



May 15, 2023

Submitted via Regulations.gov

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**AUTM's Comments in Response to the USPTO's Request for Comments Regarding Artificial Intelligence and Inventorship (Docket ID Number: PTO-P-2022-0045)**

Thank you for the opportunity to provide comments regarding patentability and inventorship of innovations made with the use of Artificial Intelligence (AI).

AUTM is the non-profit leader in efforts to educate, promote, and inspire professionals to support the further development of academic research that drives innovation and changes the world. Our community is comprised of more than 3,000 members who work in more than 800 universities, research centers, hospitals, businesses, and government organizations around the globe. AUTM's members are primarily from academic settings (67%). 15% are practicing attorneys and 5% are from industry. Some 22% of our members are international.

AUTM members in academic settings are focused on advancing early-stage inventions and other technologies to the marketplace primarily through licensing to partners (i.e., implementers). Between 2012 and 2021 (the most recent decade for which we have data), our skilled professionals filed over 150,000 patents for academic inventors and over 16,000 in 2021 alone. Between 2012 and 2021 our U.S. members negotiated over 60,000 intellectual property license agreements on behalf of U.S. universities and academic research institutions, and in 2021 alone over 8,000 such license agreements. Thus, AUTM has valuable insights and an important voice regarding intellectual property matters generally and patents in particular. We applaud the United States Patent and Trademark Office (USPTO) for its efforts to bolster the robustness and reliability of patents such that the time-limited, exclusive rights secured thereby incentivize innovation and promote economic prosperity and national security for all Americans.

AUTM sees a variety of types and uses of AI-related inventions. There is innovation in the design of AI architecture itself, which is and should remain patent eligible. AI also enables inventions, as in the following examples:

- AI can find predictive classifiers using combinations of classifications that are each individually already known by natural persons or humans<sup>1</sup> though the combination was not previously appreciated. One example could be a multivariate biomarker, which might predict individuals at risk of a certain disease or those likely to respond well (or have an adverse reaction) to a certain drug.
- AI can find predictive classifiers not already known to humans, such as features or combinations of features in images or songs not readily discernible or even definable by humans. As one example, AI's apparent ability to replicate the style of certain artists can be seen as an ability to distill and define features not readily discernible by natural persons except when fully integrated.
- AI can design the shape and material composition of things, such as filters, propeller blades, catalysts, or drugs. In one example, the AI analyzes performance data on a variety of objects, materials, or chemicals, parsed by detailed chemical composition and structure. The AI can then propose a new combination of chemical composition and structure. Natural persons could limit the design space of the AI as desired—e.g., by shape, size, temperature stability, or any required specification.

All of these examples require large amounts of data (at least partly pre-categorized by natural persons) to train the AI. Thus, this response includes significant discussion of data as a key enabler of AI-related innovation.

### **Summary of Comments**

This request for comments (RFC) seeks public input “on the current state of AI technologies and inventorship issues that may arise in view of the advancement of such technologies, especially as AI plays a greater role in the innovation process.” AUTM believes that AI inventions must be protected in a way that encourages both innovation and disclosure. As AUTM has noted in prior public statements, patents remain essential tools for partnering with industry to translate academic research into real-world applications. At this point, current law can adequately address AI innovations, and it is unnecessary and perhaps counterproductive to change the law based on speculation about the future of AI. Thus, rather than recommending changes to the patent laws, AUTM supports guidance that reinforces patentability of AI-enabled inventions, as well as inventions on novel AI architectures. AUTM also supports improved protection of the datasets that are necessary to further AI innovation.

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<sup>1</sup> The terms “natural person” and “human” are used interchangeably in these comments.

## AUTM Responses to Questions

1. How is AI, including machine learning, currently being used in the invention creation process? Please provide specific examples. Are any of these contributions significant enough to rise to the level of a joint inventor if they were contributed by a human?

