

# The University of Cincinnati Intellectual Property and Computer Law Journal

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Volume 6 | Issue 2

Article 1

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April 2022

## The Patentability of Inventions with Artificial Intelligence Listed as an Inventor Following Thaler v. Hirshfeld

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### Recommended Citation

Kaitlyn Taylor, *The Patentability of Inventions with Artificial Intelligence Listed as an Inventor Following Thaler v. Hirshfeld*, 6 U. Cin. Intell. Prop. & Computer L.J. (2022)

Available at: <https://scholarship.law.uc.edu/ipclj/vol6/iss2/1>

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## **The Patentability of Inventions with Artificial Intelligence Listed as an Inventor**

### **Following *Thaler v. Hirshfeld***

By: Kaitlyn Taylor

#### **Introduction**

Computers have become an integral part of daily life for a plethora of individuals in the United States and around the world. For many, computers create ease and improve quality of life as they provide a variety of different functions. From allowing individuals to communicate with one another across the globe, to providing a medium for individuals to work and learn, to many things never previously imaginable, computers have completely transformed many aspects of daily life. Following the development of computers, many inventors and developers have been consistently looking for methods to make them faster, better, smarter, and able to solve problems. This drive eventually led to the creation of Artificial Intelligence (“AI”). AI essentially utilizes computers and machines in order to mimic the problem-solving and decision-making capabilities that are present within the human mind.<sup>1</sup>

AI can serve a wide range of purposes and applications, encompassing everything from various types of speech recognition to customer service, among many others. Some individuals are even harnessing the power of AI to help create new inventions, solve problems and innovate new methods of improving society.<sup>2</sup> For example, AI has been used to detect defects in pharmaceutical products, to develop new composition for green technology products, and for analyzing biological samples in the manufacturing process, along with many other applications.<sup>3</sup> As a result, when inventors are seeking intellectual property protection for their new inventions, specifically patent protection, some inventors chose to list the artificial intelligence as the inventor of the new invention when filing patent applications.

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<sup>1</sup> *Artificial Intelligence (AI)*, IBM, <https://www.ibm.com/cloud/learn/what-is-artificial-intelligence> (last visited Feb. 13, 2022).

<sup>2</sup> Michael Sartori & Matthew Avery, *Industry Insights To Navigate AI Chemical Invention Patents* (Mar. 2, 2022) <https://www.law360.com/articles/1469893/industry-insights-to-navigate-ai-chemical-invention-patents> (last visited Mar. 4, 2022).

<sup>3</sup> *Id.*

This was the case with Stephen Thaler when he filed two patent applications listing AI machine Device for the Autonomous Bootstrapping of Unified Sentience (“DABUS”) as the sole inventor of the inventions claimed in the applications.<sup>4</sup> These patent applications were not processed, as no natural person was identified as the inventor on the application.<sup>5</sup> As a result, Thaler brought a complaint against the United States Patent and Trademark Office (“USPTO”), appealing the refusal, alleging that his complaint should not have been refused and that artificial intelligence can meet the inventorship criteria.<sup>6</sup>

In September of 2021, the United States District Court for the Eastern District of Virginia ruled that based upon the statutory language present within the Patent Act, artificial intelligence cannot be listed as an inventor on a patent application.<sup>7</sup> The Patent Act utilizes plain language that does not specifically address AI, and *Thaler* was the first case to present the issue of whether or not AI could be listed as an inventor on a patent application before the court.<sup>8</sup> In this ruling, the court provided a long-awaited answer to a question that had been speculated and argued for several years along with the rise of artificial intelligence, whether or not AI can be listed as an inventor. With this ruling, AI cannot be listed as an inventor on a patent application in the United States. Additionally, the ruling in the *Thaler* case raises a number of questions regarding the impact that the decision will have on the patentability of other inventions where AI played a role in the conception and reduction to practice of the invention.

This article aims to discuss the impact that the decision in *Thaler v. Hirshfeld* has had, and will continue to have, on the patentability of inventions where AI was listed as the inventor of the invention. Additionally, this article aims to discuss the impact that the *Thaler* decision could have on subsequent attempts to patent inventions where AI was utilized in the process of conception and reduction to practice for the invention.

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<sup>4</sup> *Thaler v. Hirshfeld*, No. 1:20CV903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393, at \*3 (E.D. Va. Sep. 2, 2021).

<sup>5</sup> *Id.*

<sup>6</sup> *Id.*

<sup>7</sup> *Id.*

<sup>8</sup> Adam Lidgett, *USPTO Tells Fed. Circ. Only Humans Can Be Inventors*, LAW360 (Feb. 4, 2022) <https://www.law360.com/articles/1461934/uspto-tells-fed-circ-only-humans-can-be-inventors> (last visited Mar. 4, 2022).

This article is organized into five sections. The first of these sections will provide general background regarding artificial intelligence along with a brief overview of the United States patent system. Thereafter, this article will provide an overview of applicable case law prior to the *Thaler* decision. Next, this article will provide a discussion of the arguments as to why AI should be listed as an inventor. Additionally, this section will cover how several other countries have handled situations where patent applications were filed with AI listed as an inventor. Then, the next section of this article will provide an overview of and discuss the *Thaler* case itself. Finally, this article will conclude with a section detailing the impact that the *Thaler* decision could have on inventions to be patented where AI played a role in the conception and reduction to practice of the invention.

## **Background**

### **What is Artificial Intelligence?**

To discuss the patentability of inventions where artificial intelligence is listed either as the sole inventor or as an inventor, one must understand artificial intelligence itself. AI is the “science and engineering of making intelligent machines, especially intelligent computer programs.”<sup>9</sup> AI is related to a similar task where computers are used to understand human intelligence; however, artificial intelligence does not need to confine itself to methods that can be observed biologically.<sup>10</sup>

Although this definition of AI embodies a modern understanding of artificial intelligence, in 1950 Alan Turing, who is often considered the “father of computer science,” began the AI conversation by asking the question: “can machines think?”<sup>11</sup> To answer this question, Turing offered the initial test, known as the “Turing Test,” in which a human would be tasked with distinguishing text responses between those created

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<sup>9</sup>John McCarthy, WHAT IS ARTIFICIAL INTELLIGENCE?, (Nov. 24, 2004) [https://borghese.di.unimi.it/Teaching/AdvancedIntelligentSystems/Old/IntelligentSystems\\_2008\\_2009/Old/IntelligentSystems\\_2005\\_2006/Documents/Symbolic/04\\_McCarthy\\_whatissai.pdf](https://borghese.di.unimi.it/Teaching/AdvancedIntelligentSystems/Old/IntelligentSystems_2008_2009/Old/IntelligentSystems_2005_2006/Documents/Symbolic/04_McCarthy_whatissai.pdf) (last visited Feb. 13, 2022).

<sup>10</sup>*Id.*

<sup>11</sup>*Artificial Intelligence (AI)*, IBM, <https://www.ibm.com/cloud/learn/what-is-artificial-intelligence> (last visited Feb. 13, 2022).

by a human and those created by a computer.<sup>12</sup> Although artificial intelligence has evolved beyond Turing's initial test, description, and understanding, it still marks the beginning of an ongoing discussion and conversation regarding AI.

Artificial intelligence has four potential goals or definitions, differentiating the computer systems who have AI from those who do not.<sup>13</sup> These come from one of the leading textbooks in the study of AI, written by Stuart Russell and Peter Norvig.<sup>14</sup> The primary objectives of artificial intelligence are based on the rationale behind thinking versus acting and are grouped into two categories each with two of the four objectives. The first category is the human approach.<sup>15</sup> The goals of the human approach are for systems to think like humans and systems to act like humans.<sup>16</sup> The second category is the ideal approach.<sup>17</sup> The goals of the ideal approach are for systems to think rationally and for systems to act rationally.<sup>18</sup>

Simply, artificial intelligence combines computer science and robust data sets so that a computer can engage in problem solving.<sup>19</sup> This allows for the creation of AI algorithms that can create "expert" systems that are able to make classifications or predictions based on data that is input into the system.<sup>20</sup> Additionally, AI encompasses the fields of machine learning and deep learning, which as a result are often mentioned in conjunction with artificial intelligence.<sup>21</sup>

There are several different types of artificial intelligence, grouped into two major categories, weak AI and strong AI.<sup>22</sup> Weak AI, which has also been called Artificial Narrow Intelligence ("ANI") or Narrow

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<sup>12</sup> A.M. Turing, COMPUTING MACHINERY AND INTELLIGENCE (1950), <https://www.csee.umbc.edu/courses/471/papers/turing.pdf> (last visited Feb. 13, 2022).

