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## Is the World Ready to Accept Artificial Intelligence as an Inventor?

Rachel Ackerman

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## I. INTRODUCTION

“I visualize a time when we will be to robots what dogs are to humans, and I’m rooting for the machines.”

—Claude Shannon<sup>1</sup>

Artificial intelligence (AI) is quickly advancing, and machines are becoming more intelligent and human-like. Although robots do not currently have rights, that time may come sooner than expected. While AI is not eligible for intellectual property (IP) protection worldwide, IP offices are currently exploring the idea of granting IP rights to AI and the potential consequences that could follow.

As CEO and founder of iRobot, Colin Angle said “[i]t’s going to be interesting to see how society deals with artificial intelligence, but it will definitely be cool.”<sup>2</sup> As innovation and creativity soar, IP rights have become extremely important because humans are no longer the only ones innovating and creating. This Comment examines whether AI should be recognized by lawmakers and courts as a patent inventor. To do so, Part II of this Comment provides an overview of basic IP rights, including patent, copyright, and trademark rights, as well as inventorship requirements for patents in the United States. Part II will also discuss the history of AI and its recent advancements by discussing the response of patent offices worldwide to the filing of patent application’s listing AI as an inventor. After understanding the requirements for patent inventorship and ownership, Part III of this Comment poses answers to pertinent questions around AI as an inventor. Part IV explores the impact AI will have on society if granted inventorship rights. Part V concludes on the topic.

## II. BACKGROUND

This part includes three sections. It begins with a discussion of the history of IP, including the development of patent law in the United States, copyright law in the United States, the history of trademark law, and a brief overview of IP rights worldwide. This historical context will help readers understand the evolution of IP law and the challenges that have arisen over time.

Next, this part will explain what artificial intelligence is by providing an early history of AI, an overview of different types of AI, explaining recent developments in the field, and includes a discussion on whether AI can be considered an inventor. This part of the Comment will be

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1. Toby Walsh, *Rise of the Machines: How Computers Could Control our Lives*, CONVERSATION (Mar. 13, 2012, 11:28 PM), <https://theconversation.com/rise-of-the-machines-how-computers-could-control-our-lives-5838> [<https://perma.cc/59VR-BLSJ>].

2. Bernard Marr, *28 Best Quotes About Artificial Intelligence*, FORBES (July 25, 2017, 12:28 AM), <https://www.forbes.com/sites/bernardmarr/2017/07/25/28-best-quotes-about-artificial-intelligence/?sh=592e82054a6f> [<https://perma.cc/U7XA-ARL8>].

essential for readers who may not be familiar with AI and its implications for IP law.

Finally, this part will introduce the reader to DABUS (Device for the Autonomous Bootstrapping of Unified Sentience): a highly controversial AI system that has been seeking patent rights in various countries. This last section of Part II will discuss the legal issues surrounding the question of whether an AI system can be named as an inventor and how this debate affects the future of IP law.

Together, these three sections provide a comprehensive overview of the historical and contemporary issues at the intersection of IP law and AI. By the end of this part, readers will have a firm understanding of the legal landscape in this rapidly evolving field.

### *A. History of Intellectual Property*

#### *1. Patent Law in the United States*

The power to grant patents is based on rights set forth in Article 1, Section 8, clause 8 of the U.S. Constitution.<sup>3</sup> Colloquially known as the “patent and copyright clause of the Constitution,”<sup>4</sup> this clause grants Congress the power “[t]o promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.”<sup>5</sup> Although patents are not explicitly mentioned here, this clause is the source of Congress’ power to enact legislation governing patents.<sup>6</sup>

A patent for an invention is a type of IP that grants a property right to the inventor.<sup>7</sup> All United States patents are issued by the United States Patent and Trademark Office (USPTO),<sup>8</sup> and are only enforceable in the United States.<sup>9</sup> An inventor who wants to obtain patent protection outside of the United States must apply for a patent in each country’s patent office or in a regional patent office.<sup>10</sup> The World Intellectual Property Organization (WIPO) is an international organiza-

3. U.S. CONST. art. I, § 8, cl. 8.

4. *Intellectual Property Clause*, LEGAL INFO. INST., [https://www.law.cornell.edu/wex/intellectual\\_property\\_clause](https://www.law.cornell.edu/wex/intellectual_property_clause) [<https://perma.cc/6ABU-3NLQ>] (last visited Nov. 22, 2022).

5. U.S. CONST. art. I, § 8, cl. 8.

6. *Id.*

7. *General Information Concerning Patents*, U.S. PAT. & TRADEMARK OFF., <https://www.uspto.gov/patents/basics/general-information-patents> [<https://perma.cc/A29Q-6EU4>] (last visited Nov. 22, 2022).

8. *Id.* (there are three types of patents: utility, design, and plant).

9. *Protecting Intellectual Property Rights (IPR) Overseas*, U.S. PAT. & TRADEMARK OFF., <https://www.uspto.gov/ip-policy/ipr-toolkits> [<https://perma.cc/HP66-DRTG>] (last visited Nov. 22, 2022).

10. *Id.*

tion that is designed to promote the worldwide protection of IP rights by serving as a world reference source for IP information and a policy forum to address international IP rights.<sup>11</sup>

Once an inventor in the United States receives a patent, the patent gives the patent holder “the right to exclude others from making, using, offering for sale or selling” the patent holder’s IP in the United States for a defined period of time.<sup>12</sup> Additionally, patents give the inventor the right to exclude others from making and using the invention in exchange for a full disclosure of how to make and use the invention.<sup>13</sup> Public disclosure of the invention in exchange for the right to exclude others is commonly known as the “quid-pro-quo” of patent law.<sup>14</sup> After the patent term expires, the invention becomes publicly available for others to make, use, and improve upon.<sup>15</sup>

The Manual of Patent Examining Procedure (MPEP) outlines the proper USPTO laws, regulations, and qualifications.<sup>16</sup> It is used by patent examiners as well as patent attorneys and agents.<sup>17</sup> According to the MPEP, to receive a patent, the invention must be useful, novel, and nonobvious.<sup>18</sup> The useful requirement, also known as utility, means that the claimed invention must have a specific, credible, and substantial utility.<sup>19</sup> Additionally, a person of ordinary skill in the art must appreciate why the invention is useful based on the characteristics of the invention.<sup>20</sup> Patents should only be granted to inventions that have practical applications and achieve what is promised by the patentee.<sup>21</sup> The novelty requirement requires the patentee to demonstrate that the claimed invention is new and is not disclosed in the prior art.<sup>22</sup> Prior art is a concept in patent law of already-existing information or documents “which may be used to determine novelty and/or non-obviousness of claimed subject matter in a patent applica-

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11. *Inside WIPO*, WIPO, <https://www.wipo.int/about-wipo/en/> [https://perma.cc/33KR-B9D9] (last visited Nov. 22, 2022).

12. 35 U.S.C. § 154(a)(1)–(2).

13. *Id.*

14. Sean B. Seymore, *Symposium: The Disclosure Function of the Patent System Introduction*, 69 VAND. L. REV. 1455, 1455 (2016).

15. Xiaoban Xin, *When Do My Patents Expire?*, JDSUPRA (Apr. 23, 2021), <https://www.jdsupra.com/legalnews/when-do-my-patents-expire-1786806/> [https://perma.cc/D5BE-V9QF].

16. U.S. PAT. & TRADEMARK OFF., MANUAL OF PATENT EXAMINING PROCEDURE (9th ed. 2020) [hereinafter MPEP].

17. *Id.*

18. *Id.* § 2103 Patent Examination Process.

19. 35 U.S.C. § 101.

20. *Id.*

21. *Id.*

22. *Id.* § 102.

tion.”<sup>23</sup> Common types of prior art include patents and published patent applications, non-patent literature, and public use or sale of devices that may read on the claimed invention.<sup>24</sup> The nonobviousness requirement is similar to the novelty requirement.<sup>25</sup> Novelty means that the claimed invention is not identically disclosed in the prior art<sup>26</sup> whereas nonobviousness looks at the differences between the prior art and the claimed invention.<sup>27</sup> A patent for a claimed invention may not be obtained if the invention is obvious when compared to the prior art.<sup>28</sup> If differences between the prior art and the claimed invention make the claimed invention, as a whole, obvious to a person having ordinary skill in the art before the filing date, then the invention is deemed obvious and unpatentable.<sup>29</sup>

The Patent Act, 35 U.S.C. § 101, defines patentable articles by saying “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”<sup>30</sup> Patentable subject matter is the four categories of invention deemed by Congress to be the appropriate subject matter of a patent.<sup>31</sup> These include processes, machines, manufactures, and compositions of matter.<sup>32</sup> In contrast to patentable subject matter, there are judicial exceptions that the courts have found to be outside of the four statutory categories of invention.<sup>33</sup> These judicial exceptions include abstract ideas, laws of nature, and natural phenomena.<sup>34</sup> However, these are not the only relevant requirements.

Another requirement is that patent applicants must also show inventorship.<sup>35</sup> To obtain a United States patent, there must be at least one inventor listed by name.<sup>36</sup> According to § 100(f), “[t]he term ‘inventor’ means the individual or, if a joint invention, the individuals

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23. Fenn Mathew, *Understanding Prior Art and its use in Determining Patentability*, U.S. PAT. & TRADEMARK OFF., <https://www.uspto.gov/sites/default/files/documents/May%20Info%20Chat%20slides%20%28003%29.pdf> [<https://perma.cc/C9V6-9G87>] (last visited Nov. 22, 2022).

24. 35 U.S.C. § 102(a)(1)–(2).

25. *See id.* §§ 102–103.

26. *Id.* § 102.

27. *Id.* § 103.

28. *Id.*

29. *Id.*

30. 35 U.S.C. § 101.

31. *Id.*

32. *Id.*

33. *Id.*; *See Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014).

34. *See Alice Corp.*, 573 U.S. at 216.

35. 35 U.S.C. § 100(f).

