Testimony before the U.S. Senate Committee on the Judiciary
Subcommittee on Intellectual Property

Hearing on

"Artificial Intelligence and Intellectual Property – Part I:
Patents, Innovation, and Competition"

June 7, 2023

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Chair Coons, Ranking Member Tillis, Members of the Subcommittee: Thank you for the opportunity to testify at today's hearing.

I am on the faculty of the UCLA schools of law and engineering. I also founded and am faculty co-director of the UCLA Institute for Technology, Law, and Policy. In testifying today, I am providing my own views, not the views of any institution I am affiliated with.

Key points in my testimony include the following:

- To ensure American economic competitiveness over the coming decades, our innovation ecosystem—including our patent system—should provide an environment in which the promise of AI can be fully realized.
- Inventions made using AI should be patentable, with inventorship attributed to persons, not AI systems.
- More specifically, persons who use tools, including AI, as extensions of their mind, should be deemed to have conceived inventions generated through the use of those tools. I believe that this approach is consistent with current U.S. patent law.
- I do not support changing U.S. patent law to permit AI systems to be named as inventors.
- I do not believe that a computer-written online preemptive prior art disclosure with no substantive nexus to human understanding of its contents should count as a "printed publication" under 35 U.S.C § 102(a).

To explore these issues in more depth, I will first provide some brief comments regarding the role of AI in American economic competitiveness. I will then address the intersection of AI and patents. My testimony today is focused on utility patents, and not on design or plant patents.

AI and American Economic Competitiveness

A few weeks ago, a team of researchers from universities in the United States and Canada published a peer-reviewed paper describing how they used Artificial Intelligence (AI) to find a new antibiotic that can be effective against drug-resistant infections.[1] This discovery is important not only in relation to future medical treatments, but also symbolically: It underscores how AI can enhance the ability of scientists to advance human well-being and the frontiers of knowledge.

AI has the potential to bring benefits not only to drug development, but also to education, motor vehicle safety, medical diagnostics, agriculture, cyberdefense, weather forecasting, logistics, and a long list of other areas. To ensure American economic competitiveness over the coming decades, our innovation ecosystem—including our patent system—should provide an environment in which the promise of AI can be fully realized.

The goal of promoting AI innovation is closely linked to broader questions of American AI policy. Subjecting AI to overly burdensome regulation would favor large, well-funded incumbents that can easily bear the compliance costs, while disfavoring the newer, smaller companies that have historically been the source of so much of American innovation.

This does not mean that we should avert our eyes from the reality that AI, like most other technologies, can be used for both beneficial and problematic purposes. But in contemplating new AI regulation it is important to consider not only how effectively it would mitigate the targeted harms, but also the unintended consequences, including in relation to innovation.[2] This includes considering the geopolitical implications of regulation, so as not to push AI innovation and investment—and the associated job creation—to non-U.S. jurisdictions.

In discussing AI governance, it is also important to recognize that many non-AI-specific frameworks will apply to AI. For instance, it would violate Title VII of the Civil Rights Act of 1964 for a company to use AI to make hiring decisions in a manner that discriminates based on a protected characteristic such as race or gender. If the AI system in a driverless car causes an accident, products liability provides a way to seek legal recourse.

AI and Patents: Three Categories

When discussing the intersection of AI and patents, it is helpful to identify three categories. First, there can be patents *about* AI. Second, there can be patents describing inventions created *using* AI. Third, AI can be used to *write* patent applications or public disclosures intended to serve as prior art. I discuss each of these categories below.[3]

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[1] Anne Trafton, *Using AI, scientists find a drug that could combat drug-resistant infections*, MIT NEWS (May 25, 2023), https://news.mit.edu/2023/using-ai-scientists-combat-drug-resistant-infections-0525.
[2] *See also* John Villasenor, *Four Key Questions to Ask*, THE CONVERSATION (Apr. 3, 2023), https://theconversation.com/regulating-ai-3-experts-explain-why-its-difficult-to-do-and-important-to-get-right-198868.
[3] There can be overlaps between two or even all three of these categories.

