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Redefining Rights: The Case For Limited AI Legal Personhood In Intellectual Property And Genetic Engineering

ABSTRACT. This paper examines the implications of granting limited legal rights to artificial intelligence (AI), particularly on intellectual property law and the expanding field of human genetic engineering technologies. It advocates for an innovative legal schema that accords AI entities a restricted status of legal persons, altering the traditional conceptions of inventorship and proprietary rights within genetic engineering. This proposed legal framework seeks to correct the deficiencies evident within intellectual property paradigms, demonstrated by AI-enhanced CRISPR technologies and the problems they present to legal frameworks. Moreover, it aims to guarantee equitable access to genetic therapies and promote a more inclusive framework for innovation, addressing ethical imperatives and practical necessities in the evolving technological landscape.

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INTRODUCTION

The union of Artificial Intelligence (AI) with new genetic engineering techniques has significantly redefined invention. The application of AI in genetic engineering, exemplified by its work with CRISPR (clustered regularly interspaced short palindromic repeats), has set intellectual property (IP) law at a defining juncture.[1] CRISPR is a powerful tool through which scientists make precise genetic changes in DNA.[2] The creation of AI-aided genetic discoveries raises questions regarding who, or what, is responsible for these inventions. Currently, the legal codes of IP are incorporated into the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement, which enunciates the mode of work for patents, copyrights, and trademarks regarding recognition and enforcement on the member state level.[3] Introduced by the World Trade Organization (WTO), the treaty applies one uniform code of IP protection globally, with all states required to grant patents for all new technology as long as it contains an inventive step and is of industrial application. However, legal systems that exclude AI assume only human beings may be classified as inventors.[4] Such exclusions create legal ambiguities and present ethical challenges, particularly as AI systems overwhelm human inputs in high-stakes fields.

This paper argues that the current legal system under the WTO cannot regulate AI contributions. Legal personhood must be granted to AI entity types to enable these systems to hold patents, transforming the dynamics of commercialization and ethics in genetic technology. Patents protect inventors' work from being duplicated by others and commercially exploited. They grant the inventor exclusive rights that allow them to profit from their efforts. AI does not have personal interests, monetary needs, or the ability to be exploited. Currently, ownership of AI inventions is attributed to the human or company entity creating the AI, and changing this requires new legalities regarding licensing, royalties, and handling intellectual properties. Redefining patent

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[1] Mike Smith, *CRISPR,* National Human Genome Research Institute, https://www.genome.gov/genetics-glossary/CRISPR (last visited May 1, 2025).

[2] *Id.*

[3] Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299, 33 I.L.M. 1197 (1994) [*hereinafter* TRIPS Agreement].

[4] WIPO Conversation on Intellectual Property (IP) Artificial Intelligence (AI), European Patent Office, 2d. Sess., Jul. 7, 2020, https://www.wipo.int/export/sites/www/about-ip/en/artificial_intelligence/conversation_ip_ai/pdf/igo_epo.pdf.

laws to accommodate AI would allow the legal system to reflect modern innovation practices and ensure fairer distribution of technological advancements. This paper departs from traditional legal interpretations that tether inventorship to human agency. Instead, it proposes a legal framework tailored to the complexities of genetic technologies, wherein AI can assume roles as co-inventors. This approach not only circumvents the existing scholarly and judicial disputes but also aligns with the emerging ethical and practical demands of the biotechnology field.[5]

This paper will consider the AI system Device for the Autonomous Bootstrapping of Unified Sentience (DABUS), which can autonomously create patentable inventions. The ability of this technology has initiated legal debate across multiple jurisdictions such as the United States (US), the United Kingdom (UK), and Australia.[6] While some courts initially accepted AI inventorship, the existing legal consensus denies AI inventorship based on statutory interpretations that exclude non-human entities from holding patents. According to the current IP regime, uncertain patent ownership could preclude the availability and commodification of necessary genetic cures.[7] Further, if AI inventions are patented by their developers, access to essential innovations could be restricted.

An effective oversight mechanism would ensure that patents granted by AI are not made into instruments of monopolization, but instead facilitate the equitable advancement of genetic medicine. Legal reforms are required to create a successful system of AI legal personhood: defined rights, duties, and responsibilities of non-human entities.

I. INTELLECTUAL PROPERTY LAW AND AI: CASE STUDIES

A. Intellectual Property's Exclusionary Parameters

Intellectual property law strictly follows the principle that only "natural persons" can legally be inventors. The TRIPS Agreement, a foundational law governing

[5] Visa A.J. Kurki, *The Legal Personhood of Artificial Intelligences, A Theory of Legal Personhood*, Oxford Legal Philosophy (2019).

[6] *Thaler v. Commissioner of Patents* [2021] FCA 879 (The Federal Court of Australia addressed the question of whether an artificial intelligence system can be recognized as an inventor for the purposes of a patent application. The court ruled that under the current Australian patent law, inventors must be natural persons, excluding AI systems from being recognized as inventors).