<sup>13</sup> STUART RUSSELL & PETER NORVIG, ARTIFICIAL INTELLIGENCE: A MODERN APPROACH (4<sup>th</sup> ed. 2021), <http://aima.cs.berkeley.edu/> (last visited Feb. 13, 2022).

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

<sup>18</sup> *Id.*

<sup>19</sup> WHAT IS ARTIFICIAL INTELLIGENCE?, <https://www.ibm.com/cloud/learn/what-is-artificial-intelligence> (last visited Feb. 13, 2022).

<sup>20</sup> *Id.*

<sup>21</sup> *Id.*

<sup>22</sup> *Id.*

AI, is a type of artificial intelligence that is trained and focused on the performance of specific tasks.<sup>23</sup> Most AI that the average individual encounters today would fall into this category, such as Amazon’s Alexa or Apple’s Siri.<sup>24</sup>

Strong AI, on the other hand, is comprised of Artificial General Intelligence (“AGI”) and Artificial Super Intelligence (“ASI”).<sup>25</sup> AGI is a form of artificial intelligence that, at this point in time, is theoretical, as this form of AI would possess both a level of intelligence that is equal to that of humans and a consciousness that is self-aware and would have the ability to solve problems, plan for the future, and learn.<sup>26</sup> ASI (also known more generally as superintelligence) would have a level of intelligence that surpasses that of human knowledge and understanding.<sup>27</sup> Currently, these types of Strong AI have not yet been developed and can truly only be seen in science fiction.<sup>28</sup>

Ultimately, artificial intelligence serves a variety of purposes, and can accomplish a plethora of different tasks. It can make things like research and development of new innovations much easier. As a result, some inventors are using artificial intelligence to aid in the development of new inventions.<sup>29</sup> For example, AI has been used to detect defects in pharmaceutical products, to develop new composition for green technology products, and for analyzing biological samples in the manufacturing process, along with many other applications.<sup>30</sup> After using AI to help create new inventions, some inventors listed the artificial intelligence as the inventor of the invention, as was the case in *Thaler v. Hirshfeld*.<sup>31</sup> This then raises the question, “why would inventors choose to list AI as an inventor on a patent application for a particular invention?” Many inventors who chose to take the route of listing the AI did so because they wanted to

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<sup>23</sup> *Id.*

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

<sup>26</sup> *Id.*

<sup>27</sup> *Id.*

<sup>28</sup> *Id.*

<sup>29</sup> Michael Sartori & Matthew Avery, *Industry Insights To Navigate AI Chemical Invention Patents* (Mar. 2, 2022) <https://www.law360.com/articles/1469893/industry-insights-to-navigate-ai-chemical-invention-patents> (last visited Mar. 4, 2022).

<sup>30</sup> *Id.*

<sup>31</sup> *Thaler v. Hirshfeld*, No. 1:20-cv-903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393, (E.D. Va. Sep. 2, 2021).

properly credit the AI that assisted in the creation of the invention.<sup>32</sup> Additionally, this way, inventors felt as though they were not taking credit for an invention that they did not substantially participate in creating, as the artificial intelligence did the majority of the work.<sup>33</sup> However, this raised a number of issues regarding the patentability of those inventions as AI was listed as the inventor, which is showcased in the *Thaler* case.

### A Brief History of Patents in the United States

To discuss the patentability of inventions where AI is listed as the inventor, one must understand the patent process and system within the United States. The Constitution of the United States laid the foundation for the governance of patent law through the Intellectual Property Clause.<sup>34</sup> “Congress shall have power . . . to 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>35</sup> Although the Intellectual Property Clause established the initial framework for patent law within the United States, the Patent Act of 1790 (“the 1790 Act”) brought forth the U.S.’s first patent laws.<sup>36</sup> These laws sought to grant a patent term of up to fourteen years, thus promoting the progress of the useful arts for those inventions deemed adequately useful and important.<sup>37</sup>

However, the Patent Act of 1793 (“the 1793 Act”) replaced the 1790 Act several years later.<sup>38</sup> It was in this act that the definition of what constitutes patentable subject matter was introduced, a definition that primarily remains unchanged.<sup>39</sup> Patentable subject matter is defined by four primary categories:

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<sup>32</sup> THE ARTIFICIAL INVENTOR PROJECT [https://www.cipco.uzh.ch/dam/jcr:1a3a7015-02c8-4b38-954b-961ef12308d0/Pr%C3%A4sentation%20Abbott\\_CIPCO%20Online%20Workshop%2011.06.2021.pdf](https://www.cipco.uzh.ch/dam/jcr:1a3a7015-02c8-4b38-954b-961ef12308d0/Pr%C3%A4sentation%20Abbott_CIPCO%20Online%20Workshop%2011.06.2021.pdf) (last visited Feb. 13, 2022).

<sup>33</sup> *Id.*

<sup>34</sup> A Brief History of Patent Law in the United States (May 7, 2014), <https://perma.cc/C75E-Q466> (last visited Feb. 11, 2022).

<sup>35</sup> U.S. CONST. art. I, § 8.

<sup>36</sup> A Brief History of Patent Law in the United States (May 7, 2014), <https://perma.cc/C75E-Q466> (last visited Feb. 11, 2022).

<sup>37</sup> *Id.*

<sup>38</sup> *Id.*

<sup>39</sup> *Id.*

manufactures, compositions of matter, processes, and machines.<sup>40</sup> If one is seeking patent protection, the subject matter of that patent must fall into one of these four categories.<sup>41</sup> Patentable subject matter, however, does not include laws of nature, abstract ideas, or natural phenomena.<sup>42</sup> As a result, any invention that can be defined as one of those exceptions is not considered patentable subject matter, even if it falls into one of the four categories previously mentioned.<sup>43</sup> Within a patent application, the claim defines the subject matter that is patentable for which one is seeking protection.<sup>44</sup> Claims function to define and precisely describe what would be protected if the patent application were to be granted.<sup>45</sup> This is so that it is clear exactly what would be and would not be protected in regarding the subject matter that is patentable.<sup>46</sup>

Within the United States, the patent system currently dictates that an individual who discovers or creates an invention that is “new and useful” may obtain a patent for that invention.<sup>47</sup> However, three requirements must be satisfied for a patent to be granted.<sup>48</sup> A patentable invention must: (1) be novel, (2) have utility, and (3) be non-obvious.<sup>49</sup> Furthermore, all patent applications must contain a written description.<sup>50</sup> This written description supports the claim of the invention along with the process in which the invention is made.<sup>51</sup> It must contain terms that are specific, clear, and concise, along with any and all other additional specifications that are laid out within the written description requirement.<sup>52</sup>

Another important requirement for a patent application is that of inventorship. Inventors, in terms of a patent application, are “the individual or, if a joint invention, the individuals collectively who invented

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<sup>40</sup> 2106 PATENT SUBJECT MATTER ELIGIBILITY [R-10.2019], <https://perma.cc/BXT7-XTW2> (last visited Feb. 11, 2022).

<sup>41</sup> *Id.*

<sup>42</sup> *Id.*

<sup>43</sup> *Id.*

<sup>44</sup> 1824 THE CLAIMS [R-07.2015], <https://perma.cc/JS94-DQ3F> (last visited Feb. 11, 2022).

<sup>45</sup> *Id.*

<sup>46</sup> *Id.*

<sup>47</sup> 35 U.S.C.S. §§101-103 (2022).