Patents *About* AI

The U.S. Patent and Trademark Office (PTO) is well-equipped to handle patent applications for inventions *about* AI, and has been doing so for years. A search on Google Patents shows that the PTO granted thousands of patents in the decade from 2013 to 2022 with claims containing one or more of the phrases "artificial intelligence," "machine learning," or "deep learning." Unsurprisingly, there were many more such patents issued in 2018-2022 than in 2013-2107.

Since U.S. patent applications are typically not published until 18 months after filing,[4] it is difficult to get public visibility into the number of patent applications about AI filed in 2022 and year-to-date in 2023. But that number is sure to be high given the level of recent attention to AI in the technology community and beyond. While there are operational responses within the PTO that might be expected in light of growing inventor interest in AI (e.g., hiring more examiners with expertise in AI), the PTO is in a good position to effectively examine patent applications regarding inventions about AI, just as it has over the decades for so many other rapidly changing technologies.

Patents on Inventions Made *Using* AI

Inventions made *using* AI pose a complex set of policy questions.[5]

The PTO has helped lead the policy dialog on these questions. The PTO announced the launch of the AI and Emerging Technologies Partnership in June 2022,[6] issued a "Request for Comments Regarding Artificial Intelligence and Inventorship"[7] in February 2023 for which responses were due in May, and held two "listening sessions", one on the East Coast in April and the second on the West Coast in May.[8]

I will refer to inventions made using AI as "AI inventions", and will use the following definition: "inventions for which an AI system has contributed to the conception in a manner that, if the AI system were a person, would lead to that person being named as an inventor."[9]

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[4] If an application claims the benefit of an earlier filing, then the 18-month publication clock starts with that earlier filing. *See* 35 U.S.C. §122(b)(1)(A). Another factor impacting publication is that an application can be accompanied by a non-publication request in accordance with 35 U.S.C. § 122(b)(2)(B)(i).

[5] For a summary of some of the points made in this section, see John Villasenor, *AI Inventions: Policy Options and a Path Forward*, BROOKINGS INST. (Mar. 6, 2023), https://www.brookings.edu/blog/techtank/2023/03/06/ai-inventions-policy-options-and-a-path-forward/.

[6] 87 Fed. Reg. 34,669 (June 7, 2022). *See also* https://www.uspto.gov/initiatives/artificial-intelligence/ai-and-emerging-technology-partnership-engagement-and-events (last visited May 28, 2023).

[7] 88 Fed. Reg. 9,492 (Feb. 14, 2023).

[8] *AI Inventorship Listening Session - East Coast*, USPTO, https://www.uspto.gov/about-us/events/ai-inventorship-listening-session-east-coast (last visited May 30, 2023); *AI Inventorship Listening Session - West Coast*, USPTO, https://www.uspto.gov/about-us/events/ai-inventorship-listening-session-west-coast (last visited May 30, 2023).

[9] John Villasenor, *Reconceptualizing Conception: Making Room for Artificial Intelligence Inventions*, 39 SANTA CLARA HIGH TECH. L. J. 197, 199 (2023).

Two key questions raised by AI inventions are: First, should they be patentable? Second, how should inventorship be handled?

I believe that AI inventions *should* be patentable, and that inventorship should be attributed to the *natural persons* who use AI as a tool to enhance their ability to innovate. More specifically, as I explained in a recent law review publication in the *Santa Clara High Technology Law Journal*,

> conception should encompass ideas formed through collaboration between a person and tools that act as extensions of their mind. The "formation" of those ideas should be attributed to the person, including when the ideas underlying the invention were first expressed by a tool used to enhance their creative capacity and subsequently conveyed to them.
>
> Reconceptualizing conception in this manner would not require any change to the text of the Patent Act, and would promote investment in AI as a means to complement and enhance human creativity. and would avoid the many problems that would be associated with permitting non-human inventors.[10]

To operationalize this approach, no statutory changes are needed. The view of conception described above is fully consistent with current U.S. patent law.