36. MPEP, *supra* note 16, § 2109 Inventorship.

collectively who invented or discovered the subject matter of the invention.”<sup>37</sup> In addition to an “inventor,” section 100(g) also defines the terms “joint inventor” and “coinventor” to mean “any 1 of the individuals who invented or discovered the subject matter of a joint invention.”<sup>38</sup> Moreover, correctly naming the inventors is essential to the issuance of a patent.<sup>39</sup> If the inventorship is incorrectly listed in a patent application, it must be corrected.<sup>40</sup> If inventorship is not corrected, the patent examiners may reject the claims of the application.<sup>41</sup>

Furthermore, an inventor must provide an inventor’s oath or declaration.<sup>42</sup> Section 115(a) sets forth the requirement that a patent application should include “the name of the inventor for any invention claimed in the application” and each named inventor should execute an oath or declaration to be filed with the patent application.<sup>43</sup> Section 115(b) provides that an oath or declaration should “contain statements that (1) the application was made or was authorized to be made by the affiant or declarant; and (2) such individual believes himself or herself to be the original inventor or an original joint inventor of a claimed invention in the application.”<sup>44</sup>

In addition to its statutory definition, inventorship was further defined in caselaw in *In re Application of Hardee*.<sup>45</sup> The Commissioner of Patents and Trademarks said that, “the threshold question in determining inventorship is who conceived the invention.”<sup>46</sup> Therefore, “[u]nless a person contributes to the conception of the invention, he is not an inventor.”<sup>47</sup>

Conception has been further defined by *Townsend v. Smith*.<sup>48</sup> Townsend filed an application for improvements in machines for cutting multiple threads on wood screws.<sup>49</sup> Smith had been issued a patent for a similar invention.<sup>50</sup> An interference proceeding was instituted to determine which party first invented the commonly

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37. 35 U.S.C. § 100(f).

38. *Id.* § 100(g).

39. MPEP, *supra* note 16, § 2157 Improper Naming of Inventors.

40. *Id.*

41. *Id.*

42. 35 U.S.C. § 115(a).

43. *Id.*

44. *Id.* § 115(b).

45. *In re Hardee*, 1984 Dec. Comm’r Pat. 1122.

46. *Id.*

47. *Id.*

48. *Townsend v. Smith*, 36 F.2d 292 (C.C.P.A. 1929).

49. *Id.* at 293.

50. *Id.*

claimed invention.<sup>51</sup> The Examiner of Interferences awarded priority to Townsend and Smith appealed.<sup>52</sup> The issue was who conceived of the invention first: Townsend or Smith.<sup>53</sup> *Townsend v. Smith* determined that conception is “the complete performance of the mental part of the inventive art” and “the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is thereafter to be applied in practice.”<sup>54</sup> Based on the evidence presented, the Court of Customs and Patent Appeals concluded that Townsend was the first to conceive and the first to reduce to practice and therefore, should be the one to receive the patent.<sup>55</sup>

Based on these two decisions, the caselaw has shown that inventorship requirement cannot be satisfied by solely coming up with an idea.<sup>56</sup> Rather, a person can only become an inventor if she has come up with an idea and has brought that “idea through to fruition.”<sup>57</sup>

In United States patent law, it is believed that the element of conception can only be performed by a human.<sup>58</sup> Conception has been defined as:

the complete performance of the mental part of the inventive act. All that remains to be accomplished, in order to perfect the act or instrument, belongs to the department of construction, not invention. It is therefore the formation, in the mind of the inventor of a definite and permanent idea of the complete and operative invention, as it is thereafter to be applied in practice, that constitutes an available conception, within the patent law.<sup>59</sup>

The U.S. Supreme Court in *Smith v. Nichols* declared that “[a] patentable invention is a mental result.”<sup>60</sup> In *Mergenthaler v. Scudder*, the Court of Appeals of the District Court of Columbia created a definition of conception that has been widely adopted by courts.<sup>61</sup> The defi-

51. *Id.*

52. *Id.* at 294.

53. *Id.*

54. *Townsend*, 36 F.2d at 295.

55. *Id.* at 296.

56. Gene Quinn, *Inventorship 101: Who are Inventors and Joint Inventors?*, IP WATCHDOG (Mar. 9, 2018, 9:15 AM), <https://www.ipwatchdog.com/2018/03/09/inventorship-joint-inventors-co-inventors/id=94592/> [<https://perma.cc/4Z5B-XYFN>].

57. *Id.*

58. *Thaler v. Vidal*, 43 F.4th 1207, 1212 (Fed. Cir. 2022) (holding that an “inventor” must be a human).

59. *Coleman v. Dines*, 754 F.2d 353, 359 (Fed. Cir. 1985) (quoting *Gunter v. Stream*, 573 F.2d 77, 80 (C.C.P.A. 1978)).

60. *Smith v. Nichols*, 88 U.S. 112, 118 (1874).

61. *Mergenthaler v. Scudder*, 11 App. D.C. 264 (D.C. Cir. 1897).



inition of conception “consists in the complete performance of the mental part of the inventive act.”<sup>62</sup>

Cases have interpreted the statutes from Title 35 of the United States Code to further define what constitutes an inventor for a patent application. In 2013, the United States Court of Appeals for the Federal Circuit determined whether the inventorship requirement had been properly met in *University of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften E.V.*<sup>63</sup> The court ultimately found that to perform the mental act of conception, the inventors must be natural persons.<sup>64</sup> Therefore, an inventor cannot be a corporation or a sovereign.<sup>65</sup> The court determined that because corporations and sovereigns are not capable of performing the mental act of conception, they cannot be inventors.<sup>66</sup> Additionally, the court concluded that states cannot be inventors.<sup>67</sup> The court reasoned that

[i]t is axiomatic that inventors are the individuals that conceive of the invention: Conception is the touchstone of inventorship, the completion of the mental part of invention. It is the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice. Conception is complete only when the idea is so clearly defined in the inventor’s mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation. [Conception] is a mental act.<sup>68</sup>

Correctly identifying the inventor is essential because inventorship is directly related to ownership of a patent.<sup>69</sup> Unless the patent rights are assigned, the inventor is presumed to be the owner of the patent.<sup>70</sup> Patent ownership gives the patent owner “the right to exclude others from making, using, offering for sale, selling, or importing into the United States” the invention claimed in the patent.<sup>71</sup> After a patent issues, it is the patent owner who has the power to enforce the patent.<sup>72</sup> Patent ownership is distinct and separate from patent inventor-

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62. *Id.* at 276 (citing 1 WILLIAM C. ROBINSON, THE LAW OF PATENTS FOR USEFUL INVENTIONS §375 (1890)).

63. *Univ. of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften E.V.*, 734 F.3d 1315 (Fed. Cir. 2013).

64. *Id.* at 1323.

65. *Id.*

66. *Id.*

67. *Id.*

68. *Id.*

69. 35 U.S.C. § 261.

70. 37 C.F.R. § 3.73(a); *See Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237, 1248 (Fed. Cir. 1993).

71. 35 U.S.C. § 154(a)(1).

72. *Id.*

ship.<sup>73</sup> In many cases, a patent inventor and a patent owner are the same person, however, a patent is a property right, and its ownership is freely alienable.<sup>74</sup>

Caselaw is clear that corporations and states cannot be inventors.<sup>75</sup> However, unlike AI, corporations and states are not capable of creation and thought.<sup>76</sup> To distinguish AI from other entities, some tests have been proposed to determine whether AI should be an inventor. One test has been proposed by Russ Pearlman.<sup>77</sup> The first step of this test is to determine if the subject matter is patentable.<sup>78</sup> A claimed invention must fall into one of four statutory categories: “processes, machines, manufactures and compositions of matter.”<sup>79</sup> The claimed invention “must not be directed to a judicial exception unless the claim as a whole includes additional limitations amounting to significantly more than the exception.”<sup>80</sup> The second step of this test is to determine if AI has independently created the proposed IP or invention.<sup>81</sup> Under this theory, AI would have to create an invention without human direction, and the process used by the AI cannot merely be mechanical.<sup>82</sup> Similar to tests of inventorship for natural persons, tests of AI inventorship would have to show independence from preexisting works.<sup>83</sup> Inventions created by AI would still have to meet the patent law requirements of utility, novelty, and non-obviousness.<sup>84</sup> AI must be shown to execute as an independent creator.<sup>85</sup>

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73. Martin Neilson, *Patent Ownership and Inventorship – A Quick Guide*, MURGITROYD BLOG (Nov. 5, 2018), <https://www.murgitroyd.com/en-us/blog/patent-ownership-and-inventorship-a-quick-guide/> [<https://perma.cc/8952-XH49>].

74. 35 U.S.C. § 261.

75. *Univ. of Utah*, 734 F.3d at 1323.

76. *Id.*

77. Russ Pearlman, *Recognizing Artificial Intelligence (AI) as Authors and Inventors Under U.S. Intellectual Property Law*, 24 RICH. J. L. & TECH. 31 (2018).

78. *Id.* at 30–38.

79. 35 U.S.C. § 101.

80. Pearlman, *supra* note 77, at 30–38; MPEP, *supra* note 16, § 2106 Patent Subject Matter Eligibility. The first part of Russ Pearlman’s test is also known as the *Alice Mayo* test.

81. Pearlman, *supra* note 77, at 33.

82. *Id.*

83. *Id.* at 30.

84. *Id.* at 31.