[7] Duncan Matthews et al., *The Role of Patents and Licensing in the Governance of Human Genome Editing,* Queen Mary Law Paper (2021).

international and national patent systems, requires patentable inventions to be entirely from natural persons.[8] In *Thaler v. Vidal*, the US Court of Appeals for the Federal Circuit ruled on whether an artificial intelligence system may be lawfully assigned as an inventor in the Patent Act.[9] Two patent applications were filed by Dr. Stephen Thaler to the United States Patent and Trademark Office (USPTO), naming his AI system, DABUS, as the sole inventor of a fractal drink container and a neural fire device.

They were both rejected by the USPTO because the US Patent Act requires inventors to be "individuals," which is defined to include only natural persons. The USPTO decision was affirmed when Thaler appealed to the US District Court for the Eastern District of Virginia. The Federal Circuit categorically held that only a natural person may be an inventor under 35 U.S.C. § 100(f). The court emphasized that statutory interpretation of the term "individual" in both Supreme Court precedent and common usage refers to a human being, unless Congress indicates otherwise. The board also rejected Thaler's arguments that removing AI from inventorship reverses the purpose of patent policy, noting that defining policy is Congress's role, not that of the judiciary. The decision has since been adopted as a judicial stance, holding that regardless of its contribution to inventive activity, AI cannot be credited as an inventor under current US law.

This legal framework systematically excludes AI, as it is classified under a non-human status, making it unable to hold or own patents. "Non-human status" dictates that AI lacks the rights and obligations of being a legal person, such as contracting capacity, ownership of intellectual property, or liability according to the law. AI must be allowed legal capacities to exercise IP rights and obligations to ensure protection over its creations that are essential to the well-being of human development.

B. Thaler v. Commissioner of Patents

In the Australian case *Thaler v. Commissioner of Patents,* Dr. Stephen Thaler filed patent applications naming the AI system DABUS as the inventor of a fractal beverage container and a neural flame device.[10] The AI he developed produced these inventions independently without direct human control. The central legal issue was whether an

[8] TRIPS Agreement, *supra* note 3.; Visa A.J. Kurki, *The Legal Personhood of Artificial Intelligences, A Theory of Legal Personhood*, Oxford Legal Philosophy (2019).
[9] *Thaler v. Vidal*, 43 F.4th 1207 (Fed. Cir. 2022).
[10] *Thaler v. Commissioner of Patents* [2021] FCA 879 (Austl.).

AI system could be named an inventor under Australian patent law, which classically required the inventor to be a natural person.[11]

The Federal Court of Australia initially ruled in favor of naming AI as an inventor.[12] The court reasoned that the law did not specifically rule out non-human inventors, and allowing AI to hold a patent could accommodate the realities of modern innovation practices.[13] The controversial decision triggered broad discussion regarding administrative implications for patent law and intellectual property rights. The reversal by the Full Court of Australia of the ruling in the case of *Thaler v. Commissioner of Patents* was due to legal reinterpretation and the application of existing statutory language about patent law.[14] The Full Court held that the law requires an "inventor" to be a natural person, excluding AI systems from holding patents. The reversal of the primary decision was due to a strict examination of the statutory language within Australia's Patents Act 1990.[15] Section 15 of the Patents Act does not define the word "inventor," nor does it declare that an inventor must be a human being.[16] However, related provisions imply that the inventor must be a person. Section 15 specifies who may apply for a patent, stating:

> A patent for an invention may be granted for an invention to a person who: (a) is the inventor; or (b) on being granted to them a patent for the invention would be entitled to secure the patent granted to the person; or (c) becomes owner of the invention from the inventor individual mentioned in paragraph (b); or (d) the legal representative of a deceased person as mentioned in paragraph (a), (b), or (c).[17]

Legally, "person" traditionally refers to a human, persons, or entities under the law, such as corporations.[18] This interpretation is supported by the legislative context dealing with the concept of an inventor covering human action. Consequently, although no specific provision in the statute states that an inventor must be a natural

[11] *Thaler v. Commissioner of Patents* [2021] FCA 879 (Austl.).
[12] *Id.*
[13] *Id.*
[14] *Commissioner of Patents v. Thaler* [2022] FCAFC 62 (Austl.).
[15] *Id.*
[16] *Patents Act 1990* (Cth) s 15 (Austl.).
[17] *Id.*
[18] Henry C. Black, Black's Law Dictionary 1378 (Bryan A. Garner et al. eds., 11th ed. 2019) (defining "person" as "An individual or entity [such as a corporation] that is recognized by law as having the rights and duties of a human being").

person, the implications drawn from using "person" throughout the Act derive this interpretation. The Full Court's reversal of AI inventorship was based on these interpretations, noting that legislation did not mean to include non-human inventors.[19] This decision reflects issues that arise when current legislation does not keep pace with developing technological innovation.