The Patent Act, which is codified at Title 35 of the United States Code, does not define conception. As the Federal Circuit wrote in 2013, "[t]he definition of conception in patent law has remained essentially unchanged for more than a century."[11] Conception is defined as "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."[12] This definition was published by Robinson in an 1890 treatise,[13] and has been cited in many cases over the years by both the Court of Customs and Patent Appeals (the precursor to the Federal Circuit) and by the Federal Circuit, including as recently as 2021.[14]

There is no need to change the text of Robinson's definition. It is sufficient to view it through a broader lens. As I wrote in the *Santa Clara High Technology Law Journal* article cited above, "[p]ersons who use tools, including AI, as extensions of their mind, should be deemed to have conceived inventions generated through the use of those tools."[15]

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[10] *Id.*
[11] Dawson v. Dawson, 710 F.3d 1347, 1352 (Fed. Cir. 2013).
[12] WILLIAM C. ROBINSON, 1 THE LAW OF PATENTS FOR USEFUL INVENTIONS § 376 (1890), https://babel.hathitrust.org/cgi/pt?id=uc1.b3124815&view=1up&seq=698. The quoted text is part of a paragraph that also includes "[t]he conception of the invention consists in the complete performance of the mental part of the inventive act."
[13] *Id.*
[14] Bio-Rad Labs., Inc. v. ITC, 996 F.3d 1302, 1318 (Fed. Cir. 2021).
[15] Villasenor, *supra* n.9 at 230.

The Problems with Naming AI Systems as Inventors

I do not believe that AI systems should be inventors.

As an initial matter, as the Federal Circuit made clear in 2022 in *Thaler v. Vidal*,[16] current U.S. patent law does not permit naming a non-human inventor. Therefore, to make it permissible to name an AI system as an inventor, Congress would have to change the law. Many Members of Congress would rightly be quite hesitant to support a change of this magnitude, especially given the uncertainty about the downstream implications.

Legislative challenges aside, there are multiple additional concerns with changing U.S. patent law to allow AI systems to be inventors:

- An AI system cannot provide the required inventor's oath/declaration that must accompany a utility patent application.[17]
- An AI system is not equipped to engage in legal transactions associated with inventorship (e.g., assigning the invention).
- An AI system cannot get deposed in litigation regarding an invention.[18]

The Problems with Deeming AI Inventions Unpatentable

Another approach that has been proposed in the academic community is to deem AI inventions unpatentable. I do not support this approach, which has at least the following drawbacks:

- It would disincentivize investment in the use of AI in areas where it has high potential. For instance, a pharmaceutical company would be unlikely to make significant investments in AI-assisted drug development if it expected that any resulting drugs would be deemed unpatentable.
- It would lead to uncertainty and disputes regarding how to determine which inventions fall into the category of AI inventions, thereby rendering them unpatentable.
- It would create a new category of patent ineligibility based on having used too much AI when making an invention.[19] The resulting "how much is too much?" question would generate years of confusion.
- These new patent ineligibility issues would arise in litigation involving patents where a question might be raised regarding whether and to what extent AI was used to make the invention.
- These risks would also reduce patent value in licensing and acquisitions.

[16] 43 F.4th 1207 (Fed. Cir. 2022), *cert. denied*, 91 U.S.L.W. 3268 (U.S. Apr. 24, 2023) (No. 22-919).
[17] 35 U.S.C § 115(b)(2).
[18] The fact that an AI system may be able to answer questions is not sufficient. A deposition is sworn testimony, and there is no meaningful way for an AI system to be sworn in.
[19] It is relevant to note here that 35 U.S.C. § 103 states that "[p]atentability shall not be negated by the manner in which the invention was made."

Preemptive Prior Art and Patent Applications *Written* by AI

The use of AI writing tools to help create explanatory text (or figures) regarding inventions is not inherently problematic. It is reasonable for an inventor, or an attorney or patent agent working on behalf of an inventor, to use AI as a time-saving tool for describing an invention.[20] However, a problem arises when AI is used to describe alleged "inventions" for which there is no conception by a human.