One example of AI use in the invention process is the use of computer algorithms to identify or design a compound that would likely bind to a target or interest. Other examples include i) predicting the properties of a material or molecule from its chemical composition and structure, ii) designing objects and art, within certain design constraints, and iii) identifying predictive classifiers, including multivariate ones, and including those not discernible by natural persons. In these and similar contexts, we do not believe the AI contributions would rise to the level of either an inventor or a joint inventor. Rather, the legal inventors may be, for example, the human who designs the query, the human who creates or refines the data used in the system, and/or the human who developed or improved the algorithms.

Moreover, AUTM has concerns about according the status of “inventor” to a machine, as current law supports the view that only natural persons can be inventors (see response to Question 3).

2. How does the use of an AI system in the invention creation process differ from the use of other technical tools?

At this point, we do not think use of an AI system in the invention process differs significantly from the use of other tools. However, as more sophisticated versions of AI systems are developed, a different answer may be appropriate. Use of training and validation data, especially from parties other than the inventors (or invention owner, if different from the inventors, presumably via employment or a work-for-hire contract) may raise questions on fair compensation to the party owning or controlling the AI. However, this can be addressed by contracts and terms of use governing access to the AI. Therefore, concerns over fair compensation for use of AI do not support laws that would allow a machine to be an “inventor.”

3. If an AI system contributes to an invention at the same level as a human who would be considered a joint inventor, and is the invention patentable under current patent laws?

Accepting the premise as true—that the AI system contributes to an invention at the same level as a human and would be considered a joint inventor—then yes; the invention should be patentable and is patentable under current U.S. patent laws.

- a. Could [35 U.S.C. 101](#) and [115](#) be interpreted such that the Patent Act only requires the listing of the natural person(s) who invent(s), such that inventions with additional inventive contributions from an AI system can be patented as long as the AI system is not listed as an inventor?

Yes.

- b. Does the current jurisprudence on inventorship and joint inventorship, including the requirement of conception, support the position that only the listing of the natural person(s) who invent(s) is required, such that inventions with additional inventive contributions from an AI system can be patented as long as the AI system is not listed as an inventor?

Yes.

- c. Does the number of human inventors impact the answer to the questions above?

No. Naming at least one human inventor will suffice.

4. Do inventions in which an AI system contributed at the same level as a joint inventor raise any significant ownership issues? For example:
  - a. Do ownership rights vest solely in the natural person(s) who invented or do those who create, train, maintain, or own the AI system have ownership rights as well? What about those whose information was used to train the AI system?

Use of an AI tool should not significantly alter the inventorship analysis. Similar questions already arise when an invention involves use of a particular reagent, protocol, or tool that was provided by another. However, guidance on how the inventorship analysis applies to AI-enabled inventions would be helpful, as discussed in more detail below (see response to Question 11).

- b. Are there situations in which AI-generated contributions are not owned by any entity and therefore part of the public domain?

Yes. There are de facto public tools, such as those found in public libraries and maker spaces.<sup>2</sup> Note that maintenance, safety training, and a process for authorizing access applies to such tools. AUTM favors development of generally agreed upon processes for managing access to AI tools, as there are for other tools that aid innovation.

5. Is there a need for the USPTO to expand its current guidance on inventorship to address situations in which AI significantly contributes to an invention? How should the significance of a contribution be assessed?

In AUTM's view, there is no need at this point to change inventorship law to address AI-enabled inventions. However, as discussed below (in response to Question 11), clear guidance on how to correctly identify and name the appropriate inventors for AI-enabled inventions is needed.

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<sup>2</sup> See, e.g., <https://drive.google.com/file/d/1Gx-qmf4d9QTY5-9j2rNn2cu6x0WDCSY5/view>.

6. Should the USPTO require applicants to provide an explanation of contributions AI systems made to inventions claimed in patent applications? If so, how should that be implemented, and what level of contributions should be disclosed? Should contributions to inventions made by AI systems be treated differently from contributions made by other (i.e., non-AI) computer systems?

Generally, no. Typical enablement and written description laws should be followed and should suffice both for inventions made by AI systems and for inventive AI architectures. However, please see below (response to Question 7) regarding the need for transparency in terms of datasets used with AI tools.