85. *Id.*

## 2. Copyright Law in the United States

Copyright is another form of IP.<sup>86</sup> While a patent protects inventions, copyright protects original works of authorship.<sup>87</sup> Examples of copyright include “literary, dramatic, musical, and artistic works.”<sup>88</sup> A copyright author is the creator of the original expression of a work.<sup>89</sup>

Three elements are required to copyright a work: fixation, originality, and expression.<sup>90</sup> The fixation requirement provides that for a work to be copyrightable that work must be “fixed in any tangible medium of expression, now known or later developed, from which [it] can be perceived, reproduced, or otherwise communicated, either directly or indirectly with the aid of a machine or device.”<sup>91</sup> Under the originality requirement, a work must be “independently created by the author” and it must have “at least some minimal degree of creativity.”<sup>92</sup> An idea cannot be copyrighted but an expression of an idea can.<sup>93</sup>

Copyright protection is contingent upon the work being created by a human.<sup>94</sup> The Compendium II of Copyright Office Practices specifically defines the author of a copyright under section 202.02(b).<sup>95</sup> Under section 202.02(b), “[t]he term ‘authorship’ implies that, for a work to be copyrightable, it must owe its origin to a human being.”<sup>96</sup>

86. *What Does Copyright Protect?*, U.S. COPYRIGHT OFF., <https://www.copyright.gov/help/faq/faq-protect.html> [<https://perma.cc/5WTA-2DTT>] (last visited Nov. 22, 2022).

87. *How Patents Differ from Copyrights and Trademarks*, FINDLAW (Feb. 20, 2018), <https://www.findlaw.com/smallbusiness/intellectual-property/patent-definition-and-the-difference-between-copyrights-and.html> [<https://perma.cc/9S3J-B6RF>]; *What Does Copyright Protect?*, *supra* note 86.

88. *What Does Copyright Protect?*, *supra* note 86.

89. *Definitions*, U.S. COPYRIGHT OFF., <https://www.copyright.gov/help/faq-definitions.html> [<https://perma.cc/654U-HFET>] (last visited Nov. 22, 2022).

90. *What Can and Can't be Copyrighted?*, NEW MEDIA RTS. (Oct. 27, 2020, 8:38 PM), [https://www.newmediarights.org/business\\_models/artist/ii\\_what\\_can\\_and\\_can%E2%80%99t\\_be\\_copyrighted](https://www.newmediarights.org/business_models/artist/ii_what_can_and_can%E2%80%99t_be_copyrighted) [<https://perma.cc/P4EU-QQ3E>].

91. 17 U.S.C. § 102(a); *See also* U.S. COPYRIGHT OFF., COMPENDIUM OF U.S. COPYRIGHT OFFICE PRACTICES ch. 300 (3d ed. 2021), available at <https://www.copyright.gov/history/comp/compendium-two.pdf> [<https://perma.cc/J96K-ZW8B>].

92. *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., Inc.*, 499 U.S. 340, 345 (1991).

93. *What Can and Can't be Copyrighted?*, *supra* note 90.

94. U.S. COPYRIGHT OFF., *supra* note 91, at ch. 200.

95. *Id.* at 200-2(b).

96. *Id.* Further, “[m]aterials produced solely by nature, by plants, or by animals are not copyrightable.” Also under literary content, “verbal expression . . . must have been originated by a human being.” *Id.* § 419. Regarding performers, “only a human performer can contribute performance authorship.” *Id.* § 495.02. This was reiterated under the section outlining works not capable of supporting a copyright claim in which the compendium said “[i]n order to be entitled to copyright registration, a work must be the product of human authorship.” *Id.* § 503.03(a).

The concept of authorship in copyright has been the subject of much debate. In 2011, a selfie taken by a monkey went viral and sparked the question whether a monkey could own a copyright on a photo that he took.<sup>97</sup> After a book publisher included a photograph taken by the monkey in one of their books, advocates for the monkey claimed that this constituted copyright infringement.<sup>98</sup> This undoubtedly brought up the question whether an animal could bring an action of copyright infringement.<sup>99</sup> Eventually in 2016, the United States District Court for the Northern District of California resolved this debate in *Naruto v. Slater*.<sup>100</sup> The district court dismissed the case for lack of standing because the Copyright Act does not provide express authority for animals to file copyright infringement actions.<sup>101</sup> Upon appeal, the United States Court of Appeals for the Ninth Circuit affirmed the district court's decision.<sup>102</sup>

### 3. *Trademark*

A trademark is a type of IP that identifies the source of the mark's goods or services.<sup>103</sup> More specifically, “[a] trademark can be any word, phrase, symbol, design, or a combination of these things that identifies” the mark holder's goods or services.<sup>104</sup> Trademarks differ from patents and copyrights because there is not an inventor or author of a trademark.<sup>105</sup> A person becomes a trademark owner once they start using their trademark in commerce.<sup>106</sup> Unlike patents and copyrights, a trademark owner does not have to be an individual, it can be a corporation, partnership, or other entity.<sup>107</sup>

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97. Jason Slotkin, ‘Monkey Selfie’ Lawsuit Ends with Settlement Between PETA, Photographer, NPR (Sept. 12, 2017), <https://www.npr.org/sections/thetwo-way/2017/09/12/550417823/-animal-rights-advocates-photographer-compromise-over-ownership-of-monkey-selfie> [https://perma.cc/A96A-WJGM].

98. *Id.*

99. *Id.*

100. *Id.*

101. *Id.*

102. *Id.*

103. *What is a Trademark?*, U.S. PAT. & TRADEMARK OFF., <https://www.uspto.gov/trademarks/basics/what-trademark> [https://perma.cc/FA6F-RFJJ] (last visited Nov. 23, 2022).

104. *Id.*

105. *See generally Trademark, Patent, or Copyright*, U.S. PAT. & TRADEMARK OFF., <https://www.uspto.gov/trademarks/basics/trademark-patent-copyright> [https://perma.cc/L2AP-KFTK] (last visited Nov. 23, 2022).

106. *Id.*

107. *Id.*

#### 4. *Brief History of Intellectual Property Rights Worldwide*

IP rights extend only to the countries in which the IP owner has filed for protection.<sup>108</sup> If a patent, copyright, or trademark holder wants protection beyond the United States, they must follow the IP laws of the country that they want protection in.<sup>109</sup> Furthermore, a patent owner “cannot use a U.S. patent to prevent someone elsewhere in the world from using [their] invention.”<sup>110</sup> Currently, there is no single international patent that provides protection across multiple countries, so patent owners must apply for protection in each country individually.<sup>111</sup> Like patents, copyright protection is not international.<sup>112</sup> Copyright law is created by laws in each country.<sup>113</sup> Similarly, due to the territoriality of trademarks, a United States trademark registration is only enforceable in the United States. Additional trademark protection may be obtained with the filing of applications in each country where the mark holder seeks protection.<sup>114</sup> Trademark registrants have the option of filing a single “international application” through the Madrid Protocol.<sup>115</sup>

#### B. *Artificial Intelligence*

AI is a fast-growing field. Indeed, funding for start-ups focusing on AI has increased greatly in recent years.<sup>116</sup> Broadly stated, AI can be defined as intelligence exhibited by machines.<sup>117</sup> The term AI is used to describe “a broad set of methods, algorithms, and technologies that make software ‘smart’ in a way that may seem human-like to an

108. *Protecting Intellectual Property Rights (IPR) Overseas*, *supra* note 9.

109. *Id.*

110. *International Patent Protection*, JUSTIA, <https://www.justia.com/intellectual-property/patents/international-patent-protection/> [<https://perma.cc/U5V6-9G4T>] (last visited Nov. 23, 2022).

111. *Id.*

112. *What is copyright?*, RTS. DIRECT, <https://www.rightsdirect.com/international-copyright-basics/> [<https://perma.cc/YKF4-GX7B>] (last visited Nov. 23, 2022).

113. *Id.*; The Berne Convention is a treaty, adopted in 1886, that internationally governs copyright law. *Berne Convention for the Protection of Literary and Artistic Works*, WIPO, <https://www.wipo.int/treaties/en/ip/berne/> [<https://perma.cc/E5AZ-2D8G>] (last visited Nov. 23, 2022).

114. *Does a U.S. Trademark Registration Protect a Trademark in a Foreign Country?*, STOP FAKES (Oct. 29, 2019), <https://www.stopfakes.gov/article?id=does-a-U-S-Trademark-Registration-Protect-a-Trademark-in-a-Foreign-Country> [<https://perma.cc/8PPL-AZTF>].

115. *Id.* “The Madrid System is a convenient and cost-effective solution for registering and managing trademarks worldwide. File a single application and pay one set of fees to apply for protection in up to 129 countries.” *Madrid – The International Trademark System*, WIPO, <https://www.wipo.int/madrid/en/> [<https://perma.cc/DLZ7-2HMM>] (last visited Nov. 23, 2022).

116. Bridget Watson, *A Mind of Its Own—Direct Infringement by Users of Artificial Intelligence Systems*, 58 IDEA: J. FRANKLIN PIERCE CTR. FOR INTELL. PROP. 65, 67 (2017).

117. B.J. Copeland, *Artificial Intelligence*, BRITANNICA (Nov. 11, 2022), <https://www.britannica.com/technology/artificial-intelligence> [<https://perma.cc/RL26-H84J>].

outside observer.”<sup>118</sup> Alternatively, Merriam-Webster defines AI as “a branch of computer science dealing with the simulation of intelligent behavior in computers” and “the capability of a machine to imitate intelligent human behavior.”<sup>119</sup> Goals of AI include learning, reasoning, problem solving, perception and language.<sup>120</sup> A long term goal of AI is for the system to be free-thinking.<sup>121</sup>

### 1. *Early History of Artificial Intelligence*

In the early 1900s, science fiction introduced the general public to the concept of artificially intelligent robots with characters such as the “Tin Man” without a heart from the *Wizard of Oz*.<sup>122</sup> After its introduction, AI did not develop much until the arrival of electronic computing<sup>123</sup> in the late 1940s and early 1950s.<sup>124</sup> By the 1950s, scientists, philosophers, and mathematicians began to explore the idea of the possibility of AI.<sup>125</sup> John McCarthy is credited with coining the term “artificial intelligence” in 1956 at the inaugural AI conference.<sup>126</sup>

However, the possibility of using AI for exploring mathematical probability and sciences was first posited by Alan Turing.<sup>127</sup> Turing, often known as the “father of computer science,” posed the question, “can machines think?”<sup>128</sup> To answer this, Turing developed the “Turing Test” which determines a machine’s ability to exhibit human behavior.<sup>129</sup> This test has three players: an interrogator, a human participant, and an AI machine.<sup>130</sup> Its purpose is to see if the AI machine can fool the human interrogator into thinking that it is a per-

118. Watson, *supra* note 116, at 67.

119. *Artificial Intelligence*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/artificial%20intelligence> [https://perma.cc/45PL-RJP2] (last visited Nov. 23, 2022).