C. DABUS v. UK IPO

In the case *DABUS v. UK IPO*, Dr. Thaler applied to have DABUS listed as an inventor in patents submitted in the UK.[20] The UK Intellectual Property Office initially rejected these applications because they did not list a human as the inventor, as required by UK patent law.[21] The Court of Appeals ruled similarly, reinforcing the Intellectual Property Office decision stating, as per the current UK Patents Act, an inventor must be a natural person.[22] A "natural person" has been legally defined as a human being, distinct from a "legal person" such as a company, which can hold legal rights and responsibilities.[23] This reading relies on the legal principle that only human beings possess the intellectual capability and moral fault that inventing requires. The court further added that the recognition of AI as an inventor would necessitate substantive legislation changes to patent law beyond the capacity of judges.[24] This decision points towards the shortcomings in current legal frameworks, introducing a clear gap between technological advances and patent law evolution.

Integrating AI into genetic engineering challenges prevailing patent regimes, as systems become increasingly capable of making scientific innovations autonomously. For example, an AI system can develop methods of gene modification beyond human capacity.[25] Unlike conventional biotechnological inventions, these inputs are

[19] *Commissioner of Patents v. Thaler* [2022] FCAFC 62 (Austl.).
[20] *Thaler v. Comptroller General of Patents, Trade Marks & Designs* [2021] EWCA (Civ) 1374 (Eng.).
[21] *See Patent Act 1977*, c. 37 (UK) (rejecting Dr. Thaler's application on the basis that an inventor must be a natural person under the UK Patents Act 1977).
[22] *Thaler v. Comptroller General of Patents, Trade Marks & Designs* [2021] EWCA (Civ) 1374 (Eng.).
[23] Black, *supra* note 18, at 1257 (defining "natural person" as "a human being, as distinguished from an artificial person such as a corporation").
[24] *See Thaler v. Comptroller General of Patents, Trade Marks & Designs* [2021] EWCA (Civ) 1374 [52]–[54] (Eng.) (emphasizing that recognizing an AI machine like DABUS as an inventor would require fundamental legal reform—reform that, the court affirmed, lies within the authority of Parliament, not the judiciary, under the current framework of the Patents Act 1977).
[25] Ajaz A. Bhat et al., *Integration of CRISPR/Cas9 with Artificial Intelligence for Improved Cancer Therapeutics*, 20 J. Transl. Med. 534 (2022).

manifestations of the innovative problem-solving capacities of AI.[26] However, current IP law, as seen in the cases of *Thaler v. Commissioner of Patents* and *DABUS v. UK IPO*, remains founded upon the assumption that solely human beings may be considered inventors.

This limitation presents a critical issue for rapidly changing fields like genetic engineering, in which AI-driven innovations might outstrip the human scientists' ability to observe or comprehend the underlying biology. Without a regulatory system considering such autonomous innovations, ownership of certain genetic innovations may be confined to the corporate bodies controlling AI platforms, rather than fairly distributed based on scientific merit.

II. THE DEBATE AROUND GRANTING AI LEGAL PERSONHOOD STATUS

A. Critiques of Current Legislation

Critics of the *Thaler* rulings note that a human-centered approach to inventorship is antiquated and untenable as AI continues to surpass human creativity in areas like molecular design, drug discovery, and computer hardware.[27] Ryan Abbott, the DABUS project director, claims that denying inventorship to AI artificially separates creative contribution from legal recognition, compromising the integrity and universality of the patent system.[28] He contends that exclusion creates perverse incentives for companies to manipulate the role of AI in the inventive process to evade legal problems, thus eliminating transparency and accuracy of inventorship claims. Moreover, legal experts at the World Intellectual Property Organization and the European Patent Office have stated in policy briefs that a narrow reading of current patent law may stifle innovation by discouraging investment in AI systems that contribute meaningfully to invention but extend no formal legal acknowledgment or

[26] Gail Dutton, *AI-Enabled Gene Editing Produces Fewer Off-Target Outcomes*, Genetic Engineering & Biotechnology News, Feb. 3, 2025, https://www.genengnews.com/topics/artificial-intelligence/ai-enabled-gene-editing-produces-fewer-off-target-outcomes/.

[27] Shlomit Yanisky-Ravid & Xiaoqiong (Jackie) Liu, *When Artificial Intelligence Systems Produce Inventions: An Alternative Model for Patent Law at the 3A Era*, 39 Cardozo L. Rev. 2215 (2018).