7. What additional steps, if any, should the USPTO take to further incentivize AI-enabled innovation ( i.e., innovation in which machine learning or other computational techniques play a significant role in the invention creation process)?

**Incentives are needed to invest in the creation of more robust, tested, and transparent datasets that are capable of more readily, and reliably, validating the trustworthiness of AI systems.** In January 2023, the National Institute of Standards and Technology (NIST) published its AI Risk Management Framework 1.0, which outlined a voluntary set of standards that are intended to help incorporate *trustworthiness* considerations into the design, development, use, and evaluation of AI products, services, and systems. See <https://nvlpubs.nist.gov/nistpubs/ai/NIST.AI.100-1.pdf>.<sup>3</sup> NIST's identified set of characteristics for assessing whether an AI system is trustworthy includes:

- valid and reliable,
- safe, secure and resilient,
- accountable and transparent,
- explainable and interpretable,
- privacy-enhanced, and
- fair with harmful bias managed.

To establish that an AI system is trustworthy, the owner or AI implementor will need to provide some reasonable level of transparency regarding the datasets that its algorithm was trained on and/or validated by. And given much of the value of an AI system resides in the fact that the datasets used to train its algorithms are proprietary and confidential, the public would greatly benefit if these systems could be validated against rigorous, widely tested and scrutinized, publicly accessible datasets. However, adequate incentives and legal protections need to be present in order to spur the creation of and access to databases that are capable of vetting the trustworthiness of AI systems.

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<sup>3</sup> See also article posted by the U.S. Federal Trade Commission on April 19, 2021 titled "Aiming for truth, fairness, and equity in your company's use of AI" at <https://www.ftc.gov/business-guidance/blog/2021/04/aiming-truth-fairness-equity-your-companys-use-ai>.

**In light of the growing importance of datasets to AI systems, the USPTO should revisit sui generis property rights for databases.** Curating, storing, and maintaining databases requires significant investment. Incentives for sharing, including conditional sharing, are needed. As previously communicated to the USPTO (see [https://autm.net/AUTM/media/About-Tech-Transfer/Documents/AUTM-Comments-on-Intellectual-Property-Protections-for-Artificial-Intelligence-Innovations\\_1-10-20.pdf](https://autm.net/AUTM/media/About-Tech-Transfer/Documents/AUTM-Comments-on-Intellectual-Property-Protections-for-Artificial-Intelligence-Innovations_1-10-20.pdf)), AUTM is interested in exploring the possible expansion of sui generis property rights to curated datasets in view of the:

- 1) reported increasing efforts toward data curation,
- 2) fact that curation may not, in some circumstances, meet the criteria required for copyright protection,
- 3) benefits of sharing, improving, and incentivizing the creation of such datasets, including in the context of public-private partnerships,
- 4) disadvantages of trade secrets, particularly in an academic environment, and
- 5) different infringement protections needed for proprietary data sets that are used in a “one and done” manner to train AI algorithms.

Given the lack of certainty as to whether owners of AI innovations will receive adequate intellectual property rights in exchange for the extent of disclosure required under patent and copyright laws, innovators may increasingly elect to maintain their AI innovations as trade secrets (when possible).

A database property right may lead in due course to best practices and precedents in agreement language, which will benefit nonprofits, and smaller, younger players in our innovation ecosystem. A property right will motivate identification of contributors, and their rights to use, share, or modify the resource. Such clarity may facilitate distribution and use for public and commercial benefit, especially given the lack of a workable statutory default for joint ownership, as exists for patent rights in the U.S. And property rights are easier to enforce than contract terms, which again would benefit nonprofits, and smaller, younger innovators generally.