Algorithmically-Generated Preemptive Prior Art

Computer algorithms (whether or not AI-enabled) can be used to write disclosures intended to foreclose patentability. This idea is not new. The creators of the website allpriorart.com, which the Wayback Machine indicates has been online since at least as early as 2016,[21] explain that

> [t]he system works by pulling text from the entire database of US issued and published (un-approved) patents and creating prior art from the patent language. While most inventions generated will be nonsensical, the cost to computationally create and publish millions of ideas is nearly zero – which allows for a higher probability of possible valid prior art.[22]

As everyone with an interest in AI knows, ChatGPT was publicly released in late 2022. ChatGPT is an example of "generative AI," a term that, as a recent post from IBM Research explains, "refers to deep-learning models that can generate high-quality text, images, and other content based on the data they were trained on."[23] ChatGPT and the much more capable tools that will certainly follow it will make it far easier to create and publish massive online databases intended to foreclose patentability over broad areas of subject matter.

To the extent that such publications occur without any substantive nexus to human understanding of their contents, there is a good argument that they should not count as "printed publication[s]" under 35 § U.S.C. 102(a).[24] The entire concept of prior art is tied to what a *person* of ordinary skill in the art (POSA) would know.

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[20] Of course, in doing so the writer would need to devote proper attention to accuracy, avoiding plagiarism, compliance with the written description requirement of 35 § U.S.C. 112, etc.

[21] *See* ALL PRIOR ART, https://web.archive.org/web/20160409211309/http:/allpriorart.com/ (Apr. 9, 2016).

[22] *About*, ALL PRIOR ART, https://allpriorart.com/about/ (last visited May 30, 2023) (parentheses in original). *See also About*, ALL PRIOR ART, https://web.archive.org/web/20160410071034/http://allpriorart.com/about/ (Apr. 10, 2016) (parentheses in original). The current and April 2016 "About" pages state that the published content is "algorithmically" generated but do not specify whether or not the algorithms used involve AI.

[23] Kim Martineau, *What is Generative AI?*, IBM RESEARCH (Apr. 20, 2023), https://research.ibm.com/blog/what-is-generative-AI.

[24] 35 U.S.C § 102(a) provides in relevant part that "[a] person shall be entitled to a patent unless— (1) the claimed invention was patented, *described in a printed publication*, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention." (emphasis added) (I am considering here the version of the statute after the revisions introduced by the America Invents Act).

The POSA is a hypothetical construct who is presumed to know of all prior art in the relevant field at the relevant time. But I do not believe that a POSA's knowledge should be so broad as to include purported "art" embodied in computer-generated text for which there is no evidence that any human has ever understood the significance. A POSA should not be presumed to know the entire contents of massive algorithmically-generated online preemptive disclosure databases filled with mostly—though not entirely—nonsensical content. I believe that this view is consistent with Federal Circuit case law on the interpretation of "printed publication."[25]

AI-Written Patent Applications

AI writing tools can be used to draft provisional and utility patent applications. As noted above, the fact of using AI to help speed the process of drafting a patent filing is not inherently problematic. Rather, concerns arise if an individual or group were to use AI to flood the PTO with auto-generated (or largely auto-generated) patent applications where there is no substantive nexus to human conception. There are several factors that will impose friction on this scenario.

First, provisional and utility patent filings (and the subsequent prosecution process initiated by the filing of a utility application) cost money. Thus, there is an economic disincentive against filing very large numbers of AI-written patent applications.[26] That said, for some entities, these costs may not be viewed as significant in light of the anticipated payoffs.