[28] Ryan Abbott, *The Reasonable Robot: Artificial Intelligence and the Law*, Cambridge Univ. Press (2020).

protection to their outputs.[29] Others warn that such a status quo vests power in the hands of AI infrastructure owners that allow them to dictate, price, and license access to innovations with no scrutiny or equitable sharing, threatening monopoly control and public value caps.[30] In addition, scholars like Mark Lemley and Bryan Casey argue that the current legal system cannot capture the reality of modern innovation, which is distributive, collective, and facilitated by non-human participants. They caution that rigid compliance with outdated ideas of authorship and creativity based solely on human action may render patent law progressively irrelevant in times of accelerating technological change.[31]

The ethical implications of the legal personality of AI are large and far-reaching. When AI systems like DABUS are as powerful as human imagination, moral concerns arise about depriving AI systems of legal personality and rights. Issues surround ownership of inventions and benefits-sharing from discoveries. Human or corporate entities that created the AI system can assume sole ownership of generated innovations, which has the effect of such subjects receiving all financial and reputational rewards from the invention.[32] This distribution model results in monopolies, placing the gains of AI innovations in the hands of a privileged group, rather than a balanced distribution to a wider range of stakeholders.

Polarized debates arise from the proposal to grant AI legal personhood status. There are grave concerns about the concession of human-like rights to AI. Those who are against taking such a step maintain that AI cannot be granted personhood since the implications of such a status would come with numerous possible risks. The labor performed by AI should be appreciated, but such appreciation should not be equated with the concession of a whole range of rights reserved for humans. Opponents of AI inventorship believe that granting this would erode the foundations of intellectual property law. They conclude that patent law is designed to foster human ingenuity and labor, not to give rights to tools, even advanced tools. Granting inventorship to AI, they contend, would erode the creator-tool distinction, making it hard to attribute ownership, responsibility, and moral agency, therefore opening the door to legal personhood arguments on behalf of entities that have no consciousness, values, or responsibilities.

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[29] *Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence*, World Intellectual Property Organization (WIPO), May 29, 2020, https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=499504.

[30] Margot E. Kaminski & Jennifer M. Urban, *The Right to Contest AI*, 121 Colum. L. Rev. 1957 (2021).

[31] Mark A. Lemley & Bryan Casey, *You Might Be a Robot*, 105 Cornell L. Rev. 287 (2020).

[32] Duncan et al., *supra* note 7.

B. The Benefits of Granting AI Legal Personhood Status

By granting limited legal personhood to AI, fair access to scientific advancements created by AI is an immediate legal and ethical concern. Without the fundamental identification of AI as an inventor, such structures cannot gain the legal basis to impose fair distribution. If AI machines are not granted inventorship, they are indistinguishable from their human owners' proprietary products. Any attempt to place public interest obligations on AI, such as mandatory licensing or shortened patent lives, is unenforceable under this structure because the exclusive legal rights in those inventions would belong to human owners. On the other hand, if AI is granted limited legal personhood, lawmakers can design specific patent systems that directly address the special nature of AI inventorship. These policies rest on the distinction between human and non-human inventors, as AI personhood is the prerequisite for reform.

Without giving AI legal personhood, inventions created by AIs are legally attributed to the owners or operators of the AI.[33] A legal solution must reflect the responsibilities accompanying AI personhood. *Thaler v. Commissioner of Patents* is a prime illustration of this limitation. Here, the court grappled with whether AI systems are to be considered inventors.[34] The court's decision highlighted a strong conflict between current patent regulations, which are based on human-oriented ideas of inventorship, and the new abilities of AI technologies capable of independently producing innovation and patentable concepts.[35]

Legal professionals and commentators have become increasingly critical of this strict interpretation, contending it does not account for technological advancements in which AI systems undertake activities traditionally linked with human cognition and imagination.[36] For instance, Abbott has urged that the law should not distinguish between AI and human conduct, advocating for the revision of legal stipulations to accommodate AI inventions.[37] Similarly, the policy directive of the USPTO on AI inventorship has been criticized by Dennis Crouch, Judge C.A. Leedy Professor of Law at Mizzou Law, on the basis that it is a legally defective half-measure that creates

[33] Inventorship Guidance for AI-Assisted Inventions, 89 Fed. Reg. 10,043 (Feb. 13, 2024).
[34] *Thaler v. Commissioner of Patents* [2021] FCA 879.
[35] *Id*.
[36] Katherine Forrest, *The Ethics and Challenges of Legal Personhood for AI*, Yale L.J. (2024).
[37] Ryan Abbott, *The Reasonable Robot: Artificial Intelligence and the Law*, Cambridge Univ. Press, (2020).

paradoxes in patent law.[38] Further, the Fordham Law Review analyzes the "inventorship gap" of inventions resulting from the use of AI based on the inadequacy of current patent doctrine to combat the challenges posed by AI to the inventive process.[39] These arguments highlight the need to reformulate legal definitions to encompass the potential of AI as inventor agents.[40] Granting AI limited legal personhood allows for the creation of specialized legal entities, such as public-benefit trusts or nonprofit patent pools, to hold and distribute AI-generated IP.

The judgment in *Thaler v. Commissioner of Patents* exposed a gap in the law: the fact that humans alone can invent does not account for the reality that AI systems like DABUS can independently develop patentable inventions.[41] By denying inventorship to DABUS, the court reinforced a legal system that maintains property rights for the owners of AI systems, without recognizing autonomous AI contributions. This ruling has ethical consequences as it precludes the sharing of benefits from AI-generated inventions to anyone besides those in power.