**Academics now, in contrast to 1998, appreciate structured resource sharing.** The world of AI and machine learning has evolved significantly since the April 1998 Conference on Database Protection and Access, after which the USPTO concluded<sup>4</sup> that academic researchers were generally uncomfortable with a database property right. Given advancements in and increased availability of AI/machine learning technologies, academics are much more likely to appreciate that:

- datasets are valuable, both for their own research, and for companies and investors desiring access to the researchers’ expertise and the data they have compiled; and
- a more formal research sharing infrastructure, such as a Material Transfer Agreement, or sharing code under open source license terms, such as those in the [CMU open source license choice grid](#), serve their interests (e.g., desire for attribution; disclaimers related to liability or fitness for a particular purpose; permissions for research use only; restrictions against subsequent transfer; must be used in safe and secure manner, etc.)

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<sup>4</sup> See <https://www.uspto.gov/learning-and-resources/ip-policy/database-protection-and-access-issues-recommendations> (“U.S. Patent and Trademark Office Report on Recommendations from the April 1998 Conference on Database Protection and Access Issues, US Patent and Trademark Office, Department of Commerce, Washington, D.C., July 1998”).

**The value of synthetic datasets for AI-enabled inventions and inventions generally:**

Synthetic datasets may incentivize AI-enabled inventions by increasing the data available for AI training and by incentivizing disclosure and patenting of such inventions. Because of enhanced privacy protection,<sup>5</sup> donors may be more willing to contribute to such datasets, and the datasets may be more readily and widely shared, thus contributing to AI training.

Allowing synthetic datasets to be used to demonstrate constructive reduction to practice of an invention (and to meet the written description and enablement requirements) may incentivize more invention as well, AI-related and non-AI-related. By analogy with the sequence listing tool, the USPTO could consider a database listing resource.

**Transparency, clarity, and trust are also incentives.**

The RFC does not distinguish between the types of AI/ML (Machine Learning), in particular, how “intelligent” they are—i.e., a tool only versus AGI (Artificial General Intelligence). The RFC also does not distinguish between whether the AI systems addressed are available to the public at little or no cost, or for private use only. It is reasonable to have different answers and concerns for different types of AI, and to have concerns over the potential for private AGIs to skew the landscape of innovators in favor of wealthier, more established, and larger players<sup>6</sup>—analogous to the concerns raised in the public-versus-private blockchain context.

8. What additional steps, if any, should the USPTO take to mitigate harms and risks from AI-enabled innovation? In what ways could the USPTO promote the best practices outlined in the *Blueprint for an AI Bill of Rights* and the *AI Risk Management Framework* within the innovation ecosystem?

Transparency, as discussed above, is helpful. Credibility requires auditable and testable algorithms, as was done in a recent article about incorrectly using low use as a proxy for low need.<sup>7</sup> Low use was instead a reflection of an unmet need for access in underserved populations. Of note, the authors provided a synthetic dataset for other researchers to use, both to confirm their own published results, and potentially to continue related studies.

The matter of fair use of copyrighted material also arises in the context of AI training and validation sets. “Fared use”<sup>8</sup> may be an approach worth considering, especially where the terms of use by the copyright owner can easily be incorporated via digital watermarking in their materials. As discussed previously, AUTM supports structured resource sharing, noting that terms other than financial ones, such as acknowledgement of the source, can readily be specified.

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<sup>5</sup> See <https://law.stanford.edu/publications/privacy-and-synthetic-datasets/> “Privacy and Synthetic Datasets” Bellovin, Steven M. and Dutta, Preetam K. and Reiting, Nathan, 22 STAN. TECH. L. REV. 1 (2019).

<sup>6</sup> See, for example, OpenAI’s letter “Planning for AGI and beyond,” <https://openai.com/blog/planning-for-agi-and-beyond>.

<sup>7</sup> Dissecting racial bias in an algorithm used to manage the health of populations. *Science*, 366, 447-453(2019); DOI:[10.1126/science.aax2342](https://doi.org/10.1126/science.aax2342).

<sup>8</sup> Sobel, Benjamin, Artificial Intelligence’s Fair Use Crisis (September 4, 2017), *Columbia Journal of Law & the Arts*, forthcoming, available at SSRN: <https://ssrn.com/abstract=3032076>.

9. What statutory changes, if any, should be considered as to U.S. inventorship law, and what consequences do you foresee for those statutory changes?