<sup>48</sup> *Id.*

<sup>49</sup> *Id.*

<sup>50</sup> 35 U.S.C.S. § 112 (2022).

<sup>51</sup> *Id.*

<sup>52</sup> *Id.*

or discovered the subject matter of the invention.”<sup>53</sup> There are several requirements that inventors must meet before they can be listed as an inventor on a patent application.<sup>54</sup> One such requirement is that an inventor must “execute an oath or declaration directed to the application.”<sup>55</sup> Additionally, an inventor must contribute to the conception of the invention.<sup>56</sup> If an inventor does not contribute to the conception of the invention, they cannot be listed as the inventor of the invention. However, an inventor is not required to reduce the invention to practice.<sup>57</sup> In *Thaler v. Hirshfeld*, the primary issue was surrounding inventorship and whether or not artificial intelligence adequately satisfied the necessary requirements for inventorship, such as satisfying the oath or declaration portion of the inventorship requirement.<sup>58</sup>

Conception of an invention is the “complete performance of the mental part of the inventive act” and the “formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is to be applied in practice.”<sup>59</sup> Also, conception must be done in the mind of the inventor.<sup>60</sup>

Following conception, reduction to practice must occur before a patent can be obtained for an invention. Reduction to practice can be established through several different means.<sup>61</sup> For example, reduction to practice can be achieved through the actual reduction to practice, which is satisfied through a two-prong test, (1) the inventor constructed an embodiment or performed a process that met every element of the interface count, and (2) the embodiment or process operated for its intended purpose.<sup>62</sup> The other way that reduction to practice can occur is through a constructive reduction to practice, which occurs when

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<sup>53</sup> 35 U.S.C.S. § 100(f) (2022).

<sup>54</sup> INVENTORSHIP <https://www.uspto.gov/web/offices/pac/mpep/s2109.html> (last visited Feb. 12, 2022).

<sup>55</sup> *Id.*

<sup>56</sup> *Id.*

<sup>57</sup> *Id.*

<sup>58</sup> *Thaler v. Hirshfeld*, No. 1:20-cv-903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393,F (E.D. Va. Sep. 2, 2021).

<sup>59</sup> CONCEPTION <https://mpep.uspto.gov/RDMS/MPEP/e8r9#/e8r9/d0e207607.html> (last visited Feb. 13, 2022).

<sup>60</sup> *Id.*

<sup>61</sup> REDUCTION TO PRACTICE <https://mpep.uspto.gov/RDMS/MPEP/e8r9#/e8r9/d0e207753.html> (last visited Feb. 13, 2022).

<sup>62</sup> *Id.*

a patent application is filed on the claimed invention.<sup>63</sup> Conception and reduction to practice together are established at the point when an invention is made clear so that an individual who is skilled in that art can reduce that invention to practice without the exercise of undue experimentation.<sup>64</sup>

Listing AI as an inventor on a patent application within the United States presents a number of issues. 35 U.S.C. § 100(f) describes an inventor as an “individual.”<sup>65</sup> The court has interpreted this to mean a human being or a person.<sup>66</sup> This would indicate that an “individual” could not mean an artificial intelligence machine, system, or computer.<sup>67</sup> Therefore, an “individual” must be a natural person.<sup>68</sup> This creates patentability problems when it comes to listing AI as an inventor on a patent application. If artificial intelligence does not meet the statutory requirement of an individual, then AI cannot meet the necessary requirements to be a qualified inventor.

### **Applicable Case Law Prior to the *Thaler* Decision**

The *Thaler* decision provided the first insight from the United States court system into whether artificial intelligence could be listed as an inventor on a patent application.<sup>69</sup> As a result, it addressed a body of prior case law regarding the inventorship requirement and what qualifications must be met for an inventor to qualify to be listed as such on a patent application.<sup>70</sup> The following three cases contain qualifications regarding inventorship and who can be listed as an inventor on a patent application that are relevant to the court’s analysis in the *Thaler* case.

*Burroughs Welcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223 (Fed. Cir. 1994), addresses inventors and the inventorship requirement. In this case, the court stated that the primary standard by which

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<sup>63</sup> *Id.*

<sup>64</sup> CONCEPTION <https://mpep.uspto.gov/RDMS/MPEP/e8r9#/e8r9/d0e207607.html> (last visited Feb. 13, 2022).

<sup>65</sup> *Thaler v. Hirshfeld*, No. 1:20-cv-903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393, at \*17 (E.D. Va. Sep. 2, 2021).

<sup>66</sup> *Id.*

<sup>67</sup> *Id.*

<sup>68</sup> *Id.*

<sup>69</sup> *Thaler v. Hirshfeld*, No. 1:20-cv-903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393, at \*2 (E.D. Va. Sep. 2, 2021).

<sup>70</sup> *Id.*

inventorship is recognized is that of conception, or the completion of the “mental part” of the inventive process.<sup>71</sup> The process of conception is the formation within the inventor’s mind, otherwise known as the definite and permanent idea of the operative and complete invention, to be applied in practice.<sup>72</sup> Therefore, according to *Burroughs*, the test for conception is whether an inventor (1) had an idea that was (2) definite and permanent enough that (3) one skilled in the art could understand the invention.<sup>73</sup> Additionally, conception must be supported by corroborating evidence.<sup>74</sup> The court also stated that unless a person contributes to the conception of the invention, that person is not an inventor.<sup>75</sup> Ultimately, this case demonstrates the concept of conception and how it relates to the inventorship requirement.

*Beech Aircraft Corp. v. Edo Corp.*, 990 F.2d 1237 (Fed. Cir. 1993), also addresses inventors and the inventorship requirement. In this case, an employee of an aircraft company filed a series of patent applications, and in these applications, the employee designated the corporation as the inventors of the inventions claimed in the patent applications.<sup>76</sup> The Federal Circuit held that a corporation cannot be declared an inventor.<sup>77</sup> This is because only natural persons can be declared inventors and a corporation is merely a corporate assignee.<sup>78</sup> An individual must be a natural person and a natural person is not a corporation or sovereign.<sup>79</sup> This case furthered the court’s interpretation of the language in the Patent Act indicating that an “individual” refers to a natural person, which in this instance cannot refer to a corporation.

*University of Utah v. Max-Planck-Gesellschaft Zur Forderung der Wissenschaften* 734 F.3d 1315 (Fed. Cir. 2013), also addresses inventors and the inventorship requirement.<sup>80</sup> In this case, state universities were involved on both sides of an inventorship dispute for a particular invention and its accompanying

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<sup>71</sup> *Burroughs Welcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223, 1227 (Fed. Cir. 1994).

<sup>72</sup> *Id.* at 1288.

<sup>73</sup> *Id.*

<sup>74</sup> *Id.*

<sup>75</sup> *Id.*

<sup>76</sup> *Beech Aircraft Corp. v. Edo Corp.*, 990 F.2d 1237 (Fed. Cir. 1993).

<sup>77</sup> *Id.*

<sup>78</sup> *Id.*

<sup>79</sup> *Id.*

<sup>80</sup> *Univ. of Utah v. Max-Planck-Gesellschaft zur Forderung der Wissenschaften E.V.*, 734 F.3d 1315 (Fed. Cir. 2013).

patent.<sup>81</sup> The court held that state governments could not be listed as inventors and that they had no sovereign interest in inventorship.<sup>82</sup> The primary reasoning behind the lack of interest of a state government in inventorship was that the inventor of a patentable invention is the individual who discovered or invented the subject matter of the invention.<sup>83</sup> Therefore, as a state government is not an individual, they have no interest and therefore cannot be listed as an inventor for a patentable invention.<sup>84</sup> In this case, the court again referred back to and emphasized the concept of conception and highlighted the importance of the individual listed as the inventor on a patent application conceiving the idea for the invention.<sup>85</sup> This case also furthers the court's interpretation of the language in the Patent Act indicating that an "individual" refers to a natural person, which in this instance cannot refer to a state government.