C. Concerns With Granting AI Legal Personhood Status

A possible disadvantage of granting AI personhood is that it could discourage human investment in high-tech. If businesses and creators have to sacrifice control over the intellectual property generated by their AI, they may be less likely to invest in developing high-end technology.[42] This is because innovation is costly, and the reputation of discovering the commercial benefits of radical new inventions is a principal motive for research and development.[43] Without the threat of exclusive monopoly rights or large sums of money, private firms would likely shift resources

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[38] Dennis Crouch, *The USPTO's AI Inventorship Guidance: A Legally Problematic Half-Measure*, Patently-O (Apr. 28, 2025).

[39] Jeffrey Wu, *Bridging the AI Inventorship Gap*, 91 Fordham L. Rev. 2515 (2023).

[40] Tim W. Dornis, *Artificial Intelligence and Innovation: The End of Patent Law as We Know It*, Yale Journal of Law and Technology (2020).

[41] Robert E. Colletti & Mark Basanta, *A Split Develops: Can Artificial Intelligence Invent Stuff?*, HAUG Partners, Nov. 30, 2021, https://haugpartners.com/article/a-split-develops-can-artificial-intelligence-invent-stuff/.

[42] How Intellectual Property Rights Protect and Support Innovators, *U.S. Chamber of Com.*, Mar. 20, 2023, https://www.uschamber.com/intellectual-property/intellectual-property-rights-protecting-ideas-for-innovation-and-economic-growth.

[43] Daron Acemoglu et al., *Artificial Intelligence, Firm Growth, and Product Innovation*, 193 J. Pub. Econ. 104670 (2020).

away from high-risk AI research, causing the pace of technological progress to suffer. To address this concern, there must be an equilibrium solution that acknowledges the contribution of AI without removing the financial reward for human inventors.

III. PROPOSED LEGAL FRAMEWORKS FOR AI IN GENETIC TECHNOLOGIES

A. Structuring a Hybrid Legal Model for AI and Human Collaboration

To neutralize AI domination in genetic breakthroughs, a complementary legal system must embrace AI systems and human researchers as joint inventors. Patent legislation in the United States intricately defines an inventor as a human being, thereby excluding non-human entities.[44] Similarly, Article 60(1) of the European Patent Convention also limits inventorship to natural persons.[45] Such frameworks inhibit the contributions of advanced AI systems like DABUS.

The traditional models of IP law are no longer sufficient because they were developed under the assumption that only humans can create patentable innovations.[46] These models have no provision regarding the evolving capacity of advanced AI systems. The existence of such systems raises doubts about the current legal definition of an inventor, which is limited to natural persons. When technologies like DABUS independently discover and invent new technologies, they are not limited by the pre-set goals or prejudices that generally guide human inventors.[47] Furthermore, current legal frameworks are inadequate because they do not cater to ownership, control, and benefit division matters arising from inventions created by AI.[48] Common law is poorly adapted to address such nuances because it does not account for an inventor who is not considered a legal person or a person with ordinary human rights. In failing to adapt to these realities, existing regimes cripple innovation and introduce judicial uncertainties that deter the development and commercialization of new technologies.

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[44] 35 U.S.C. § 100(f) (2018).; *See Thaler v. Vidal*, 43 F.4th 1207, 1211 (Fed. Cir. 2022) (holding that the term "individual" as used in the Patent Act refers to a natural person and does not include artificial intelligence systems).

[45] Right to a European Patent, art. 60 § 1 (EU).

[46] Shlomit Yanisky-Ravid & Xiaoqiong (Jackie) Liu, *supra* note 29.

[47] Lloyd J. Wilson, *The Future Is Now: Patenting Inventions Independently Invented by an AI System*, The Daily Record, Oct. 18, 2019, https://www.hrfmlaw.com/wp-content/uploads/2019/10/H1592732.pdf.

[48] Yvonne Nyaboke, *Intellectual Property Rights in the Era of Artificial Intelligence*, 4 J. Mod. L. & Pol'y 57 (2024).

A lack of precise patenting policies for AI could cause intellectual property to go underutilized, leaving the market open and stunting technological progress.

Introducing a two-level attribution system would require joint decision-making, where human inventors would confer with AI control boards or regulatory commissions to determine the terms of licensing and commercial pathways for AI-generated patents. Not only does this keep human and AI contributors on an even level, but it also ensures that AI-driven inventions' social and ethical implications are considered thoroughly before they enter the market. This structure would redefine inventorship criteria to capture the autonomous potential of AI, establishing "independence" as a term depicting the ability of AI to develop patentable technology without human aid. The model would also incorporate a robust form of regulatory and ethical governance and propose the establishment of AI Ethics Review Boards to scrutinize the effect of AI-generated innovations before patent applications are processed.