120. Copeland, *supra* note 117.

121. *Id.*

122. Rockwell Anyoha, *The History of Artificial Intelligence*, HARV. UNIV. (Aug. 28, 2017), <https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/> [https://perma.cc/EM8W-KH5M].

123. *What is Artificial Intelligence?*, IBM, <https://www.ibm.com/cloud/learn/what-is-artificial-intelligence> [https://perma.cc/776V-TNLL] (last visited Apr. 16, 2023).

124. *The Modern History of Computing*, STAN. ENCYCLOPEDIA OF PHIL. (June 9, 2006), <https://plato.stanford.edu/entries/computing-history/> [https://perma.cc/R6LB-9HZX].

125. Anyoha, *supra* note 122.

126. *What is Artificial Intelligence?*, *supra* note 123.

127. Copeland, *supra* note 117.

128. *What is Artificial Intelligence?*, *supra* note 123.

129. Benjamin St. George, *Turing Test*, TECH TARGET, <https://searchenterpriseai.techtarget.com/definition/Turing-test> [https://perma.cc/VZ9M-GKMT] (last visited Nov. 23, 2022).

130. Stephen Johnson, *The Turing test: AI still hasn’t passed the “imitation game”*, BIG THINK (Mar. 7, 2022), <https://bigthink.com/the-future/turing-test-imitation-game/> [https://perma.cc/AQ9J-CXN6].

son.<sup>131</sup> If the interrogator cannot distinguish the human participant from the AI machine, then that machine will pass the test and is considered to have demonstrated human-like intelligence.<sup>132</sup> As of 2023, no AI has passed the Turing Test because they have been unable to fool the interrogator into thinking that they are the human participant.<sup>133</sup>

## 2. *Types of Artificial Intelligence*

AI systems are versatile and perform a variety of functions.<sup>134</sup> AI can be classified based on its ability to act like a human including its capability of thought and feeling.<sup>135</sup> Categories of AI include: “reactive machines, limited memory machines, theory of mind and self-aware.”<sup>136</sup> Reactive machines are limited in their ability; they only respond to external stimuli.<sup>137</sup> Limited memory machines are similar to reactive machines, but they also have the ability to make decisions based on learned or stored data.<sup>138</sup> Many present-day AI systems are limited memory machines.<sup>139</sup> Theory of mind AI has the ability to perceive and respond to external stimuli.<sup>140</sup> Self-aware AI possesses intelligence similar to humans.<sup>141</sup>

## 3. *Recent Developments in Artificial Intelligence*

As computer power increased in the 1990s and early 2000s, AI became more advanced.<sup>142</sup> In 1997, an AI machine developed by IBM, named Deep Blue, became the first machine to beat a world chess champion in a game of chess.<sup>143</sup> The challenge was to create a computer powerful and fast enough to compete in real-time against a human competitor in a game of chess.<sup>144</sup> Once this supercomputer was

131. *Id.*

132. *Id.*

133. *Id.*

134. Naveen Joshi, *7 Types of Artificial Intelligence*, FORBES (June 19, 2019, 10:54 PM), <https://www.forbes.com/sites/cognitiveworld/2019/06/19/7-types-of-artificial-intelligence/?sh=322f828f233e> [https://perma.cc/2YJE-TR4J].

135. *Id.*

136. *Id.*

137. *Id.*

138. *Id.*

139. *Id.*

140. Joshi, *supra* note 134.

141. *Id.*

142. *What is Artificial Intelligence?*, *supra* note 123.

143. *Id.*

144. Chris Higgins, *A Brief History of Deep Blue, IBM's Chess Computer*, MENTAL FLOSS (July 29, 2017), <https://www.mentalfloss.com/article/503178/brief-history-deep-blue-ibms-chess-computer> [https://perma.cc/2ZTD-GRSQ].

designed, it competed against Garry Kasparov, a world champion chess player.<sup>145</sup> After a six-game match, Deep Blue beat Kasparov.<sup>146</sup> This was the first computer to beat a human in a game of chess.<sup>147</sup> Researchers used the findings from Deep Blue to begin to tackle problems in other fields.<sup>148</sup>

Deep Blue's success encouraged IBM to build another computer that could beat humans at an even more complicated game.<sup>149</sup> IBM developed Watson, a supercomputer that analyzed language and content.<sup>150</sup> IBM described Watson as "an analytical computing system that specializes in natural human language and provides specific answers to complex questions at rapid speeds."<sup>151</sup> In 2011, Watson played a game of *Jeopardy!* against two champions and beat them.<sup>152</sup>

In response to IBM's success, other companies began to develop AI systems to play games. For example, DeepMind created a computer program called AlphaGo that could play the game of Go, a strategic board game, against humans.<sup>153</sup> AlphaGo uses neural networks: one that selects the next move and another that predicts the game winner.<sup>154</sup> In 2015, AlphaGo beat a professional Go player, and, in 2016, AlphaGo beat one of the greatest Go players in the world.<sup>155</sup> Today, there are various real-world applications of AI systems, including speech recognition, customer service, computer vision, recommendation engines, and automated stock trading.<sup>156</sup>

145. *Id.*

146. *Deep Blue*, IBM, <https://www.ibm.com/ibm/history/ibm100/us/en/icons/deepblue/> [<https://perma.cc/33V2-RP6P>] (last visited Nov. 23, 2022).

147. *Id.*

148. *Id.*

149. *Id.*

150. *The DeepQA Research Team*, IBM, [https://researcher.watson.ibm.com/researcher/view\\_group.php?id=2099](https://researcher.watson.ibm.com/researcher/view_group.php?id=2099) [<https://perma.cc/4HME-Y4DQ>] (last visited Nov. 23, 2022).

151. Devindra Hardawar, *IBM's Watson AI takes on Jeopardy's best contestants*, VENTURE BEAT (Jan. 13, 2011, 10:16 AM), <https://venturebeat.com/2011/01/13/ibm-watson-jeopardy/> [<https://perma.cc/JN3M-9VCL>].

152. Dean Takahashi, *It's alive: IBM's Watson supercomputer defeats humans in final Jeopardy match*, VENTURE BEAT (Feb. 16, 2011, 7:14 PM), <https://venturebeat.com/2011/02/16/ibm-watson-wins-final-jeopardy-match/> [<https://perma.cc/QS6R-QHMQ>].

153. *AlphaGo*, DEEPMIND, <https://www.deepmind.com/research/highlighted-research/alphago> [<https://perma.cc/EJL7-E2T7>] (last visited Mar. 20, 2023).

154. *Id.*

155. *Id.*

156. *What is Artificial Intelligence?*, *supra* note 123, at 5–6.



#### 4. *Artificial Intelligence as an Inventor*

As AI has become more sophisticated, these systems have begun to develop potentially patentable inventions.<sup>157</sup> An AI system had already created a patentable invention, however, the AI system was not disclosed or listed as an inventor.<sup>158</sup> As a result, the USPTO did not have to address the question of inventorship regarding AI at that time.<sup>159</sup>

##### C. *DABUS Case Study*

Dr. Stephen Thaler created an AI system called DABUS.<sup>160</sup> DABUS created two inventions: the “neural flame” and the “fractal container.” On behalf of DABUS, Thaler filed two patent applications for its inventions.<sup>161</sup>

The first, the “neural flame,” is “a light beacon that flashes in a new and inventive manner to attract attention.”<sup>162</sup> The light flashes in patterns and speeds not previously contemplated.<sup>163</sup> This invention has potential uses in search and rescue missions because it can enhance the ability to attract attention.<sup>164</sup> Yet, the application for the neural flame was denied by the USPTO because there was no human inventor listed.<sup>165</sup>

The “fractal container,” also invented by DABUS, “is a beverage container based on fractal geometry.”<sup>166</sup> This invention relates to food containers meant for use with solids and liquids.<sup>167</sup> This invention is designed to improve food containers by providing numerous practical advantages, such as reducing the number of necessary containers to safely transport food and improving the ergonomics of securing the

157. Watson, *supra* note 116, at 65.

158. *Id.* at 67–68.

159. *Id.* at 68.

160. Tyler Sonnemaker, *No, an artificial intelligence can't legally invent something—only 'natural persons' can, says U.S. patent office*, BUS. INSIDER (Apr. 29, 2020, 2:41 PM) <https://www.businessinsider.com/artificial-intelligence-cant-legally-named-inventor-us-patent-office-ruling-2020-4?r=U.S.&IR=T> [https://perma.cc/39ZT-LBPK].

161. Complaint for Declaratory and Injunctive Relief at 3, Thaler v. Iancu, No. 1:20-cv-00903 (E.D. Va. Aug. 6, 2020).

162. *Id.*

163. *Id.*

164. Tiera Oliver & Taryn Engmark, *Who's IP is it? The AI Inventor or the AI's Inventor?*, EMBEDDED COMPUTING DESIGN (Sept. 10, 2021), <https://www.embeddedcomputing.com/technology/ai-machine-learning/whos-ip-is-it-the-ai-inventor-or-the-ais-inventor> [https://perma.cc/5MXK-Q95H].

165. *In re* Application of No.: 16/524,350, 2020 WL 1970052 (filed Jan. 20, 2020) (Decision on Petition).