### **Arguments for AI Inventorship and How This Issue Has Been Addressed Elsewhere**

#### **Why Should AI be Listed as an Inventor on a Patent Application?**

Many arguments have been made regarding why artificial intelligence should be able to be listed as an inventor on a patent application and why patent protection for AI-generated inventions should be recognized. The primary argument as to why artificial intelligence should be listed as an inventor for inventions where AI either created or substantially participated in the creation of the invention is that it will protect the rights of human inventors.<sup>86</sup> It has been argued that allowing an individual to be listed as an inventor for an invention that was generated by artificial intelligence would allow that individual to take credit for work that they truly did not complete, therefore devaluing the inventorship of humans.<sup>87</sup> Allowing humans to take credit for AI-generated inventions would put someone who uses AI to solve a problem in

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<sup>81</sup> *Id.*

<sup>82</sup> *Id.*

<sup>83</sup> *Id.*

<sup>84</sup> *Id.*

<sup>85</sup> *Id.*

<sup>86</sup>THE ARTIFICIAL INVENTOR PROJECT [https://www.cipco.uzh.ch/dam/jcr:1a3a7015-02c8-4b38-954b-961ef12308d0/Pr%C3%A4sentation%20Abbott\\_CIPCO%20Online%20Workshop%2011.06.2021.pdf](https://www.cipco.uzh.ch/dam/jcr:1a3a7015-02c8-4b38-954b-961ef12308d0/Pr%C3%A4sentation%20Abbott_CIPCO%20Online%20Workshop%2011.06.2021.pdf) (last visited Feb. 13, 2022).

<sup>87</sup> *Id.*

an equal position with someone who legitimately took the time to solve a problem and invent something new.<sup>88</sup>

Additionally, some inventors would like to credit the AI for the work that it did in the creation of the invention, even though it has no real interest in receiving any type of recognition or acknowledgment.<sup>89</sup> Some inventors also argue that in not allowing AI-created inventions to list artificial intelligence as an inventor, innovation will be stifled.<sup>90</sup> This is because they fear that in preventing AI inventorship, individuals may be unable to use artificial intelligence to invent, thus delaying or stifling innovation and the creation of new inventions.<sup>91</sup>

However, these arguments do not suggest that the artificial intelligence should then have the right to own the patent, just that AI should be listed as the inventor of that invention that the artificial intelligence created.<sup>92</sup> Additionally, the inventor of a patent is not necessarily the individual who owns the invention. They can be the same person and sometimes are, however, they do not have to be. Therefore, AI could be listed as the inventor without having the right to own the patent. The argument that listing AI as an inventor on a patent application, would devalue human inventorship is the primary reasoning as to why many individuals believe that AI should be able to be listed as an inventor on a patent application.<sup>93</sup>

#### How Have Other Countries Handled the Patentability of Inventions With AI Listed as an Inventor?

The question then becomes, have any countries around the world agreed with this argument that AI should be listed as the inventor on a patent application and issued a patent that lists artificial intelligence as the inventor? Yes, in July of 2021, the patent office in South Africa issued a patent that listed AI as the

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<sup>88</sup> *Id.*

<sup>89</sup> *Id.*

<sup>90</sup> *Id.*

<sup>91</sup> *Id.*

<sup>92</sup> *Id.*

<sup>93</sup> *Id.*

inventor.<sup>94</sup> This patent is owned by Stephen Thaler, the individual who initially filed the patent applications at issue in *Thaler*.<sup>95</sup> Thaler also filed patent applications in the European Patent Office (“EPO”), the United Kingdom Intellectual Property Office (“UKIPO”), and Intellectual Property Australia.<sup>96</sup> Initially, all of these offices denied Thaler’s patent application.<sup>97</sup> Upon appeal, both the EPO and UKIPO’s decisions were upheld, with the appeals board for each office asserting that only humans can be listed as inventors on their patents.<sup>98</sup> In the United Kingdom, a judge ruling on the patentability of AI generated inventions stated that, in relation to Thaler’s artificial intelligence DABUS, it “cannot even hold property, let alone transfer it.”<sup>99</sup>

The EPO stated that on patent applications, only humans can be listed as inventors.<sup>100</sup> Additionally, the EPO clarified that this decision indicated that, at the EPO, AI-generated inventions are unpatentable.<sup>101</sup> Additionally, in an attempt to circumvent this problem so that AI-generated inventions could be patentable at the EPO, Thaler asked the EPO that the inventor section be left blank as a machine cannot transfer patent rights.<sup>102</sup> However, the EPO denied this request as well, sustaining their previous decision that only a human can be listed as an inventor on their patent applications.<sup>103</sup>

However, Thaler won an appeal in the Federal Court of Australia, where the court stated that artificial intelligence can be listed as an inventor under Australia’s patent law.<sup>104</sup> This is because the term

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<sup>94</sup> A FIRST: AI SYSTEM NAMED INVENTOR, <https://spectrum.ieee.org/first-time-ai-named-inventor> (last visited Feb. 13, 2022).

<sup>95</sup> *Thaler v. Hirshfeld, No. 1:20-cv-903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393, at \*2 (E.D. Va. Sep. 2, 2021)*.

<sup>96</sup> A FIRST: AI SYSTEM NAMED INVENTOR, <https://spectrum.ieee.org/first-time-ai-named-inventor> (last visited Feb. 13, 2022).

<sup>97</sup> *Id.*

<sup>98</sup> *Id.*

<sup>99</sup> Andrew Karpan, *2 Wins for AI-Made Inventions May Be Just The Beginning* (Aug. 5, 2021)

<https://www.law360.com/articles/1410414/2-wins-for-ai-made-inventions-may-be-just-the-beginning> (last visited Mar. 4, 2022).

<sup>100</sup> Dani Kass, *EPO Appeal Board Affirms Only Humans Can Be Inventors* (Dec. 21, 2021)

<https://www.law360.com/articles/1450922/epo-appeal-board-affirms-only-humans-can-be-inventors> (last visited Mar. 4, 2022).

<sup>101</sup> *Id.*

<sup>102</sup> *Id.*

<sup>103</sup> *Id.*

<sup>104</sup> A ROSE BY ANY OTHER NAME: AN AUSTRALIAN COURT RULES THAT AI CAN BE AN INVENTOR,

<https://www.jdsupra.com/legalnews/a-rose-by-any-other-name-an-australian-2006467/#:~:text=November%202021-,A%20Rose%20by%20Any%20Other%20Name%3A%20an%20>

“inventor” is not defined within the statute, and as a result, that requirement is not limited to humans and therefore could potentially include AI.<sup>105</sup> Essentially, in this ruling, the court said that there was no reason why Thaler could not protect inventions listing artificial intelligence as the sole inventor under the patent system in Australia.<sup>106</sup> Additionally, the court in Australia indicated that AI-generated inventions have great value to society as a whole, and that they have a wide variety of applications.<sup>107</sup> However, this decision from Australia did receive some criticism as the court did not address many of the ownership issues that would result from an AI-generated invention, as there is nothing within Australian patent law indicating that AI can own anything or assign ownership to someone or something else.<sup>108</sup> Therefore, it is likely that this issue will likely receive additional attention in Australia moving forward.<sup>109</sup>

Thus far, South Africa remains the only country to have issued a patent where AI is listed as the inventor, and the possibility of such a patent being issued remains an option in Australia, although a patent where artificial intelligence is listed as the inventor has not yet been issued in Australia.<sup>110</sup> However, the vast majority of countries have strongly opposed the concept of permitting artificial intelligence to be listed as an inventor on a patent application.<sup>111</sup> In the United States, this opposition is best summarized in the *Thaler* case.

***Thaler v. Hirshfeld:***

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[0Australian%20court%20rules,AI%20can%20be%20an%20inventor&text=On%2030%20July%202021%2C%20the.inventor%20under%20Australian%20patent%20laws](#). (last visited Feb. 13, 2022).

