

No. 22-919

IN THE
Supreme Court of the United States

STEPHEN THALER,

Petitioner,

v.

KATHERINE K. VIDAL, UNDER SECRETARY OF
COMMERCE FOR INTELLECTUAL PROPERTY AND
DIRECTOR OF THE UNITED STATES PATENT AND
TRADEMARK OFFICE, UNITED STATES PATENT
AND TRADEMARK OFFICE, *et al.*

Respondents.

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED
STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

**BRIEF OF *AMICI CURIAE* LAWRENCE
LESSIG, SHLOMIT YANISKY-RAVID, OSMAN
GÜÇLÜTÜRK, AND DR. CHRISTOPHER MASON
IN SUPPORT OF PETITIONER**

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TABLE OF CONTENTS

	<i>Page</i>
TABLE OF CONTENTS.....	i
TABLE OF CITED AUTHORITIES	iv
INTEREST OF AMICI CURIAE.....	1
SUMMARY OF ARGUMENT.....	3
ARGUMENT.....	6
I. Review Is Warranted Because The Decision Below Conflicts With The Court’s Jurisprudence Promoting Innovation and Technological Advancement	6
A. This Case Presents A Vehicle For This Court To Recognize That AI Systems Autonomously Invent Without Human Intervention And To Provide Public Guidance On Navigating This Novel Feature	7
B. Hundreds of Billions In AI Investment Capital Has Already Been Staked On Investments That Include Potentially Life-Saving Medicines	10

Table of Contents

	<i>Page</i>
C. The Problem Of AI Patentability Has Lingered For Many Years And With New AI Tools Proliferating, Clear Guidance From This Court Is Necessary To Determine An AI Invention’s Patentability.....	13
II. Absent This Court’s Review, The Decision Below Will Nullify U.S. Patent Protection For AI-Generated Inventions, Harming Innovation, Creativity, Competition and Investments	16
A. U.S. Patent Law Goals Are Consistent With Recognizing AI As The “Inventor”..	17
i. Recognizing AI Patents Fosters Immediate Investment In Technology	18
B. Recognizing AI Patents Fosters The Patent Act’s Goal Of Encouraging Disclosure Of Trade Secrets To Stimulate Innovation and Competition.....	22
C. The USPTO’s Failure To Grant Patent Protection To AI Inventors Puts The U.S. Economy At A Competitive Disadvantage And Drives Innovation Offshore	23

Table of Contents

	<i>Page</i>
III. Absent This Court’s Review, The Decision Below Creates Unfair Risks of Patent Invalidity For Legitimate Owners of Innovative AI	25
CONCLUSION	27

TABLE OF CITED AUTHORITIES

	<i>Page</i>
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	<i>Page</i>
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INTEREST OF AMICI CURIAE¹

Lawrence Lessig is the Roy L. Furman Professor of Law and Leadership at Harvard Law School. He previously taught at Stanford Law School, where he founded the Center for Internet and Society, and at the University of Chicago. He clerked for Judge Richard Posner on the 7th Circuit Court of Appeals and Justice Antonin Scalia on the United States Supreme Court. Lessig is the founder of Equal Citizens is a founding board member of Creative Commons, and serves on the Scientific Board of AXA Research Fund. A member of the American Academy of Arts and Sciences and the American Philosophical Society, he has received numerous awards including a Webby, the Free Software Foundation's Freedom Award, Scientific American 50 Award, and Fastcase 50 Award. He is the author of numerous award-winning books.

Professor Shlomit Yanisky-Ravid is an accomplished expert in Intellectual Property (IP) Law, specializing in the challenges artificial intelligence (AI) and emerging technologies pose to IP laws, and proposing solutions for interpreting IP laws in the context of AI. She has been a Visiting Professor at Fordham Law School since 2012, leading the IP-AI & Blockchain Projects, a research fellow at Yale Law School's Information Society Project, a board member of Penn State Dickinson Law IP & Innovation and the Global IP Alliance, and a Senior Law Faculty

1. Pursuant to Sup. Ct. R. 37.6, *amici curiae* state that no counsel for any party authored this brief in whole or in part and no party or counsel for any party made a monetary contribution intended to fund the preparation or submission of this brief. Only *amici curiae* made such monetary contributions. All parties have received timely notice of the intent to file this brief.

Member at Ono Academic College, Law School in Israel (where she founded the Shalom Comparative Research Institute, Eliyahu Law and Tech Center). She has won awards and scholarships for publications and research on the legal impact of AI and blockchain, including the visionary article “Generating Rembrandt” recognized by Michigan State University.

Osman Güçlütürk is a Visiting Fellow at the Information Society Project, Yale Law School.

Dr. Christopher Mason is a Professor of Genomics, Physiology, and Biophysics at Weill Cornell Medicine, and he also holds appointments at the Tri-Institutional Computational Biology and Medicine Program (Rockefeller University, Memorial Sloan-Kettering Cancer Center, and Cornell University), affiliate appointments at Harvard Medical School and the Information Society Project (ISP) at Yale Law School, where he was a Fellow from 2006-2009. Dr. Mason is also the Director of the WorldQuant Initiative for Quantitative Prediction at Cornell, which builds and deploys AI algorithms in clinical practice, bioinformatics, and biotechnology.