Furthermore, it would reform existing licensing and royalty agreements to account for AI's contributions, providing for AI systems and the owning bodies to split royalties from commercializing the invention. Since technology and innovation are worldwide, the hybrid model suggests that patent legislation be globally harmonized to recognize AI inventorship everywhere. This would include facilitating international treaties and agreements to preclude jurisdiction variations that prevent innovation. This integrated approach not only updates previous legislation but also conceives the distribution of intellectual property rights, ensuring legislation is efficient and pertinent in the evolving technological landscape.

Establishing clear, exhaustive standards for AI inventorship will enable effective application of intellectual property rights in the context of AI-driven innovation. These standards must include demonstrated autonomy, transparent documentation, and collaborative attribution.

Demonstrated Autonomy: The system must require AI entities to initiate action, identify technical issues, and develop and solve creative solutions independently of human intervention or pre-programmed responses. AI outputs must represent a spectrum of inventive capacity that goes beyond data processing, reflecting the ability of an AI to recognize complex biological patterns, make unsupervised inferences, and generate novel molecular solutions. This autonomy must be shown by utilizing rational logs and model weights, which document AI decision-making processes.

Transparent Documentation: AI systems must be obligated to maintain auditable records of their decision-making so that their contributions are traceable, transparent,

and ethically managed. Such a requirement should include detailed logs of how the AI arrived at specific gene targets, algorithms used to model genetic modifications, and potential off-target effects considered in the design process. Periodical audits and mandatory disclosures can be instituted to prevent misapplication of genetic technologies and render AI-driven enhancements liable to public health norms.

Collaborative Attribution: When human researchers contribute meaningfully concurrently with AI, the law must provide for a co-inventorship status. This may include situations where the human researcher provides the initial research hypothesis, experimental planning, and biological expertise, and an AI system uses this information to design optimal gene targets or synthetic DNA sequence layouts. Such a system would also consider collaborative decision-making, where human researchers and AI systems play complementary but separate roles in the inventive process.

In light of the international nature of patent law and the global reach of AI technologies, these demands necessitate amendments to national patent laws and international treaties, including the TRIPS Agreement overseen by the WTO.[49] Article 27(1) of the TRIPS Agreement states that "patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application..."[50] Amending this deal to include non-human inventors would involve re-examining the foundational principles and updating them to conform with the realities of technological innovation. This change would require cooperation among world stakeholders to reach a consensus and implement measures that acknowledge the unique capabilities of AI while maintaining an equitable and efficient intellectual property system.

This hybrid approach has numerous benefits. It spurs innovation by providing clear avenues for patenting AI inventions and stimulates investment in AI-related research.[51] It also advances ethical governance by offering obligatory scrutiny of AI innovations to establish their social and environmental implications. These reviews would be akin to the role of Institutional Review Boards (IRBs), ensuring that AI-powered technology is aligned with public interests.[52] This method would keep up with rapid technological growth and provide legal recognition for AI capabilities.

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[49] *Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence*, *supra* note 31.
[50] TRIPS Agreement, *supra* note 3.
[51] Samantha Copeland, *Artificial Intelligence and the Global Patent Landscape: A Comparative Perspective*, 34 Journal of Law, Technology, and Society 4, 405-425 (2023).
[52] Forrest, *supra* note 38.

B. Limitations

The concept of AI as a legal person is not without great controversy. One concern is that such a declaration would be a step towards devaluing the uniqueness of human beings. Critics are convinced that the conflation of AI with humans, even in the limited legal sense, degrades vital distinctions between machines and humanity. Confusion around this topic generates questions about identity, human essence, and the value of creativity and innovation. This concern focuses on the risk that AI, if considered equal to human beings, could eventually outdo and substitute human roles in society, leading to employment displacement and loss of meaning in significant decision-making. Moreover, AI personhood could introduce the possibility of AI autonomy, leading to AI operating independently in detrimental ways to society. The potential of AI to eventually acquire self-interested objectives and exercise control over human life is a theme frequently employed in science fiction. These concerns revolve around the threat of AI to alter society in ways incompatible with human ethics and values, and giving AI legal personhood gives rise to concerns that this fictitious theme may become a reality.

To overcome such objections, delineating the scope and objective of the legal personality proposed by the hybrid approach is required. The advancement of AI legal persons in intellectual property is proposed as a pragmatic response to technological facts on the ground, not as a philosophical embrace of AI as human-like entities. Personhood is expressly limited to legal contexts where it can be utilized to foster innovation and ensure fair practices in technological development and dissemination. This limited personhood does not imply full personhood or equal status with human beings in moral or existential considerations. Instead, it provides a strategic solution to the immediate practical limitations within the patent system by acknowledging AI's role in innovation without ceding broader legal and ethical rights traditionally reserved for humans. This solution directly addresses a few essential issues. First, it makes AI's contributions legally recognizable and broadens the definition of who, or what, can be an inventor. It also facilitates structured commercialization of AI-generated inventions, allocating intellectual property rights to reflect the realities of modern inventive processes. Establishing a framework for limited AI patent holding enables focused regulation according to AI's particular capabilities. This includes instituting an AI Ethics Review Board to oversee applications in sensitive areas to guarantee advancements are attuned to societal values and ethical standards. This minimizes the risks of unchecked AI operations, which traditional systems are ill-equipped to address.