<sup>105</sup> *Id.*

<sup>106</sup> Andrew Karpan, *2 Wins for AI-Made Inventions May Be Just The Beginning* (Aug. 5, 2021) <https://www.law360.com/articles/1410414/2-wins-for-ai-made-inventions-may-be-just-the-beginning> (last visited Mar. 4, 2022).

<sup>107</sup> *Id.*

<sup>108</sup> *Id.*

<sup>109</sup> *Id.*

<sup>110</sup> A ROSE BY ANY OTHER NAME: AN AUSTRALIAN COURT RULES THAT AI CAN BE AN INVENTOR, <https://www.jdsupra.com/legalnews/a-rose-by-any-other-name-an-australian-2006467/#:~:text=November%2023%2C%202021-,A%20Rose%20by%20Any%20Other%20Name%3A%20an%20Australian%20court%20rules,AI%20can%20be%20an%20inventor&text=On%2030%20July%202021%2C%20the.inventor%20under%20Australian%20patent%20laws>. (last visited Feb. 13, 2022).

<sup>111</sup> *Id.*

On July 29, 2019, Stephen Thaler filed two patent applications with the USPTO.<sup>112</sup> In order to fulfill the oath or declaration requirement for inventors under the Patent Act, Stephen Thaler included a substitute statement on behalf of DABUS.<sup>113</sup> In this statement, Thaler explained that although DABUS was the sole inventor of the invention claimed on the patent application, it was incapable of executing the usual oath or declaration required for inventorship.<sup>114</sup> The USPTO ultimately did not accept this substitute statement and, as a result, refused to process the applications.<sup>115</sup> This is because Thaler had listed his artificial intelligence machine DABUS as the inventor on the patent applications.<sup>116</sup>

Thaler then brought his complaint against Andrew Hirshfeld and the USPTO.<sup>117</sup> Hirshfeld was named as the defendant in this case because he was serving as the Commissioner for Patents for the USPTO at the time of the *Thaler* case, and the Commissioner is often named as the defendant in patent appeal cases as they manage and lead all aspects of patent operation and examination at the USPTO. In this complaint Thaler alleged that a refusal to process his applications was “arbitrary” and “an abuse of discretion.”<sup>118</sup> Not only did Thaler ask that his patent applications be reinstated and the previous decision regarding his applications vacated, but Thaler also sought a declaration that patent applications for an invention generated by AI not be rejected since no natural person was listed as an inventor.<sup>119</sup> Additionally, Thaler requested a declaration that on patent applications, an AI-generated invention should list artificial intelligence as the inventor when AI has met the necessary criteria for inventorship.<sup>120</sup>

The primary argument presented on behalf of Andrew Hirshfeld and the USPTO was that it interpreted the various applicable provisions of the Patent Act in a way consistent with the statutory

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<sup>112</sup> *Thaler v. Hirshfeld*, No. 1:20-cv-903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393, at \*2 (E.D. Va. Sep. 2, 2021).

<sup>113</sup> *Id.* at 4.

<sup>114</sup> *Id.*

<sup>115</sup> *Id.* at 2.

<sup>116</sup> *Id.* at 4.

<sup>117</sup> *Id.* at 2.

<sup>118</sup> *Id.*

<sup>119</sup> *Id.*

<sup>120</sup> *Id.*

language that was present and past interpretations of this language.<sup>121</sup> Thaler, on the other hand, presented the argument that because the USPTO did not consider alternative interpretations or provide any evidence that the statutes and their interpretations intended to exclude AI from inventorship, AI that meets the appropriate criteria should be listed as an inventor.<sup>122</sup>

Ultimately, the court rejected Thaler's argument, stating that the USPTO and Hirshfeld's interpretation of the statute(s) was consistent both with the language that is present in the Patent Act, as well as prior case law.<sup>123</sup> The court then turned to answer the primary question of this case, whether the construction of the statute requires an inventor to be a human being.<sup>124</sup> The court conducted an analysis of the statutory construction of this particular statute regarding who may be classed as an inventor, specifically closing in on the word "individual."<sup>125</sup>

The overall conclusion of the court, following this analysis was that Congress, in creating the Patent Act, selected the word "individual" specifically with the intent that it meant a natural person.<sup>126</sup> Therefore, an inventor must be a natural person.<sup>127</sup> This conclusion is additionally supported by and consistent with the current holdings of the Federal Circuit, as under current patent law, inventors must be classified as natural persons.<sup>128</sup> Additionally, the court noted that ordinarily, artificial intelligence systems or machines are not normally referred to as "individuals."<sup>129</sup>

The court ultimately stated that artificial intelligence cannot be listed as an inventor on a patent application and instead pointed to Congress for a change to be made indicating otherwise, thus expanding

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<sup>121</sup> *Id.* at 11.

<sup>122</sup> *Id.* at 12.

<sup>123</sup> *Id.*

<sup>124</sup> *Id.* at 13.

<sup>125</sup> *Id.* at 13-17.

<sup>126</sup> *Id.* at 18.

<sup>127</sup> *Id.*

<sup>128</sup> *Id.* at 19.

<sup>129</sup> Adam Lidgett, *USPTO Tells Fed. Circ. Only Humans Can Be Inventors*, LAW360 (Feb. 4, 2022)

<https://www.law360.com/articles/1461934/uspto-tells-fed-circ-only-humans-can-be-inventors> (last visited Mar. 4, 2022).

the scope of patent law.<sup>130</sup> This is because it is not the job of the court to overcome the plain language of a statute for a policy concern, that is a matter to be handled by Congress.<sup>131</sup> Finally, the court stated that if an “individual” was meant to include artificial intelligence, therefore allowing AI to satisfy the inventorship requirement of a patent application, that Congress would have selected a different word when constructing the statutory language of the Patent Act.<sup>132</sup> As a result, the court ultimately upheld the USPTO’s decision to refuse to process Thaler’s patent applications listing DABUS as the inventor.<sup>133</sup>

**How Has/Will the *Thaler* Decision Impact the Patenting of Inventions Where AI Played a Part in the Invention’s Conception and Reduction to Practice?**

Ultimately, the decision reached by the court in *Thaler* has had and will continue to have quite an impact on the patentability of inventions where AI played a substantial role in the conception and reduction to practice of these inventions. This is because the *Thaler* case, for the first time, officially established that in terms of inventions where artificial intelligence is listed as the inventor, the invention is not patentable.<sup>134</sup> Therefore, the decision is bound to have an effect on all inventions involving AI, as it is setting a new precedent that will affect the patentability of inventions created by artificial intelligence for the foreseeable future, unless a change occurs and patent protection is broadened through new legislature. This impact brings forth several issues and concerns about the future and patentability of AI-generated inventions. It also leaves many remaining questions that have yet to be answered regarding the future and patentability of inventions created by artificial intelligence. Finally, those involved in the creation of AI-generated inventions and those involved in the intellectual property sphere more generally have presented a series of

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<sup>130</sup>Thaler v. Hirshfeld, No. 1:20-cv-903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393, at \* 23 & 25 (E.D. Va. Sep. 2, 2021).

<sup>131</sup> *Id.* at 23.

<sup>132</sup> *Id.* at 25.

<sup>133</sup> *Id.* at 26.

<sup>134</sup> Thaler v. Hirshfeld, No. 1:20-cv-903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393, (E.D. Va. Sep. 2, 2021).

solutions that will help to solve many of the issues and concerns brought forth by the *Thaler* decision as well as answer several of the unanswered questions resulting from *Thaler*.

#### Issues and Concerns Following the *Thaler* Decision

Given that the *Thaler* decision provided the first insight from the court into the patentability of AI-generated inventions and whether or not AI can be named as an inventor for inventions created by artificial intelligence, this decision will impact the patentability of AI-generated inventions. The court's ruling in this case, stating that artificial intelligence cannot be considered and listed as an inventor, has several implications that usher in issues and concerns with this decision. The *Thaler* decision brings forth several primary issues and concerns regarding the patentability of AI-generated inventions, concerns regarding the honesty of future patent applicants, concerns regarding the impact that this decision will have on innovation, and concerns regarding a shift to relying on trade secrets for protection of AI-generated inventions.