166. U.S. Patent Application No. 16/524,532 (filed July 29, 2019).

167. *Id.*

containers.<sup>168</sup> This application was also denied by the USPTO because there was no human inventor listed.<sup>169</sup>

### 1. *DABUS and Inventorship in the United States*

The issue of whether AI can be an inventor has been an ongoing problem, however, it was not until a patent was filed with no human inventor listed that the USPTO had to directly address this issue.<sup>170</sup> In July 2019, patent applications No. 16/524,350 ('350) and No. 16/524,532 ('532) were filed with no human inventor listed.<sup>171</sup> The applications listed a single inventor named "DABUS" and the family name was "invention generated by artificial intelligence."<sup>172</sup> The applications identified the assignee as Stephen L. Thaler.<sup>173</sup> Thaler created DABUS and DABUS created the invention that was claimed in the patent application.<sup>174</sup> Thaler also filed a statement reporting that he was the assignee of DABUS's inventions because existing law does not allow a machine to own property.<sup>175</sup> Further, Thaler did not file an oath or declaration with the application.<sup>176</sup>

Thaler said that the invention in the application was generated independently by a machine.<sup>177</sup> The patent applicant, Thaler, received a "Notice to File Missing Parts of Nonprovisional Application" from the USPTO<sup>178</sup> because the application did not identify an inventor by his or her legal name.<sup>179</sup> Instead, the name listed was the name of an AI system.<sup>180</sup> The application data sheet filed with the '350 patent appli-

168. *Id.*

169. Complaint for Declaratory and Injunctive Relief, *supra* note 161, at 4.

170. *In re* Application of No.: 16/524,350, 2020 WL 1970052 (filed Jan. 20, 2020) (Decision on Petition).

171. U.S. Patent Application No. 16/524,350 (filed July 29, 2019); '532 Patent Application.

172. '350 Patent Application; '532 Patent Application.

173. '350 Patent Application; '532 Patent Application.

174. '350 Patent Application; '532 Patent Application.

175. Audrey A. Millemann, *No, Machines Cannot be Inventors!*, IP L. BLOG (May 22, 2020), <https://www.theiplawblog.com/2020/05/articles/ip/no-machines-cannot-be-inventors/> [<https://perma.cc/FUS9-Q5PP>].

176. *In re* Application of No.: 16/524,350, 2020 WL 1970052, at \*2 (filed Jan. 20, 2020) (Decision on Petition).

177. *Id.*

178. "If an application is missing the inventor's oath or declaration, requisite fees, or is not filed in English, the USPTO will send the applicant a Notice to File Missing Parts." Gene Quinn & Michael Benson, *Understanding U.S. Patent Prosecution*, IP WATCHDOG (June 30, 2018, 8:30 AM), <https://www.ipwatchdog.com/2018/06/30/understanding-u-s-patent-prosecution/id=98955> [<https://perma.cc/3PUP-TWW2>]; See MPEP, *supra* note 16, § 506(I)(C) Completeness of Original Application.

179. *In re* Application of No.: 16/524,350, 2020 WL 1970052, at \*2-3 (filed Jan. 20, 2020) (Decision on Petition).

180. *Id.*

cation listed DABUS as the given name and the family name was “[i]nvention generated by artificial intelligence.”<sup>181</sup> Thaler filed a petition for supervisory review to have DABUS recognized as the inventor, but the petition was denied because the AI system did not qualify as a human inventor.<sup>182</sup>

In response, Thaler argued that inventorship should not be limited to humans and should be extended to include AI.<sup>183</sup> To bolster his position, Thaler provided policy considerations explaining why AI should be listed as an inventor.<sup>184</sup> These policy considerations included incentivizing innovation through the use of AI systems, reducing the improper naming of people who do not actually qualify as inventors, and providing proper notice to the public of the actual inventors of an invention.<sup>185</sup> The USPTO did not find these arguments persuasive and concluded that inventorship is limited to natural persons and does not apply to a machine.<sup>186</sup>

Thaler also argued that the USPTO had granted patents relating to the DABUS machine and by granting those patents, the USPTO implicitly legalized the process for DABUS to be listed as an inventor.<sup>187</sup> As defined by the United States Code, the USPTO only grants a patent if it appears that the applicant is entitled to a patent under the law.<sup>188</sup> In the decision on petition, the USPTO addresses Thaler’s argument by saying that “an invention that covers a machine does not mean that the patent statutes provide for that machine to be listed as an inventor in another patent application—any more than a patent for a camera allows the camera [to] hold a copyright” and concluded by saying that “a machine does not qualify as an inventor under the patent laws.”<sup>189</sup>

As a result, the petition to vacate the Notice to File Missing Parts of Nonprovisional Application was denied.<sup>190</sup> Consequently, the application would remain incomplete until a human inventor was properly listed on the patent application.<sup>191</sup> More significantly, this decision

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181. Millemann, *supra* note 175.

182. *In re* Application of No.: 16/524,350, 2020 WL 1970052, at \*2–3 (filed Jan. 20, 2020) (Decision on Petition).

183. *Id.* at 7.

184. *Id.*

185. *Id.*

186. *Id.*

187. *Id.*

188. *Id.*; 35 U.S.C. § 151.

189. *In re* Application of No.: 16/524,350, 2020 WL 1970052, at \*7 (filed Jan. 20, 2020) (Decision on Petition).

190. *Id.* at 1.

191. *Id.* at 2.

meant the USPTO would not grant patents to non-human entities, such as AI systems.<sup>192</sup> The Federal Circuit recently addressed this issue in *Thaler v. Vidal* and held that “the Patent Act requires that inventors must be natural persons; that is, human beings.”<sup>193</sup>

## 2. *DABUS and Inventorship in Australia*

After the USPTO denied his United States application, Thaler filed a patent application with Australia’s Patent Office.<sup>194</sup> Like the USPTO, it also refused to proceed with the application.<sup>195</sup> After the refusal, Thaler appealed to Australia’s Federal Court.<sup>196</sup> In an opinion rendered by Justice Beach, the Federal Court determined that AI could be an inventor.<sup>197</sup> To reach this decision, the court looked to the Patents Act 1990.<sup>198</sup> The court concluded that “none of these provisions exclude an inventor from being a non-human artificial intelligence device or system.”<sup>199</sup> Specifically, Justice Beach supported his decision by stating,

[a]n inventor as recognised under the Act can be an artificial intelligence system or device. But such a non-human inventor can neither be an applicant for a patent nor a grantee of a patent. So to hold is consistent with the reality of the current technology. It is consistent with the Act. And it is consistent with promoting innovation.<sup>200</sup>

## 3. *DABUS and Inventorship in Europe*

Additionally, Thaler filed two patent applications naming DABUS as the inventor with the European Patent Office (EPO).<sup>201</sup> In 2019, the EPO rejected Thaler’s application<sup>202</sup> on the grounds that the in-

192. *Id.* at 6.

193. *Thaler*, 43 F.4th at 1210.

194. Kingsley Egbuonu, *The Latest News on the DABUS Patent Case*, IP STARS (Nov. 17, 2022), <https://www.ipstars.com/NewsAndAnalysis/The-latest-news-on-the-DABUS-patent-case/Index/7366> [<https://perma.cc/2W56-Q7AC>].

195. *Id.*

196. *Id.*

197. *Id.*

198. Patents Act 1990 (No. 83, 1990) (Austl.), available at <https://www.legislation.gov.au/Details/C2019C00088> [<https://perma.cc/M7VA-7DFZ>].

199. Egbuonu, *supra* note 194.

200. *Id.*

201. Martin Stierle, *Artificial Intelligence Designated as Inventor – An Analysis of the Recent EPO Case Law*, 69 GRUR INT’L 918, 918 (2020), available at <https://doi.org/10.1093/grurint/ikaa105> [<https://perma.cc/LWP8-PZ84>].

202. Serge Rebouillat et al., *New AI-IP-EI Trilogy Opens Innovation to New Dimensions; Another Chip in “the Innovation Wall”, What About Emotional Intelligence (EI)?*, 12 INTELLIGENT INFO. MGMT. 131, 137 (2020), available at <https://doi.org/10.4236/iim.2020.124010> [<https://perma.cc/EFX3-VXCG>].

ventor was not human.<sup>203</sup> The EPO's decision that an inventor must be a natural person was aligned with the international standard for inventorship.<sup>204</sup> Further, the EPO's decision was aligned with IP5, an authority in Intellectual Property which includes the EPO, the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the National Intellectual Property Administration of the People's Republic of China (CNIPA), and the USPTO.<sup>205</sup>

#### 4. *DABUS and Inventorship in South Africa*

In South Africa, Thaler also filed a patent application for the "food container" and listed DABUS as the inventor.<sup>206</sup> Yet, unlike his previous applications, Thaler's request was granted.<sup>207</sup> Thus, on July 28, 2021, South Africa's patent office was the first in the world to grant a patent to an AI inventor.<sup>208</sup>

#### 5. *DABUS and Inventorship in the United Kingdom*

Thaler filed the two patent applications with the UK Intellectual Property Office (UKIPO).<sup>209</sup> The UKIPO withdrew the applications because proper inventorship was not satisfied.<sup>210</sup> The applications failed "on two grounds: DABUS was not a person and so cannot be the inventor and, separately, Dr. Thaler was not entitled to apply for the patents."<sup>211</sup> Thaler appealed the decision.<sup>212</sup> In a 2-1 decision, the panel determined that, under UK law, an inventor must be a human.<sup>213</sup> Lady Justice Elisabeth Laing wrote in support of this deci-

203. *EPO publishes grounds for its decision to refuse two patent applications naming a machine as inventor*, EUR. PAT. OFF. (Jan. 28, 2020), <https://www.epo.org/news-events/news/2020/20200128.html> [<https://perma.cc/C9D6-7JFQ>].

204. *Id.*

205. Rebouillat et al., *supra* note 202.

206. Winstead Intellectual Property Practice, *Recent Developments in Artificial Intelligence and IP Law: South Africa Grants World's First Patent for AI-Created Invention*, NAT'L L. REV. (Aug. 3, 2021), <https://www.natlawreview.com/article/recent-developments-artificial-intelligence-and-ip-law-south-africa-grants-world-s> [<https://perma.cc/7EWQ-MPC9>].