Amici are concerned that the Patent Act and patent laws be interpreted consistently and predictably across international boundaries to fairly protect inventors, creativity and innovation in light of the growing role of emerging technologies and new techniques of innovation. Congress wrote the Patent Act in broad language to protect inventors and accommodate unforeseeable innovation. The Supreme Court traditionally interprets IP law to accommodate new technologies. Amici are concerned that --- left undisturbed --- the Federal

Circuit's decision will unfairly deny U.S. patent protection to U.S. inventors or render patent ownership uncertain for decades to come, negatively impact the AI industry, disincentivize innovation, and as a result, harm the U.S. economy and international trade by impeding technological development and investment.

Amici have no personal stake in the outcome of this case. Amici seek to advise the Court of the harmful consequences of weakening the AI industry by voiding patent protection and rendering the patent ownership regime uncertain and open to unfair challenges and excessive red tape.

SUMMARY OF ARGUMENT

Because it completely deprives an entire class of important and potentially life-saving patentable inventions of any protections, the Federal Circuit's affirmance of the U.S. Patent and Trademark Office's denial of a patent to Dr. Stephen L. Thaler as the owner of an artificial intelligence system jeopardizes billions in current and future investments, threatens U.S. competitiveness and reaches a result at odds with the plain language of the Patent Act and this Court's tradition of interpreting the Patent Act in a manner friendly to new technology and innovation.

This case presents a perfect vehicle for this Court to recognize that AI systems have been producing inventions constituting patentable subject matter for decades and that the USPTO's policy of denying patent protection to owners of AI systems who credit AI systems with "inventor" status is unwarranted by the Patent Act's language and

harms innovation. In drafting the Patent Act, Congress did not foresee AI, but intended to reward all individual creators of patentable inventions with economic incentives. Thus, consistent with both the Patent Act's plain language and Congressional intent, this Court should interpret the Patent Act's definition of "inventor" to include AI systems consistent with this Court's jurisprudence embracing technological innovation. The question presented is important as it affects potentially thousands or even tens of thousands of past, present and future AI-related patent filings. It has been undisputed for many years that AI "invents" patentable subject matter. This Court has never addressed this important, novel function that is unique in human history. AI is worthy of this Court's urgent attention because it is complex, important, an engine for economic growth and technological innovation. AI systems are developed and supported by many individual creators and stakeholders.

AI has undisputedly been creating patentable inventions since 1983 and the numbers and economic importance of these inventions is now exploding. The life-saving potential and economic effect of these AI inventions is spectacular particularly in the pharmaceutical industry where, savings on developing new drugs through AI is expected to reach \$52 billion *annually*. Billions have already been invested in AI: it is deeply unfair to the investors that inventions generated by those AI systems will not be protected by patents. It is estimated that hundreds of billions in AI investment capital are to be deployed in coming years.

But this entire exciting and important field is likely to be crippled due to the USPTO's denial of a patent to Dr.

Thaler as the owner of the DABUS AI system. As reported in the press, this case has raised significant alarms in the U.S. business community. Absent this Court's review, the USPTO will invalidate all AI-generated inventions until Congress acts. Such action could take years that the U.S. economy and investors can ill afford. The Federal Circuit's decision is the last word on this controversy: no other cases will be emerging from other federal circuit courts to facilitate this Court's review. The goals of the Patent Act of providing economic incentives for innovation and encouraging disclosures to spur new inventions would be served by recognizing AI as the inventor. By contrast, the USPTO's misguided policy encourages AI investors to claim "inventor" status for themselves, or otherwise risk losing any patent protection. Absent this Court's review, an entire exciting field will be stifled for years due to an entirely unnecessary bureaucratic overreach that Congress never intended, that harms the public welfare and that the plain language of the Patent Act does not require.

The USPTO's failure to grant patent protection to AI inventors puts the U.S. economy at a competitive disadvantage and drives innovation offshore. Global capital moves quickly to jurisdictions that promote innovation. Owners of AI systems will be incentivized to conceal important new innovations rather than reveal them in exchange for patent protection.

The USPTO's decision creates unfair risks of patent invalidity. Where AI has autonomously created an invention, an AI system owner listing AI as the "inventor" creates a risk of the patent's invalidity. If individuals cannot accurately claim to be the inventor and if the

AI system is excluded from “inventor” status, patents including such claims will be unfairly invalidated.

USPTO’s misguided policy decision, affirmed by the Federal Circuit, threatens investor confidence, removes laudable economic incentives, encourages a secrecy that threatens innovation and risks driving capital offshore to the detriment of the U.S. economy.