Second, both provisional and utility patent applications need to satisfy the written description requirement.[27] This requires that the specification describe the invention in "full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use" the invention.[28] There is plenty of evidence indicating that today's generative AI technology still falls far short of being able to generate the quality of writing that a patent attorney or patent agent can produce.[29] It would be a highly risky enterprise to file a patent application written

[25] *See, e.g.*, Blue Calypso, LLC v. Groupon, Inc 815 F.3d (Fed. Cir. 2016). The *Blue Calypso* court explained that the fact that something was available online (or in the pre-World Wide Web days, in physical form in a library) does not necessarily mean it is a printed publication under § 102. Rather, the court wrote, "[t]o qualify as a printed publication, a reference 'must have been sufficiently accessible to the public interested in the art.'" *Id.* at 1348 (quoting In re Cronyn, 890 F.2d 1158, 1160 (Fed. Cir. 1989)). While *Blue Calypso* addressed a set of patents subject to pre-America Invents Act (AIA) § 102, it is reasonable to assume that "printed publication" has the same meaning in both pre- and post-AIA § 102. *See also* Voter Verified, Inc. v. Premier Election Sols., Inc., 698 F.3d 1374 (Fed.Cir.2012).

[26] If the goal is to simultaneously get thousands of pages of disclosure on file, filing a smaller number of longer applications would generally be even more expensive, due to the size fees that apply to provisional and utility filings exceeding 100 sheets. *See* 37 C.F.R. § 1.16(s).

[27] *See* 35 U.S.C § 112(a). *See also* 35 U.S.C. § 111(b)(1), which provides that a provisional application "shall include— (A) a specification as prescribed by section 112(a) . . ." Of course, a provisional application is not examined by the PTO. But to the extent that a provisional application fails to satisfy § 112(a), the patent owner could lose a priority date challenge arising in future litigation involving a utility patent issued from an application claiming priority to the provisional. Losing that priority date would expand the universe of prior art that could be asserted against the patent claims in a validity challenge.

[28] 35 U.S.C § 112(a).

[29] *See, e.g.*, Benjamin Weiser, *Here's What Happens When Your Lawyer Uses ChatGPT*, N.Y. TIMES (May 27, 2023), https://www.nytimes.com/2023/05/27/nyregion/avianca-airline-lawsuit-chatgpt.html.

entirely by today's AI tools, with no human supervision. But generative AI will improve with time, and the writing it will output will require correspondingly less human editing to render it as good as what an attorney or patent agent would write.

Third, a utility application must be accompanied by an oath or declaration stating that "such individual believes himself or herself to be the original inventor or an original joint inventor of a claimed invention in the application."[30] Invention requires conception, and as discussed earlier, conception must occur in the human mind. It would strain credulity to assert that a single person or small group of persons, including under the broadened view of conception I have advocated for in the section on AI inventions, could credibly claim to have simultaneously or nearly simultaneously conceived of hundreds or thousands of inventions.

It is possible to predict some but certainly not all of the scenarios under which generative AI might be used in the future to write patent applications in ways that undermine the goals of the U.S. patent system.[31] That means that it will be important not only to identify the predictable scenarios but also to be agile in identifying emerging, unforeseen scenarios and formulating policy responses. It will also be important to ensure that these policy responses do not cause collateral damage by impeding inventors who are using AI for productive purposes.

I will also mention that I am currently finishing up the process of writing a new law review publication on the issues raised by the use of generative AI in writing patent applications and preemptive prior art. I would be happy to share the article with interested Members of the Subcommittee once it is published.

In closing, I would like to thank the Members of the Senate Judiciary Committee's Subcommittee on Intellectual Property for the opportunity to participate in today's hearing. I look forward to the discussion today and beyond on ways to ensure that the United States remains a global innovation leader.

In the era of AI, I am confident that with engagement from Members of Congress, the PTO, civil society, businesses, and academia, the U.S. patent system will retain its vital role in promoting American innovation, technology leadership, and economic competitiveness.

[30] 35 U.S.C § 115(b)(2).

[31] Here is an example scenario: Once generative AI becomes sufficiently capable, an entity could use it to autogenerate and file on the same day hundreds of provisional applications in a particular field of art. The entity could then use the subsequent 11 months to study those filings and harvest patentable ideas. Then, in the subsequent month, and before the expiration of the one-year period following the provisional filing date, the entity could file a set of utility applications, each claiming the benefit of a carefully selected subset of the provisional filings. Of course, this sort of invention-by-hindsight approach would mean that conception had not in fact occurred as of the date the provisional applications were filed. But it would nonetheless be challenging to address.