207. *Id.* In the United States, Thaler argued that South Africa had granted patents with DABUS as an inventor. *Thaler*, 43 F.4th at 1213. The Federal Circuit responded by saying that that "foreign patent office was not interpreting [the U.S.] Patent Act" and therefore, its determination did not alter the holding in the United States case. *Id.*

208. Winstead Intellectual Property Practice, *supra* note 206.

209. James Nurton, *UK Judge Upholds Refusal of DABUS Patents*, IP WATCHDOG (Sept. 24, 2020, 4:15 PM), <https://www.ipwatchdog.com/2020/09/24/uk-judge-upholds-refusal-dabus-patents/id=125584/> [<https://perma.cc/B2V9-LUPR>].

210. *Id.*

211. *Thaler v. Comptroller Gen. of Pats. Trade Marks & Designs* [2021] 5 EWCA Civ 1374.

212. *Id.*

213. *AI cannot be the inventor of a patent, appeals court rules*, BBC NEWS (Sept. 23, 2021), <https://www.bbc.com/news/technology-58668534> [<https://perma.cc/V69K-QQ9W>].

sion that “[o]nly a person can have rights” and that “[a] machine cannot.”<sup>214</sup> She reasoned that “[a] patent is a statutory right and it can only be granted to a person.”<sup>215</sup>

### III. ANALYSIS

This part analyzes the current stance toward granting IP protection to non-human entities by examining both the United States view and the worldwide arguments for and against allowing non-human entities to gain these rights. This part also proposes answers to pertinent questions involving AI and its impact on IP policy and inventorship. Finally, this part aims to offer insight on how this issue should be decided and guidance on how courts should follow this line of reasoning going forward.

#### *A. Is there a trend towards granting intellectual property protection to non-human entities?*

##### *1. In the United States*

There is not a trend in the United States towards granting IP protection to non-human entities such as AI. As seen within the published decision on the *Thaler* petition,<sup>216</sup> the USPTO has taken the position that only natural persons can be inventors.<sup>217</sup> The dispute mainly centers around whether AI is capable of conception—a required element to receive a patent.<sup>218</sup>

Currently, there is a disconnect between those who believe that patents can only be conceived by humans<sup>219</sup> and those who argue AI’s advancements render it capable of human qualities.<sup>220</sup> While the USPTO has adopted the position that only natural persons can be inventors, some leading voices in the field are “seeking intellectual property rights for inventions generated by an AI without a tradi-

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214. *Thaler* [2021] 23 EWCA Civ 1374.

215. Igor Bonifacic, *UK appeals court rules AI cannot be listed as a patent inventor*, ENGADGET (Sept. 23, 2021), <https://www.engadget.com/uk-appeal-court-artificial-intelligence-patent-191631993.html> [<https://perma.cc/GEP8-PQQJ>].

216. *In re* Application of No.: 16/524,350, 2020 WL 1970052, at \*4–5 (filed Jan. 20, 2020) (Decision on Petition)

217. *Id.*

218. Kaelyn R. Knutson, *Anything You Can Do, AI Can’t Do Better: An Analysis of Conception as a Requirement For Patent Inventorship And A Rationale For Excluding AI Inventors*, 11 CYBARIS INTELL. PROP. L. REV. 1, 4, 12 (2020).

219. *Id.* at 15.

220. Pearlman, *supra* note 77, at 10.

tional human inventor.”<sup>221</sup> Known as “The Artificial Inventor Project,” those in favor of AI inventorship argue a “machine is not ‘just a tool’ but it is automating invention.”<sup>222</sup>

In essence, this debate rests on whether human beings are the only ones capable of conception. Advocates against allowing AI to receive patents argue conception is a “human neurological process,” and human conception “is vital to the functioning of the U.S. patent system because of the underlying policy of incentivizing inventiveness.”<sup>223</sup> Indeed, if conception truly requires a human neurological process, AI cannot conceive an invention under the current patent laws.<sup>224</sup> Nevertheless, researchers are currently working to create human-like AI.<sup>225</sup> Therefore, the mental processes, such as conception, may soon occur in non-human entities.<sup>226</sup>

Although the USPTO decided not to grant patent applications to AI systems, there are arguments in favor of allowing AI to be an inventor because (1) AI is capable of creating IP,<sup>227</sup> (2) AI’s technological advancements require the law to advance with it,<sup>228</sup> and (3) AI can now function without human intervention.<sup>229</sup> While it is important to distinguish between human created inventions and AI created inventions,<sup>230</sup> AI technology is advancing and is now capable of many things, such as independently winning at games (for example, chess and *Jeopardy!*) and generating potentially patentable inventions.<sup>231</sup> Therefore, advocates believe the law should change with it.<sup>232</sup>

Since one of the primary purposes of IP law is to encourage innovation and serve the public interest by fostering advancements in the

221. Ryan Abbott, *The Artificial Inventor Project*, ARTIFICIAL INVENTOR, <https://artificialinventor.com/> [https://perma.cc/R3T2-398T] (last visited Nov. 23, 2022).

222. Ryan Abbott, *Frequently Asked Questions*, ARTIFICIAL INVENTOR, <https://artificialinventor.com/frequently-asked-questions/> [https://perma.cc/8JJR-5HD8] (last visited Nov. 23, 2022).

223. Knutson, *supra* note 218, at 5.

224. *Id.*; “AI processing, regardless of relative efficiency compared to humans, cannot amount to ‘conception,’ as defined by U.S. patent law, so AI cannot and should not be recognized as inventors under U.S. patent law.” *Thaler* [2021] 4 EWCA Civ 1374.

225. University of Glasgow, *Developing Artificial Intelligence That “Thinks” Like Humans*, SCITECHDAILY (Oct. 18, 2021), <https://scitechdaily.com/developing-artificial-intelligence-that-thinks-like-humans/> [https://perma.cc/X6TH-YWJR].

226. *Id.*

227. *Artificial Intelligence and Intellectual Property*, WIPO, [https://www.wipo.int/about-ip/en/frontier\\_technologies/ai\\_and\\_ip.html](https://www.wipo.int/about-ip/en/frontier_technologies/ai_and_ip.html) (last visited Nov. 23, 2022) [https://perma.cc/JK3G-UBPB].

228. Pearlman, *supra* note 77, at 3.

229. *Id.*

230. *Frequently Asked Questions: AI and IP Policy*, WIPO, [https://www.wipo.int/about-ip/en/artificial\\_intelligence/faq.html](https://www.wipo.int/about-ip/en/artificial_intelligence/faq.html) (last visited Nov. 23, 2022) [https://perma.cc/D2VM-GPP5].

231. Pearlman, *supra* note 77, at 3.

232. *Id.*

fields of art and science, proponents argue that United States lawmakers must recognize AI as an inventor to achieve this goal.<sup>233</sup> Because “AI systems have already demonstrated intelligence, creativity, and inventiveness,”<sup>234</sup> it is important that the laws address potential long-term impacts to technological growth.<sup>235</sup> The advancements in AI have made the systems more human-like and have even tried to replicate human intelligence.<sup>236</sup> AI can create inventions that, if invented by a human, would be patent eligible.<sup>237</sup> Under current United States law, AI is not recognized as an inventor, meaning that even if the subject matter is patentable, patents cannot be obtained by AI.<sup>238</sup> Proponents of allowing AI to be recognized as inventors argue that advanced AI systems, which are designed to mimic human cognition, can perform mental processes similar to those of humans.<sup>239</sup>

## 2. *Worldwide*

Determining how machines and their inventions are treated has become a worldwide concern.<sup>240</sup> Patent offices around the world are facing the question of whether existing IP rights can be applied to machine created IP, or if systems granting IP protection need to be modified.<sup>241</sup> Although it is accepted that non-humans can create IP, under the current systems in place, they “lack the requisite personality to claim those rights.”<sup>242</sup> Specifically, the EPO is concerned that AI could not claim certain rights, such as enforcement and transfer, associated with inventorship.<sup>243</sup> The EPO has concluded that AI is unable to possess certain rights, as these specific rights are not applicable to AI.<sup>244</sup> However, the EPO has seen an increase in AI-driven filings,

233. *Id.* at 3–4.

234. *Id.* at 4.

235. David McCombs et al., *Where We Are on AI Inventorship and Where We Should be Heading*, IP WATCHDOG (Oct. 12, 2021, 7:15 AM), <https://www.ipwatchdog.com/2021/10/12/ai-inventorship-heading/id=138648/> [<https://perma.cc/Z4EK-RL4G>].

236. Pearlman, *supra* note 77, at 4.

237. *Id.* at 37.

238. *Id.*

239. *Id.*

240. *Frequently Asked Questions: AI and IP Policy*, *supra* note 230.

241. *Id.*

242. Douglas Goldhush, *DABUS Denied: Only Natural Persons can be Named as Inventors on US Patents*, SQUIRE PATTON BOGGS (Apr. 28, 2020), <https://www.iptechblog.com/2020/04/dabus-denied-only-natural-persons-can-be-named-as-inventors-on-us-patents/> [<https://perma.cc/M4D6-EE67>].