#### *Concerns Regarding the Patentability of AI-Generated Inventions*

The first primary concern regarding the impact of the *Thaler* decision as it relates to AI-generated inventions is obviously that of patentability. AI-generated inventions are currently not patentable with AI listed as the inventor on the patent application.<sup>135</sup> As a result, this makes it much more difficult for inventions where AI participated in the conception and reduction to practice to be patented. The primary concern is that the *Thaler* decision will lead to AI-generated inventions being excluded from patentability altogether in the United States, as was the case with the EPO.<sup>136</sup> If this entire class of inventions, those generated by artificial intelligence, are excluded from patentability, this would greatly undermine the patent

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<sup>135</sup> *Id.*

<sup>136</sup> Dani Kass, *EPO Appeal Board Affirms Only Humans Can Be Inventors* (Dec. 21, 2021) <https://www.law360.com/articles/1450922/epo-appeal-board-affirms-only-humans-can-be-inventors> (last visited Mar. 4, 2022).

system itself and be incredibly detrimental in a wide variety of areas.<sup>137</sup> In the patent world, both in the United States and across the globe, it would create a plethora of problems regarding patentability if only certain jurisdictions were able to grant patents for AI-generated inventions.<sup>138</sup> As a result, although the patentability of inventions created by artificial intelligence is currently in question and up in the air due to the *Thaler* decision, it is likely that this will lead to eventual changes both in the United States and across the world in an effort to help standardize this system and determine if AI-generated inventions truly are patentable.<sup>139</sup> Ultimately, the *Thaler* case brings the patentability generally of inventions where AI played a role in the invention's conception and reduction to practice into question. Additional cases will need to be decided or additional legislation will need to be passed in order to determine which side of the spectrum the USPTO and the United States as a whole will fall on in regard to the patentability of AI-generated inventions.

#### *Concerns Regarding Patent Applicant Honesty*

Another primary concern regarding the impact of the *Thaler* decision, specifically as it relates to other inventions where AI played a substantial role in the conception and reduction to practice of the invention is that this will encourage patent applicants to be dishonest when filing patent applications. Since the *Thaler* case has indicated that within the United States, artificial intelligence cannot be listed as the inventor on a patent application, some patent applicants may simply choose not to disclose the role or involvement of AI in the invention.<sup>140</sup> Instead, some patent applicants may simply choose to list themselves

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<sup>137</sup> Adam Lidgett, *Innovation At Risk If AI Can't Be An Inventor*, *Fed. Circ. Told* (Dec. 9, 2021) <https://www.law360.com/articles/1447377/innovation-at-risk-if-ai-can-t-be-an-inventor-fed-circ-told> (last visited Mar. 4, 2022).

<sup>138</sup> Andrew Karpan, *2 Wins for AI-Made Inventions May Be Just The Beginning* (Aug. 5, 2021) <https://www.law360.com/articles/1410414/2-wins-for-ai-made-inventions-may-be-just-the-beginning> (last visited Mar. 4, 2022).

<sup>139</sup> *Id.*

<sup>140</sup> Enrico Bonadio et. al, *Artificial Intelligence as Inventor: Exploring the Consequences for Patent Law*, 1 *Intell. Prop. Q.* (2021) <https://deliverypdf.ssrn.com/delivery.php?ID=54009810411912201501108609407201807802008504108503906810108709708111602011106408011204512403803111001000309709611200611408406711901102806603209706601>

as the inventor of that invention, not including the role that artificial intelligence played in the invention's conception and reduction to practice.<sup>141</sup> Patent applicants may elect to do this out of fear that their applications would be challenged if they disclosed the involvement of AI in the invention's conception and reduction to practice.<sup>142</sup> So, to avoid being challenged or the invention being declared not patentable, some patent applicants may just not disclose this crucial information about the creation of the invention.<sup>143</sup> This obviously could cause a slew of problems as it would be allowing individuals to take credit for work that they did not literally accomplish themselves as in the case of AI-generated inventions, the artificial intelligence does much of the work analyzing data, etc. Furthermore, if inventions created by artificial intelligence are determined to not be patentable in the United States, as was the case in Europe with the decision made by the EPO, this would potentially allow patents to be granted for inventions that are not patentable.<sup>144</sup> As a result, this could compel patent applications to be dishonest, which is a concern that could lead to a variety of other issues and problems.

#### *Concerns Regarding the Impact of the Thaler Decision on Innovation*

Another one of the primary concerns regarding the impact of the *Thaler* decision is that it will stifle innovation. This is because many individuals across the globe firmly believe that AI-generated inventions are vital to promoting innovation.<sup>145</sup> As a result, there is a fear among those involved with artificial intelligence that preventing AI from being listed as an inventor for an AI-generated invention will lead to a decrease in the patentability of these inventions and, as a result, a stifling of innovation.<sup>146</sup> Artificial intelligence is far more efficient than humans when it comes to researching and generating new materials

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<sup>141</sup> *Id.*

<sup>142</sup> *Id.*

<sup>143</sup> *Id.*

<sup>144</sup> Dani Kass, *EPO Appeal Board Affirms Only Humans Can Be Inventors* (Dec. 21, 2021)

<https://www.law360.com/articles/1450922/epo-appeal-board-affirms-only-humans-can-be-inventors> (last visited Mar. 4, 2022).

<sup>145</sup> *Id.*

<sup>146</sup> *Id.*

and innovations.<sup>147</sup> For example, it takes an average of fifteen to twenty years for a human team of scientists to come up with new material, whereas AI and machine learning can decrease that timeframe down to two to five years on average.<sup>148</sup> As a result, artificial intelligence can drastically decrease the timeframe in which innovation can occur. This is the primary reasoning behind why many inventors and individuals involved with artificial intelligence and AI-generated inventions fear that the *Thaler* decision will negatively impact innovation by leading to an overall decrease in innovation. Additionally, some have argued that allowing AI to be considered an inventor will incentivize the development of artificial intelligence for the purpose of creating new inventions and that because *Thaler* prohibits AI from being listed as an inventor, that this will stifle innovation.<sup>149</sup> Additionally, if AI-generated inventions are not considered to be patentable or if it is more difficult to patent inventions created by artificial intelligence, this could lead inventors to see other alternative methods of protection, such as trade secrets. This too could lead to a stifling of innovation.

#### *Concerns Regarding a Shift to Relying on Trade Secret Protection*

The final concern regarding the impact of the *Thaler* decision is that it will lead to patent applications instead seeking other methods of protection if AI-generated inventions are less likely to be considered patentable. One such alternative method that inventors could turn to would be trade secret protection.<sup>150</sup> In relying on trade secret protection, instead of applying for a patent, individuals responsible for AI-generated inventions may instead choose to keep the invention secret and skip the patent process

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<sup>147</sup> David Rotman, *AI is reinventing the way we invent* (Feb. 15, 2019) <https://www.technologyreview.com/2019/02/15/137023/ai-is-reinventing-the-way-we-invent/> (last visited Mar. 4, 2022).

<sup>148</sup> *Id.*

<sup>149</sup> Adam Lidgett, *Innovation At Risk If AI Can't Be An Inventor, Fed. Circ. Told* (Dec. 9, 2021) <https://www.law360.com/articles/1447377/innovation-at-risk-if-ai-can-t-be-an-inventor-fed-circ-told> (last visited Mar. 4, 2022).

