibility to make sure that these narratives are shaped by a dedication to justice, inclusivity, and a critical understanding of the role that law plays in determining our shared future.

This symposium is the result of discussions held at the *Narratives, Frontier Technology, and the Law* conference on October 30th, 31st, and November 1st 2024 in Maastricht, The Netherlands. These discussions have helped us understand how the law not only regulates technological change, but actively defines the space in which it occurs. The articles in this collection demonstrate the dual role of law as both a stabiliser of existing power structures and a space for critical intervention, emphasising how lawyers must engage with technology not as an external phenomenon, but as an internally constructed narrative that calls for scrutiny. The governance of frontier technologies is frequently framed through a Western lens; however, the narratives that underpin technological regulation affect people all over the world. Recognising who gets to tell the story of technological governance is as important as the regulations themselves. In this respect, we find it important to highlight that this conference was led by two non-European scholars, both immigrants from the Global South.

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