Statutory changes are unnecessary for the time being, but better tools for performing the inventorship analysis generally would be helpful—e.g., clarifying the definitions of “invention” and “conception” as applicable to AI-enabled inventions, and confirming that the §103 requirement applies to a person (as opposed to what would have been obvious to a machine).

- a. Should AI systems be made eligible to be listed as an inventor? Does allowing AI systems to be listed as an inventor promote and incentivize innovation?

Not at this time. In AUTM’s view, the threshold question is when, if ever, and under what circumstances the U.S. law can and should confer personhood to a machine. This question should be answered before determining whether the law should expand the concept of “inventorship” to include nonhuman inventors.

- b. Should listing an inventor remain a requirement for a U.S. patent?

Yes.

10. Are there any laws or practices in other countries that effectively address inventorship for inventions with significant contributions from AI systems?

AUTM is not aware of any such laws or practices. However, as discussed in the response to question 7, it would be helpful if U.S. law provided stronger property rights for databases, such as provided by the European Union’s Database Directive (see [https://autm.net/AUTM/media/About-Tech-Transfer/Documents/AUTM-Comments-on-Intellectual-Property-Protections-for-Artificial-Intelligence-Innovations\\_1-10-20.pdf](https://autm.net/AUTM/media/About-Tech-Transfer/Documents/AUTM-Comments-on-Intellectual-Property-Protections-for-Artificial-Intelligence-Innovations_1-10-20.pdf)).

11. The USPTO plans to continue engaging with stakeholders on the intersection of AI and intellectual property. What areas of focus (e.g., obviousness, disclosure, data protection) should the USPTO prioritize in future engagements?

AUTM appreciates the USPTO’s efforts to engage with stakeholders and encourages continued engagement regarding the intersection of AI and intellectual property as it relates to patentability. If AI can contribute to an inventive concept through a series of algorithms and datasets, the most problematic requirements are likely inventorship (e.g., identifying the appropriate human inventors) and obviousness (e.g., ensuring that use of AI does not unfairly affect the determination of whether an invention would have been obvious to one of ordinary skill in the art).



**Clear guidance to assist inventorship determinations is needed.**

If AI contributes to a claim of a pending patent application or issued patent, it would be helpful to have clear guidance to assist identification of the statutory inventors. For example, is the developer of the AI program necessarily an inventor? Does it matter if the AI program is generally available to the public? Inventorship impacts ownership of the patent rights and, more importantly, an incorrect listing of inventors could jeopardize the validity of an issued patent. Therefore, it would be helpful to have guidance from the USPTO clarifying how the inventorship analysis is correctly applied to AI-enabled inventions.

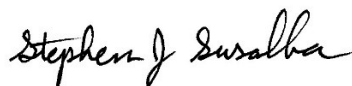
**Obviousness law (or uncertainty over obviousness of AI-enabled inventions) should not deter AI innovation.**

If AI assists a user in finding a solution or invention to a problem that has a long-felt need, the use of AI itself should not raise the nonobviousness bar that must be met by the applicant. The appropriate question should still be whether the invention would have been obvious to a person of ordinary skill in the art at the time of the invention. Whether AI was used to make the invention may, in some situations, be a relevant factor in the analysis, but it should not trigger application of a more stringent test for obviousness. In other words, the use of AI should not render the resulting innovation obvious (or more likely to be obvious) simply because the AI can process and analyze data so much more efficiently than the human brain. Such a result—or even uncertainty over the appropriate obviousness test for AI-enabled inventions—would discourage disclosure of innovations that have the potential to greatly benefit society.

**Conclusion**

In conclusion, AUTM appreciates the opportunity to provide comments on this important issue. AUTM strongly supports reliable and robust patent rights. We believe that strong patent rights promote competition because they facilitate market entry of new startups by attracting investors and commercialization partners that might not otherwise have committed to develop and distribute the technology for public benefit. Finally, our technological superiority and thus our national security and economic prosperity depend on our ability to restore and protect robust and reliable patent rights.

Sincerely,



Stephen J. Susalka, Ph.D.  
Chief Executive Officer