<sup>150</sup> Enrico Bonadio et. al, *Artificial Intelligence as Inventor: Exploring the Consequences for Patent Law*, 1 *Intell. Prop. Q.* (2021) <https://deliverypdf.ssrn.com/delivery.php?ID=540098104119122015011086094072018078020085041085039068101087097081116020111064080112045124038031110010003097096112006114084067119011028066032097066014111090109002015005018079009082002082080015110118083081126114071101088071013007103076002070106075020072&EXT=pdf&INDEX=TRUE> (last visited Mar. 4, 2022).

entirely. This would avoid any potential issues that could arise with attempting to patent an AI-generated invention and the patentability issues that may occur as a result; however, doing so would circumvent the benefits of the patent process and system.<sup>151</sup>

The patent process and system in the United States is laid out in such a way that both the inventor and general public are able to benefit from an invention's disclosure and commercialization.<sup>152</sup> This is because an inventor is able to reap the benefits of their hard work in creating something new and innovative as they are able to market and license the invention without having to worry about another inventor "stealing" their work and attempting to profit off of it. Additionally, the general public is able to benefit from the invention itself as well as the general progress and improvements to the daily quality of life that occur with every innovation. However, instead of relying on trade secret protection and not pursuing a patent for inventions created by artificial intelligence, inventors are circumventing this process, which would also stifle innovation.

#### Questions Yet To Be Answered Following the *Thaler* Decision

In *Thaler*, the court primarily focused on whether artificial intelligence could be listed as an inventor on a patent application, concluding that an inventor must be a natural person and therefore that AI could not be classified as an inventor.<sup>153</sup> However, it is likely that this discussion has not ended and that additional cases, and possibly legislation will follow the *Thaler* case.<sup>154</sup> This is because *Thaler* has many conflicting decisions in various countries around the world.<sup>155</sup> Until the decisions from South Africa and Australia, every country that had considered patent applications where AI was listed as the inventor had

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<sup>151</sup> *Id.*

<sup>152</sup> *Id.*

<sup>153</sup> *Id.*

<sup>154</sup> Bonnie Eslinger, *What to Watch in 2022: The Biggest IP Cases Coming Up* (Jan. 1, 2022) <https://www.law360.com/articles/1448326/what-to-watch-in-2022-the-biggest-ip-cases-coming-up> (last visited Mar. 4, 2022).

<sup>155</sup> *Id.*

rejected those applications.<sup>156</sup> However, these decisions stating that AI can be listed as an inventor indicates that other countries, including the United States, may and likely will reevaluate this issue moving forward.<sup>157</sup> Furthermore, the *Thaler* decision leaves a variety of questions about the patentability of AI-generated inventions unanswered.<sup>158</sup> For example, can inventions created by artificial intelligence receive patent protection at all? If AI cannot be listed as the inventor of a particular invention where it substantially or wholly participated in the conception and reduction to practice, who can be? If an individual, meaning a natural person, is to be listed as the inventor of an AI-generated invention, how is that individual selected? Who should that individual be? The *Thaler* case is an important first step in determining the patentability of AI-generated inventions, however, additional decisions and/or legislation are necessary in order to answer many of the questions that remain following the *Thaler* decision.

#### *Can AI-Generated Inventions Receive Any Patent Protection?*

This issue, of the patentability of inventions created by artificial intelligence, and therefore the court's ruling in *Thaler* is of great importance. This is because it leaves a crucial question largely unanswered: can inventions that are made by artificial intelligence receive patent protections in the United States?<sup>159</sup> The court does provide insight into AI inventorship, clearly ruling that artificial intelligence does not qualify as an inventor.<sup>160</sup> However, it does not provide insight into what patent protections, if any, AI generated inventions are able to receive.<sup>161</sup> As time passes, artificial intelligence continues to not only improve in its abilities and functionality, but it also continues to become more widely and frequently used

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<sup>156</sup> Adam Lidgett, *USPTO Tells Fed. Circ. Only Humans Can Be Inventors*, LAW360 (Feb. 4, 2022) <https://www.law360.com/articles/1461934/uspto-tells-fed-circ-only-humans-can-be-inventors> (last visited Mar. 4, 2022).

<sup>157</sup> *Id.*

<sup>158</sup> Bonnie Eslinger, *What to Watch in 2022: The Biggest IP Cases Coming Up* (Jan. 1, 2022) <https://www.law360.com/articles/1448326/what-to-watch-in-2022-the-biggest-ip-cases-coming-up> (last visited Mar. 4, 2022).

<sup>159</sup> Adam Lidgett, *Innovation At Risk If AI Can't Be An Inventor, Fed. Circ. Told* (Dec. 9, 2021) <https://www.law360.com/articles/1447377/innovation-at-risk-if-ai-can-t-be-an-inventor-fed-circ-told> (last visited Mar. 4, 2022).

<sup>160</sup> *Id.*

<sup>161</sup> *Id.*

and implemented in a wide variety of situations and contexts.<sup>162</sup> As a result, inventors and other individuals looking to make and utilize artificial intelligence will be seeking protection and licensure of AI systems and software in order to implement them in various situations and contexts. In this context, patent protection would likely be the most beneficial avenue for protection of artificial intelligence and inventions created by artificial intelligence, because of this, the question of whether or not inventions generated by AI can receive patent protection will need to be answered. Therefore, this issue regarding patent protection of inventions where AI played a role in the creation of the invention is important and will continue to become increasingly important with the increased adoption of and improvements in the ability of artificial intelligence.<sup>163</sup>

*If AI Cannot be Listed as the Inventor, Then Who Can be Listed as the Inventor in AI-generated Inventions?*

Another question that is left unanswered by the *Thaler* decision is if AI cannot be recognized as an inventor of an invention where it played a substantial or the primary role in the conception and reduction to practice of the invention, then who can be named as the inventor of an invention created by artificial intelligence?<sup>164</sup> In the USPTO's initial evaluation of Thaler's patent application where DABUS was rejected as the inventor, the USPTO did not determine who or what actually created the invention at issue and therefore who the true inventor was.<sup>165</sup> The only determination made was that DABUS could not be listed as the inventor.<sup>166</sup> Therefore, this would seem to indicate that an individual could list themselves as the inventor and take credit for an invention generated by AI, and this has happened previously.<sup>167</sup> For example,

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<sup>162</sup> *Id.*

<sup>163</sup> *Id.*

<sup>164</sup> Susan Krumplitsch Et. Al., *AI Inventorship Decision Leaves Open Questions* (Sept. 17, 2021) <https://www.law360.com/articles/1422790/ai-inventorship-decision-leaves-open-questions> (last visited Mar. 4, 2022).

<sup>165</sup> *Id.*

<sup>166</sup> *Id.*

<sup>167</sup> *Id.*

U.S. Patent No.6,847,851, which belongs to John Koza, has Koza himself listed as the inventor on the issued patent.<sup>168</sup> However, his “invention machine” which utilizes artificial intelligence, was allegedly responsible for inventing the subject matter of the patent.<sup>169</sup> However, this information was not disclosed to the USPTO through the patent application process.<sup>170</sup> As a result, it appears that if AI cannot be listed as the inventor of a particular invention, an individual can take credit for the creation of an invention that was actually generated by AI.

Additionally, a lack of a universally recognized definition of AI itself creates a series of questions and problems regarding who can be listed as the inventor of a particular invention if not AI.<sup>171</sup> Specifically, if an individual should be listed as the inventor in place of the AI itself, which individual should be considered the inventor? All artificial intelligence systems are not equal, with some able to perform and achieve more complex tasks than others.<sup>172</sup> Some AI systems can only perform tasks that are well-defined whereas others have the capability to learn and perform tasks much like the human mind.<sup>173</sup> Ultimately, all AI systems require varying levels of human input, training, and development. Therefore, with so many individuals involved in the creation of the artificial intelligence itself, who would be considered the proper inventor of the AI-generated invention? The courts and the USPTO have not yet addressed this question, and it is likely that it will need to be addressed moving forward.

#### Potential Solutions to the Patentability Issues Resulting From the *Thaler* Decision

Given that the *Thaler* decision states that AI cannot be listed as the inventor on patent applications within the US, this leads to potential problems surrounding the patentability of AI-generated inventions.

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<sup>168</sup> U.S. Patent No. 6,847,851B1 (issued Jan. 25, 2005).

<sup>169</sup> Susan Krumplitsch Et. Al., *AI Inventorship Decision Leaves Open Questions* (Sept. 17, 2021) <https://www.law360.com/articles/1422790/ai-inventorship-decision-leaves-open-questions> (last visited Mar. 4, 2022).