243. *Id.*

244. *Id.*



and this surge could help push the EPO towards making changes in its laws.<sup>245</sup>

*B. How should the world deal with Artificial Intelligence and Intellectual Property?*

Discussions within WIPO are focused on three major concerns: (1) “whether AI [can] be an inventor or creator within the existing IP frameworks,” (2) how to protect “AI algorithms and software,” and (3) what rights concern “the underlying training data and data inputs.”<sup>246</sup> In addressing these three concerns, WIPO considers how little human interaction is required for a machine to claim its own IP.<sup>247</sup>

WIPO conducted forums to discuss the impact of AI on IP policy<sup>248</sup> and created a public consultation process that encouraged people worldwide to provide feedback to IP policy makers.<sup>249</sup> The patent system is fundamental to innovation and meant to “encourage the investment of human and financial resources and the taking of risk in generating inventions that may contribute positively to the welfare of society.”<sup>250</sup> WIPO has proposed new policy considerations for the patent system.<sup>251</sup> A general policy consideration question includes: “[i]s it too early to consider these questions because the impact of AI on both science and technology is still unfolding at a rapid rate and there is, at this stage, insufficient understanding of that impact or of what policy measures, if any, might be appropriate in the circumstances?”<sup>252</sup> Many believe the answer to this question is, unequivocally, no. Even though the impact of science and technology is advancing at a rapid rate, it is not too early to consider the impact of AI on IP policy.<sup>253</sup> This is because AI, such as DABUS, has already been listed as an inventor on patent applications.<sup>254</sup> Although most jurisdictions have not allowed AI to be listed as the patent’s inven-

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245. *AI cannot be the inventor of a patent, appeals court rules*, *supra* note 213.

246. *Frequently Asked Questions: AI and IP Policy*, *supra* note 230.

247. *Id.*

248. *The WIPO Conversation on Intellectual Property and Artificial Intelligence*, WIPO, [https://www.wipo.int/about-ip/en/artificial\\_intelligence/conversation.html](https://www.wipo.int/about-ip/en/artificial_intelligence/conversation.html) [https://perma.cc/S4HB-F7DC] (last visited Nov. 23, 2022).

249. *Id.*

250. *WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI)*, WIPO (Dec. 13, 2019), [https://www.wipo.int/edocs/mdocs/mdocs/en/wipo\\_ip\\_ai\\_2\\_ge\\_20/wipo\\_ip\\_ai\\_2\\_ge\\_20\\_1.pdf](https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_ai_2_ge_20/wipo_ip_ai_2_ge_20_1.pdf) [https://perma.cc/85VT-FAJ6].

251. *Id.*

252. *Id.*

253. *Id.*

254. Yogini Bhavsar-Jog, *Artificial Intelligence as an Inventor on Patents – The Global Divide and the Path Forward*, JDSUPRA (Dec. 22, 2021), <https://www.jdsupra.com/legalnews/artificial-intelligence-as-an-inventor-7892764/> [https://perma.cc/PUJ2-AETM].

tor,<sup>255</sup> this should not foreclose WIPO’s consideration of the issue. WIPO is responding properly to this trend because lawmakers must think long term.<sup>256</sup> Further, IP owners need certainty regarding the issue of AI and inventorship.<sup>257</sup>

Nevertheless, not everyone agrees with this assertion. Some believe that courts and lawmakers should wait to decide on the issue of AI inventorship until AI is more sophisticated.<sup>258</sup> U.S. District Court Judge Brinkema, who dismissed a suit filed by Dr. Thaler challenging his rejected applications listing AI as the inventor, acknowledged that “[a]s technology evolves, there may come a time when artificial intelligence reaches a level of sophistication such that it might satisfy the accepted meaning of inventorship.”<sup>259</sup> However, she concluded that the “time has not yet arrived,” and even if or when it does, “it will be up to Congress to decide how, if at all, it wants to expand the scope of patent law.”<sup>260</sup>

Although the laws may not be in a position to change, it is important to consider these policy implications, since AI now has “widespread applications throughout the economy and society.”<sup>261</sup> These applications are likely to have an “impact on the creation, production and distribution of economic and cultural goods and services.”<sup>262</sup> Therefore, allowing AI to be listed as an inventor would encourage innovation while increasing competition.<sup>263</sup> In the end, society will also benefit because, once a patent reaches the end of its term, it will be free for the public to use.<sup>264</sup> As a result, it is crucial that leaders and lawmakers begin to discuss new policy sooner rather than later.

Regarding patent inventorship and ownership, WIPO has proposed questions for policymakers to consider. A main question is whether the law should permit AI to be named as the inventor or if a human inventor must be named.<sup>265</sup> If the law requires human inventorship,

255. *Id.*

256. McCombs et al., *supra* note 235.

257. *Id.*

258. Bhavsar-Jog, *supra* note 254.

259. *Id.*

260. *Id.*

261. *WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI)*, *supra* note 250.

262. *Id.*

263. *Why Patents Are Good: Everything You Need to Know*, UP-COUNSEL, <https://www.upcounsel.com/why-patents-are-good> [<https://perma.cc/WD2K-X3UN>] (last visited Nov. 22, 2022).

264. *Id.*

265. *WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI)*, *supra* note 250.

should the law provide further guidance for determining who the human inventor should be, or should this decision be left to a private arrangement?<sup>266</sup>

Policymakers should look to copyright law for help. Similar to AI creating patentable inventions, AI has created copyrightable works, and there is an issue of who should own the IP.<sup>267</sup> For copyrights, one argument is that AI should not own the copyright because “it doesn’t have legal status and it wouldn’t know or care what to do with property.”<sup>268</sup> Instead, it has been proposed that the person who owns the machine who created the copyright should own the copyright because they do have legal status and would have the know-how and desire to enforce their rights.<sup>269</sup> In sum, the owner of the AI machine would be the owner of the copyright.<sup>270</sup>

A similar approach should be applied to patent law. If AI is listed as an inventor, the creator or owner of the AI machine would be the owner of the patent.<sup>271</sup> Therefore, the owner of the patent would be the owner of the AI machine.<sup>272</sup> As of now, AI cannot enforce its rights via civil suit for patent infringement, so there must be a human patent owner associated with the application to do so.<sup>273</sup> A human inventor should not be required because patent owners are the ones who have the power to enforce a patent regardless of who is listed as an inventor.<sup>274</sup> Since a patent owner must enforce the patent rights, a human must be the patent owner.<sup>275</sup>

If AI is to be recognized as an inventor, AI must also independently conceive of the idea.<sup>276</sup> Unlike humans, AI can operate under the di-

266. *Id.*

267. Ryan Abbott, *Should AI be Treated the Same as Humans Legally?*, MARSH MCLENNAN (Nov. 3, 2020), <https://www.brinknews.com/should-ai-be-treated-the-same-as-humans-legally> [<https://perma.cc/Q4AL-C5HM>].

268. *Id.*

269. *Id.*

270. *Id.*

271. *Id.*

272. *Id.*

273. Goldhush, *supra* note 242.

274. *Enforcement of Patent Rights*, JUSTIA, <https://www.justia.com/intellectual-property/patents/enforcement> [<https://perma.cc/BMH8-XXSD>] (last visited Jan. 27, 2022); Patent ownership gives the owner:

the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States, and, if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States, or importing into the United States, products made by the process, referring to the specification for the particulars thereof.

35 U.S.C. § 154(a)(1).

275. 35 U.S.C. § 154(a)(1); Abbott, *supra* note 267.

276. Pearlman, *supra* note 77, at 30–31.

rection of a human to solve a specific problem, or AI can be programmed to think freely. The two-part test proposed by Russ Pearlman, described in Part II.A.1, aims to address the idea of AI independently conceiving an invention.<sup>277</sup> Part one of the test for AI inventorship requires that for AI to be an inventor, the subject matter of the patent must be patent eligible.<sup>278</sup> Part two of the test deals with independent inventorship.<sup>279</sup> The second part requires AI to create an invention without human direction in order to be listed as an inventor.<sup>280</sup> Similar to the second part of Pearlman’s test, Thaler argued that the AI system “was not created to solve a particular problem and it was not trained on any special data relevant to the instant invention.”<sup>281</sup> If a machine recognizes the novelty and salience of the invention, that machine should be listed as the inventor.<sup>282</sup> The USPTO rejected this argument and found that the patent statutes preclude such a broad interpretation.<sup>283</sup> However, as AI technology evolves and its capabilities expand, the statutory interpretations should evolve with the changes in technology. If AI can develop patent eligible subject matter and independently conceive of the invention, then AI should be able to be a patent inventor.<sup>284</sup>

Since AI can create patent eligible subject matter, as seen in the DABUS applications,<sup>285</sup> insisting on only granting patents to humans is “outdated.”<sup>286</sup> Moreover, allowing AI to be an inventor can have a beneficial economic impact.<sup>287</sup> For example, in the UK, the current patent laws require that an inventor be a person.<sup>288</sup> However, UKIPO realizes that “AI technology could increase UK’s GDP by 10% in the next decade.”<sup>289</sup> Based on these findings, the UK government an-

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277. *Id.* at 30.

278. *Id.*

279. *Id.*

280. *Id.* at 30–32.

281. *In re* Application of No.: 16/524,350, 2020 WL 1970052 (filed Jan. 20, 2020) (Decision on Petition).

282. *Id.*

283. *Id.*

284. See Part Two of Pearlman’s test. Pearlman, *supra* note 77, at 30; *In re* Application of No.: 16/524,350, 2020 WL 1970052 (filed Jan. 20, 2020) (Decision on Petition).

285. Leo Kelion, *AI System ‘Should be Recognised as Inventor,’* BBC NEWS (Aug. 1, 2019), <https://www.bbc.com/news/technology-49191645> [<https://perma.cc/M9LN-WL8T>].