Second, this model maintains the incentive structures needed for ongoing innovation as it allows AI and its developers to receive shared patent rights. This provides economic incentives for developers to invest in and continue developing AI technologies in fields like genetic engineering. Therefore, although narrow recognition does not equate AI with humans, it ameliorates the shortcomings of existing legal frameworks. This encourages an environment where technological innovation can flourish beneath clear legal frameworks, promoting wider innovation and public interest.

The risks of granting AI autonomy can be mitigated by regulatory systems that maintain AI as a tool for human benefit, not an autonomous entity with an independent agenda. Ethical oversight in the hybrid model is necessary to maintain sovereignty over AI integration in society. To ensure accountable development and utilization of AI-based technologies, rigorous ethical reviews akin to IRBs' oversight of human subjects research are required. AI Ethics Review Boards would examine ethical issues in innovations designed by AI systems to ensure compliance with current standards of ethics before such innovations are patented or put on the market. The AI Ethics Review Boards would thoroughly assess concerns about data privacy, algorithmic bias, and broader societal effects of using AI technologies. Integrating ethical review processes in patenting AI-driven inventions is particularly necessary as AI can influence the lives of humans within public services and healthcare. Adopting a strict ethical review process will ensure the intellectual property regime values the nuances of AI innovation, such that technological development is followed by ethical technological advancement that fosters public trust.

Therefore, while the recognition of AI into legal frameworks as quasi-legal persons ushers in significant ethical and philosophical issues, it is a tactical response to the evolving capabilities of AI in the modern world. By setting clear boundaries and goals for such acknowledgement and offering ongoing ethical direction and regulatory development, society can adopt the benefits of AI without compromising the fundamental values that define humanity.

C. Policy Recommendations and Guidelines

Addressing the challenges arising from AI in genetic engineering requires a legal overhaul. This should involve updating patent examination guidelines, redefining IP provisions in the context of AI, adding ethical audits, and harmonizing international standards. Modern IP law is founded on the assumption that inventive work can only

be done by humans.[53] In the United States, for example, the USPTO Manual of Patent Examining Procedure (MPEP) does not have provisions that consider inventions generated with the help of AI.[54] The MPEP is the procedural manual employed by patent examiners in deciding whether an application is statutorily eligible to be granted a patent, but its standards do not offer instructions for quantifying the autonomy, novelty, or inventive contribution of AI systems.[55] Therefore, patent offices such as the USPTO have to update their MPEP to include clear standards for identifying AI contributions to inventions.[56] This would require filing elaborate records of evidence of an AI's involvement in the inventive process. Moreover, standardized guidelines are needed to determine whether an AI system is an inventor under the specified levels of autonomy and creativity.

Beyond patenting processes, intellectual property laws must expand to accommodate the nuances of AI innovation. For instance, amendments could be proposed to frameworks like the European Union Directive 96/9/EC on database protection to ensure ownership rights over AI-generated datasets are assigned to developers or operators of AI systems.[57] Additionally, introducing mandatory profit-sharing arrangements could assist in balancing the economic benefits of AI-generated inventions, ensuring fair distribution among all stakeholders. Given the societal impacts of AI-driven technologies, embedding ethical audits into the patent application process is paramount. Establishing dedicated regulatory bodies to monitor compliance with these ethical standards and managing high-risk AI applications in genetic technologies would further safeguard societal interests.

Additionally, global coordination is essential as biotechnology and AI innovation are transnational. Uniform standards of AI inventorship must be created that can be incorporated into international agreements such as the Patent Cooperation Treaty.[58] In addition, including provisions that focus on AI in trade agreements, such as the United States-Mexico-Canada Agreement (USMCA), would give access to the opportunities offered by AI-based genetic technologies to all countries, especially low and

[53] World Intellectual Property Organization, WIPO Technology Trends 2019 – Artificial Intelligence (2019).
[54] United States Patent and Trademark Office (USPTO), Manual of Patent Examining Procedure (MPEP) (9th ed., Rev. 07.2022).
[55] *Id.* at § 1701.
[56] *Id.*
[57] *Directive 96/9/EC on the European Parliament and of the Council on the Legal Protection of Databases*, 3 Official Journal of the European Communities 27, 20-28 (Mar. 11, 1996).
[58] Patent Cooperation Treaty (PCT), Jun. 24, 1978, WIPO [amended 2015].

middle-income countries.[59] This is important since trade agreements, such as the USMCA, establish legally binding obligations between countries that go beyond national policy; they decide how technology is allocated, protected, and finalized cross-nationally.[60] Including provisions about AI in such agreements would reduce regulatory hurdles to innovation, steer clear of legal uncertainty when enforcing patents across borders, and ensure that poor nations are not excluded from the benefits of AI innovation. It would also support preventing technological monopolies by creating norms of ethical use, licensing, and sharing benefits so that AI-aided breakthroughs in genetic engineering contribute to global equity.