<sup>170</sup> *Id.*

<sup>171</sup> *Id.*

<sup>172</sup> *Id.*

<sup>173</sup> *Id.*

These problems could be dealt through several different methods, with either a clarifying or distinguishing decision from the court or a change resulting from new legislature as the court was calling for in *Thaler*. Ultimately, in *Thaler*, the court held that a change allowing for AI-generated inventions to be patentable and for AI to be listed as the inventor would need to come from Congress.<sup>174</sup> The court stated that a change would need to be made to the statutory language in the Patent Act specifically referencing AI in regards to inventorship, and that such a change would be up to Congress.<sup>175</sup> A policy change that would likely result from new legislation is what some in the intellectual property (“IP”) community are calling for to help promote positive change and preserve patentability of AI-generated inventions.<sup>176</sup>

One such example of a solution to promote positive change, preserve the patentability of AI-generated inventions, and allow for AI inventorship was suggested by the International Association for the Protection of Intellectual Property (“AIPPI”).<sup>177</sup> The AIPPI presented an alternative solution to counter the *Thaler* case and the problems it presents relating to patentability of AI-generated inventions.<sup>178</sup> This counter to the court’s decision in *Thaler* presented by the AIPPI stated that AI could be listed as an inventor for AI-generated inventions, however, a human should also be listed as a co-inventor.<sup>179</sup> This solution placed a single caveat on the human that would be eligible to be listed as co-inventor, the human listed must have made an intellectual contribution to the inventive concept.<sup>180</sup> This would prevent AI from being named the sole inventor of the patented invention, thus eliminating many of the problems surrounding assigning ownership to artificial intelligence, and fixing any patentability issues surrounding AI-generated inventions.<sup>181</sup> A human would be listed as co-inventor, and as a result, that human would be able to maintain

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<sup>174</sup> *Thaler v. Hirshfeld*, No. 1:20-cv-903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393, (E.D. Va. Sep. 2, 2021).

<sup>175</sup> *Id.*

<sup>176</sup> Andrew Karpan, *2 Wins for AI-Made Inventions May Be Just The Beginning* (Aug. 5, 2021)

<https://www.law360.com/articles/1410414/2-wins-for-ai-made-inventions-may-be-just-the-beginning> (last visited Mar. 4, 2022).

<sup>177</sup> *Id.*

<sup>178</sup> *Id.*

<sup>179</sup> *Id.*

<sup>180</sup> *Id.*

<sup>181</sup> *Id.*

ownership or transfer ownership of the patent itself, all while giving the AI credit for the invention that it generated.<sup>182</sup>

Ultimately, it is likely that this issue has not been fully resolved. The *Thaler* decision will likely make it more difficult for AI-generated inventions to be deemed patentable, given that other countries have presented avenues for the patentability of AI-generated inventions.<sup>183</sup> However, this will likely lead to a change, either legislative or from the court system, being made in the United States and potentially other countries as well.<sup>184</sup> It is predicted that the patentability issues surrounding inventions that were either AI-generated or where AI played a role in the conception and reduction to practice of the invention will likely be resolved through the reworking of patent law within the United States.<sup>185</sup> This will likely include the expansion of ownership limits as to who can own a patent.<sup>186</sup> Ownership will likely be expanded so that the needs of AI-generated inventions and AI technologies can be accommodated in the future and inventions involving AI can still maintain patentability and new AI-generated inventions can be patented with AI listed as the inventor.<sup>187</sup>

### Conclusion

In conclusion, the *Thaler* decision in 2021 had an impact on the patentability of inventions where AI played a substantial role in the conception and reduction to practice of these inventions. This is because the *Thaler* case, for the first time, officially established that in terms of inventions where artificial intelligence is listed as the inventor, the invention is not patentable.<sup>188</sup> Ultimately, this decision demonstrated that AI cannot be considered an inventor on a patent application or issued patent within the

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<sup>182</sup> *Id.*

<sup>183</sup> *Id.*

<sup>184</sup> *Id.*

<sup>185</sup> *Id.*

<sup>186</sup> *Id.*

<sup>187</sup> *Id.*

<sup>188</sup> *Thaler v. Hirshfeld*, No. 1:20-cv-903 (LMB/TCB), 2021 U.S. Dist. LEXIS 167393, (E.D. Va. Sep. 2, 2021).

United States.<sup>189</sup> Although this decision aligns with the view of the patent offices of many countries in the world, it contrasts with that of South Africa, as South Africa issued a patent where artificial intelligence was listed as the inventor, along with Australia, where the court stated that it was possible for AI to be listed as an inventor on a patent application.<sup>190</sup>

The court's decision in *Thaler*, in combination with the fact that there is a variety of interpretations from different countries across the globe regarding AI inventorship on patent applications has brought forth a variety of issues. The *Thaler* decision brings forth several primary issues and concerns regarding the patentability of AI-generated inventions, concerns regarding the honesty of future patent applicants, concerns regarding the impact that this decision will have on innovation, and concerns regarding a shift to relying on trade secrets for protection of AI-generated inventions.

Furthermore, the *Thaler* case, being the first court decision to speak to AI inventorship, left several questions unanswered. For example, can inventions created by artificial intelligence be granted patent protection at all? If AI cannot be listed as the inventor of a particular invention where it substantially or wholly participated in the conception and reduction to practice, who can be? If an individual, meaning a natural person, is to be listed as the inventor of an AI-generated invention, how is that individual selected? Who should that individual be?

Despite these concerns and questions left unanswered, individuals who are in the intellectual property sphere or who work with AI-generated inventions or artificial intelligence generally are hopeful that the global differences regarding AI inventorship will lead to changes both in the United States and globally.<sup>191</sup> These changes could occur from either additional court decisions or legislative changes. One

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<sup>189</sup> *Id.*

<sup>190</sup> A ROSE BY ANY OTHER NAME: AN AUSTRALIAN COURT RULES THAT AI CAN BE AN INVENTOR, <https://www.jdsupra.com/legalnews/a-rose-by-any-other-name-an-australian-2006467/#:~:text=November%2023%2C%202021-,A%20Rose%20by%20Any%20Other%20Name%3A%20an%20Australian%20court%20rules,AI%20can%20be%20an%20inventor&text=On%2030%20July%202021%2C%20the,inventor%20under%20Australian%20patent%20laws>. (last visited Feb. 13, 2022).

<sup>191</sup> Andrew Karpan, *2 Wins for AI-Made Inventions May Be Just The Beginning* (Aug. 5, 2021) <https://www.law360.com/articles/1410414/2-wins-for-ai-made-inventions-may-be-just-the-beginning> (last visited Mar. 4, 2022).

suggestion presented the solution of listing both AI and a human individual as co-inventors, as long as the human participated in the invention's creation. This solution would alleviate problems surrounding AI ownership along with artificial intelligence not falling into the typical description and interpretation of an "individual."<sup>192</sup>

All in all, *Thaler v. Hirshfeld* has presented the court's first decision regarding AI inventorship, and this decision will likely lead to an increased difficulty in patenting AI-generated inventions, negatively impacting the patentability of inventions where AI substantially participated in the conception and reduction to practice for the invention. However, this decision left many gaps and issues that must be addressed and answered moving forward, and as a result, it is likely that this topic will be addressed, and these issues dealt with in the years to come. Stephen Thaler is seeking Supreme Court permission to appeal the District Court's decision.<sup>193</sup> Therefore, it is possible that many of these issues will be resolved in the coming years. Despite all of this, it is likely that AI will still be utilized to solve problems and create innovations moving forward. Who would have thought that a computer would be capable of learning and creating an invention eligible for patent protection and that artificial intelligence would be listed as an inventor?

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<sup>192</sup> *Id.*

<sup>193</sup> Bonnie Eslinger, *What to Watch in 2022: The Biggest IP Cases Coming Up* (Jan. 1, 2022) <https://www.law360.com/articles/1448326/what-to-watch-in-2022-the-biggest-ip-cases-coming-up> (last visited Mar. 4, 2022).