286. *Id.*

287. *Id.*

288. *Id.*

289. Ryan N. Phelan, *Can an Artificial Intelligence (AI) be an Inventor?*, PAT. NEXT (Mar. 24, 2021), [https://www.patentnext.com/2021/03/can-an-artificial-intelligence-ai-be-an-inventor/?utm\\_source=Mondaq&utm\\_medium=Syndication&utm\\_campaign=LinkedIn-integration](https://www.patentnext.com/2021/03/can-an-artificial-intelligence-ai-be-an-inventor/?utm_source=Mondaq&utm_medium=Syndication&utm_campaign=LinkedIn-integration) [<https://perma.cc/U574-TGQ2>].

nounced their commitment to “responding to the challenges that come with this growth.”<sup>290</sup>

In addition to questions surrounding inventorship and ownership, WIPO has proposed questions about how to apply the patent requirement of nonobviousness to AI. As applied to AI, the nonobviousness inquiry<sup>291</sup> asks whether AI generated content qualifies as prior art.<sup>292</sup> For an inventor to receive a patent, the invention must involve either an inventive step or be nonobvious, such that the invention is not obvious to a “person skilled in the relevant art to which the invention belongs.”<sup>293</sup>

If the invention is already known anywhere in the world or it has been previously disclosed in a patent to the public, or is for sale, it is considered prior art.<sup>294</sup> AI generated content should qualify as prior art. Although not currently patentable worldwide, AI generated content should serve as prior art.<sup>295</sup> This, in turn, should prevent human inventors from claiming previously disclosed concepts by AI and receiving patents on them.<sup>296</sup> Any patent applications claiming subject matter created by AI as the inventive step would therefore be obvious and unpatentable.<sup>297</sup>

#### IV. IMPACT

The world may not be ready to decide on the issue of AI inventorship, however, lawmakers and courts need to look long-term and provide clarity to IP owners. As AI advances and becomes more human-like, humans will likely become more willing to accept AI as an inventor.

Perhaps the better question to ask is not whether AI can conceive, but whether AI can “think” like humans.<sup>298</sup> If AI can think like

290. *Id.*

291. *Nonobviousness*, LEGAL INFO. INST., <https://www.law.cornell.edu/wex/nonobviousness> [<https://perma.cc/8VYP-J9HU>] (last visited Mar. 27, 2022).

292. *WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI)*, *supra* note 250.

293. *Id.*

294. *What is prior art?*, EUR. PAT. OFF., <https://www.epo.org/learning/materials/inventors-handbook/novelty/prior-art.html> [<https://perma.cc/4KWY-QWLC>] (last visited Jan. 24, 2022).

295. See 35 U.S.C. § 102(a) (prohibiting patents for inventions that are “otherwise available to the public”); Lucas R. Yordy, Note, *The Library of Babel for Prior Art: Using Artificial Intelligence to Mass Produce Prior Art in Patent Law*, 74 VAND. L. REV. 521, 521, 524–25 (2021).

296. Yordy, *supra* note 295, at 521–23.

297. *WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI)*, *supra* note 250.

298. David K. Johnson, *Could Artificial Intelligence Actually Think Like Humans?*, WONDRIUM DAILY (May 27, 2021), <https://www.thegreatcoursesdaily.com/could-artificial-intelligence-actually-think-like-humans/> [<https://perma.cc/EC8C-LTU5>].

humans and is capable of conception, then it should be considered an inventor.<sup>299</sup> Based on current advancements in AI technology, it seems likely AI will be able to think like a human. Currently, AI excels in performing tasks and is still a tool that requires human involvement.<sup>300</sup> AI “is still deficient in creative thinking, abstract and original thought and identifying problems and undefined corresponding solutions.”<sup>301</sup> Until AI can overcome these deficiencies, “it will remain a tool, rather than an inventor.”<sup>302</sup>

Further, the law should not exclude inventions that have been generated autonomously by an AI system from patent protection. Many patent offices (excluding South Africa<sup>303</sup> and Australia<sup>304</sup>) have said that AI generated inventions should be prevented from receiving patents because AI is not human.<sup>305</sup> However, because the examination process for a patent application is less formalized in South Africa than in the United States or Europe, the legal significance of this decision to grant a patent to an AI inventor remains to be seen.<sup>306</sup> Many patent offices, such as the USPTO, EPO, and UKIPO, have affirmative requirements that an inventor must be a human.<sup>307</sup>

The existence of patents helps to encourage others to explore new technologies and subsequent derivative inventions.<sup>308</sup> If AI cannot receive patent protection in the United States, it could stagnate the amount of publicly available information created by AI.<sup>309</sup> Further, AI as an inventor can increase the speed while decreasing the cost of innovation.<sup>310</sup> People may continue to create even if their IP cannot be protected, however, without the incentive of patent protection, in-

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299. *In re Hardee*, 1984 Dec. Comm’r Pat. 1122; Conception is “the complete performance of the mental part of the inventive art” and “the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is thereafter to be applied in practice.” *Townsend*, 36 F.2d at 295.

300. McCombs et al., *supra* note 235.

301. *Id.*

302. *Id.*

303. *DABUS Gets Its First Patent in South Africa Under Formalities Examination*, IP WATCHDOG (July 29, 2021, 8:13 AM) <https://www.ipwatchdog.com/2021/07/29/dabus-gets-first-patent-south-africa-formalities-examination/id=136116/> [<https://perma.cc/32PJ-AS9Z>].

304. Rebecca Currey & Jane Owen, *In the Courts: Australian Court finds AI systems can be “inventors”*, WIPO (Sept. 2021), [https://www.wipo.int/wipo\\_magazine/en/2021/03/article\\_0006.html](https://www.wipo.int/wipo_magazine/en/2021/03/article_0006.html) [<https://perma.cc/D9J9-N8Z3>].

305. Phelan, *supra* note 289.

306. *Id.*

307. *Id.*

308. Erica Fraser, *Computers as Inventors – Legal and Policy Implications of Artificial Intelligence on Patent Law*, 13 SCRIPTed 305, 312 (2016).

309. *Id.* at 325.

310. *Id.* at 326.

ventions may no longer be disclosed.<sup>311</sup> More likely, however, is that the innovation will continue but will be protected in other ways, such as through trade secrets.<sup>312</sup>

Machines cannot be inventors worldwide yet, but they can still contribute to the pace of innovation. Humanity as a whole is not yet ready to admit that AI is capable of mental processes like conception. However, some patent offices are making great strides and showing that more people are open to the idea of non-humans creating IP.<sup>313</sup> This is, ultimately, a question left up to the legislature.<sup>314</sup> Any change would “have implications reaching far beyond patent law, i.e., to authors’ rights under copyright laws, civil liability and data protection.”<sup>315</sup> The laws must change for human perception to change.

## V. CONCLUSION

AI has the potential to significantly contribute to innovation, however the current interpretation of patent laws and statutes prevents AI from being legally recognized as an inventor.<sup>316</sup> Inventorship in the United States requires conception<sup>317</sup> and caselaw has determined that conception is limited to natural persons.<sup>318</sup> Except for South Africa<sup>319</sup> and Australia,<sup>320</sup> the global perspective on inventorship is akin to that of the United States, where patent offices in other countries do not acknowledge AI as an inventor.<sup>321</sup> However, AI can create patentable inventions and therefore should be able to be listed as a patent inventor.

311. Paul Belleflamme, *Patents and Incentives to Innovate: Some Theoretical and Empirical Economic Evidence*, 13 *ETHICAL PERSPECTIVES* 267, 278 (2006); Richard Posner, *Do Patent and Copyright Law Restrict Competition and Creativity Excessively?*, *BECKER-POSNER BLOG* (Sept. 13, 2012), <https://www.becker-posner-blog.com/2012/09/do-patent-and-copyright-law-restrict-competition-and-creativity-excessively-posner.html> [<https://perma.cc/HL2U-FHR5>].

312. Richard D. Nelson & Roberto Mazzoleni, *Economic Theories About the Costs and Benefits of Patents*, in *INTELLECTUAL PROPERTY RIGHTS AND THE DISSEMINATION OF RESEARCH TOOLS IN MOLECULAR BIOLOGY: SUMMARY OF A WORKSHOP HELD AT THE NATIONAL ACADEMY OF SCIENCES, FEBRUARY 15–16* (U.S. Nat’l Rsch. Council eds., 1996), available at <https://www.ncbi.nlm.nih.gov/books/NBK233535/> [<https://perma.cc/A3RE-M5G8>].

313. *DABUS Gets Its First Patent in South Africa Under Formalities Examination*, *supra* note 303; Currey & Owen, *supra* note 304.

314. Memorandum Opinion at 18, *Thaler v. Hirschfeld*, 558 F. Supp. 3d 238 (E.D. Va., Sept. 2, 2021) (No. 1:20-cv-00903).

315. *AI cannot be the inventor of a patent, appeals court rules*, *supra* note 213.

316. Memorandum Opinion at 3, *Thaler v. Iancu*, No. 1:20-cv-00903 (E.D. Va. Aug. 6, 2020).

317. *In re Hardee*, 1984 Dec. Comm’r Pat. 1122.

318. *Univ. of Utah*, 734 F.3d at 1323.

319. *DABUS Gets Its First Patent in South Africa Under Formalities Examination*, *supra* note 303.

320. Currey & Owen, *supra* note 304.

321. Phelan, *supra* note 289.

There are two main arguments against recognizing AI as an inventor. First, it is believed that conception, being a mental process unique to humans, is not possible for AI.<sup>322</sup> Second, since AI is unable to enforce IP rights, it should not be granted rights that it cannot enforce.<sup>323</sup> While AI may not currently have the capability to enforce its own IP rights, rapid advances in AI systems are making them increasingly human-like.<sup>324</sup> Therefore, AI should be able to be named as a patent inventor.<sup>325</sup> Although AI inventors cannot enforce their own rights, humans are capable of doing so on behalf of AI.<sup>326</sup> This would allow for AI's innovative contributions to society to be recognized and protected. Furthermore, AI generated innovations should count as prior art.<sup>327</sup> A human should not get a patent for the innovative concepts developed by AI.<sup>328</sup> Allowing AI to be an inventor would further encourage innovation and have widespread economic benefits.<sup>329</sup> It remains to be seen how the world will decide on the issue of AI and inventorship, but it will definitely be cool.

*Rachel Ackerman*

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322. *Univ. of Utah*, 734 F.3d at 1323.

323. Goldhush, *supra* note 242.

324. Pearlman, *supra* note 77.

325. Abbott, *supra* note 267.

326. Goldhush, *supra* note 242.

327. Yordy, *supra* note 295.

328. *Id.*

329. *Why Patents Are Good: Everything You Need to Know*, *supra* note 263.