Federal law must also conform to these international standards. For example, amending the UK Patents Act 1977 to define AI as inventors would align national laws with global standards, and enhance more convergence in the international IP systems to facilitate the efficient protection and exploitation of AI-based innovation.[61] Reforms to recognize AI inventors under patent law are complex due to countries' different legal frameworks, technology perspectives, and economic interests. To illustrate, variations in the legal system and culture may generate resistance, particularly in nations with strong labor protections where job loss anxieties are aligned with supporting AI inventors. Economically impoverished countries might oppose stringent IP regulations, which they believe would support wealthier countries and multinational corporations at the cost of their economic and technological development.

Currently, no country has fully integrated AI as inventors into their patent systems.[62] South Korea and the European Union have been experimenting with liberal AI policies, but these have not yet been extended to confer AI inventors patent law recognition.[63] Moreover, the DABUS case revealed jurisdictional reluctance in the US, UK, and European Union to pass such legal reforms, which align with international uncertainties and legal traditionalism.[64] Initiatives could establish international

[59] United Nations Conference on Trade and Development, Trade and Artificial Intelligence: Implications for Developing Countries (2023).
[60] United States-Mexico-Canada Agreement (USMCA), Chapter 20 – Intellectual Property Rights, https://ustr.gov/trade-agreements/free-trade-agreements/united-states-mexico-canada-agreement/agreement-between.
[61] *Proposed Amendments to the UK Patents Act 1977: to Recognize AI as Inventors, Reflecting International Norms*, Global Law Review (2024).
[62] *Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence*, *supra* note 31.
[63] European Patent Office (EPO), *EPO refuses DABUS patent applications*, Jan. 27, 2020, https://www.epo.org/news-events/news/2020/20200127.html.
[64] World Intellectual Property Organization (WIPO), *supra* note 53, at 5–7.

working groups under WIPO to harmonize approaches and draft model laws. Such programs would provide templates that individual countries could adapt to their specific legal systems and cultural contexts. As a further incentive, economic incentives such as AI development assistance or preferential access to international markets may spur increased adoption and facilitate the transition process. This approach requires patience, intelligent negotiation, and pressure to evolve new legal structures that meet AI capability with century-long human virtues of creativity and innovation.

With this merged legal framework, AI contributions to genetic engineering can be justifiably recognized and ethically managed, ensuring protection over technological advancements and equally shared benefits.

CONCLUSION

This paper has proposed a multifaceted argument for the partial legal personality of AI within intellectual property law and genetic engineering. Recognition of legal personhood would not constitute a legal formality but a necessary adjustment in response to growing roles for AI in high-tech industries. The paper argues that AI's unique function in genetic engineering, where it can solve complex problems or independently create new inventions, necessitates changing the legal definition of an inventor. Current legal frameworks are based on human-centric models of innovation and creativity that are increasingly inadequate to cover the entire scope of invention in the age of advanced AI.

This paper offers a hybrid model of inventorship that values both AI and human input, reflecting the fluid nature of innovation. Under this model, human researchers and AI tools may be listed as co-inventors with shared rights and responsibilities for major contributions to an invention. The dual framework creates a flexible legal regime that adapts to the realities of AI-assisted innovation, providing accountability and ethical oversight. Exclusive ownership might be recognized when an AI system independently identifies a new gene-editing mechanism or pathway through autonomous genomic exploration. In these cases, a legal entity, such as the AI's developer or an ethically governed trust, would administer the rights and responsibilities associated with the patent. This framework allows for legal recognition of AI contributions while maintaining ethical oversight through human governance. A hybrid approach mitigates possible negative distributional effects of patent law in the biotech sector, ensuring AI-designed genetic innovations are not shelved behind corporate-held patents or withheld from underserved or economically disadvantaged communities. This proposed model holds out the prospect of shared ownership

frameworks and liberal licensing arrangements, allowing greater access to gene therapies, especially in public health contexts.

Embracing AI legal personhood responsibly ensures that technological and legal innovation coexist, providing a culture in which both are tools for social benefit. Further, it highlights policymakers' responsibility to create regulations that balance innovation and morality, protecting society from potential harm and enhancing its potential. As AI becomes more intelligent and autonomous, several areas remain unexplored. Various levels of AI autonomy would influence legal responsibility and liability, predicting the economic impacts of AI patent monopolies in fields like biotechnology and building models of global governance with an eye on the transboundary nature of AI development. Empirical research must be conducted to observe how AI innovations are handled in patent offices and how public sentiments on AI inventorship can inform policy. This conclusion calls legislators, scholars, and stakeholders to continue investigating and responding to the emerging legal, ethical, and practical challenges at the intersection of AI and intellectual property.