ARGUMENT

I. Review Is Warranted Because The Decision Below Conflicts With The Court’s Jurisprudence Promoting Innovation and Technological Advancement

Review is warranted because the Decision Below² subverts Congress’ intent to promote innovation with economic incentives by grafting a requirement into the Patent Act that an “inventor” also be a human being when the Patent Act’s plain language has no such requirement. The USPTO’s “human being” requirement conflicts with this Court’s jurisprudence interpreting the Patent Act in a manner that promotes innovation and technological advancement. The primary purpose of the U.S. patent system is to provide economic incentives to stimulate innovation.³ Where Congress did not anticipate a new technology, this Court interprets patent law in a manner promoting innovation and fostering technological

2. *Thaler v. Vidal* No. 21-2347 (Federal Circuit Judgment entered August 5, 2022); *Thaler v. Hirschfeld* No. 1:20-civ-00903-LMB-TCB (E.D. Virginia judgment entered September 2, 2021).

3. *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 480 (1974).

advancement.⁴ The Patent Act pre-dates AI's invention. This Court has recognized that "technology and other innovations progress in unexpected ways"⁵ and that "a statute is not confined to the particular applications . . . contemplated by the legislators."⁶ In drafting the Patent Act, Congress intentionally used broad, general language due to the unforeseeability of future innovation.⁷ AI and its revolutionary capabilities fall directly into the category that Congress did not foresee. As it has consistently done before, this Court ought to interpret statutory language with common sense and practicality in the face of technological change that permits non-humans --- increasingly --- to invent patentable subject matter. Fragile investor confidence and the pressing need for continued investment AI systems warrant this Court seizing this opportunity resolve this important issue.

A. This Case Presents A Vehicle For This Court To Recognize That AI Systems Autonomously Invent Without Human Intervention And To Provide Public Guidance On Navigating This Novel Feature

This case presents an important vehicle for this Court to recognize that AI systems have the novel ability to invent autonomously, creatively, and unpredictably without

4. 35 U.S.C. §101; *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc.*, 534 U.S. 124, 135 (2001) (Section 101 is a "dynamic provision designed to encompass new and unforeseen inventions.").

5. *Bilski v. Kappos*, 561 U.S. 593, 605 (2010).

6. *Diamond v. Chakrabarty*, 447 U.S. 303, 315 (1980).

7. *Id.*

human intervention and to provide needed guidance on resulting intellectual property ownership.⁸ Unlike any technology that this Court has previously addressed, AI systems are capable of autonomously and creatively generating novel, non-obvious, useful, and innovative processes and inventions, increasingly stepping into the shoes of human inventors.⁹ While there is no singular definition of “Artificial Intelligence,” it is universally understood as a system capable of performing human-like tasks, including learning, evolving, communicating, making decisions, creating, and inventing.¹⁰

The advent of “neural networks” has rendered AI systems more autonomous, intelligent, and creative. AI systems transform large amounts of data by grid components into computer language, identifying patterns. AI systems use these patterns to make decisions, predictions, creations, and inventions. Inventions created by AI systems frequently meet the subject matter criteria found in Section 101 of the Patent Act.¹¹ Unlike traditional

8. See generally Shlomit Yanisky-Ravid & Xiaoqiong Liu, *When Artificial Intelligence Systems Produce Inventions: The 3A Era and an Alternative Model for Patent Law*, 39 CARDOZO L. REV. 2215 (2018).

9. See Suzi Morales, *Can Artificial Intelligence Invent Things? A Curious Legal Case Could Have Big Implications for Business*, THE OBSERVER (Sep. 21, 2022, 05:30 AM), <https://observer.com/2022/09/can-artificial-intelligence-invent-things-a-curious-legal-case-could-have-big-implications-for-business/>

10. See Shlomit Yanisky-Ravid, *Generating Rembrandt: Artificial intelligence, Copyright, and Accountability in the 3A Era – The Human-Like Authors are Already Here – A New Model*, 2017 MICH. ST. L. REV. 708 (2017).

11. 35 U.S.C. § 101

software, current AI systems can invent patentable subject matter without human intervention and without copying or making “a puzzle” from existing data.¹²

Software programmers, data providers, trainers, users, together with stakeholders and shareholders constitute the “Multi-Player Model” used to develop AI technologies and systems.¹³ Calculations leading to an AI invention may be unknown to the Multi-Players. When AI systems invent autonomously, no human directs the process or performs prior calculations. The only command given to the AI is to “invent.”

AI’s unique functional features and the tremendous role AI plays in the U.S. economy are important reasons for this Court to review this case. Investing in, creating, training, and testing AI systems to achieve inventive capability is an enormous, complex and hugely expensive process. This Court’s review would also benefit the public welfare because AI has raised criticisms of being biased, inaccurate or for violating rights.¹⁴

Because AI systems, representing hundreds of billions in U.S. investments vital to the economy, have the ability to generate autonomously, creatively, and unpredictably

12. See Anders Krogh, *What Are Artificial Neural Networks?*, 26 NATURE BIOTECHNOLOGY 195, 195-97 (2008).

13. See Yanisky-Ravid, *Generating Rembrandt*, *supra* note 10.

14. See Shlomit Yanisky-Ravid & Sean K. Hallisey, *Equality and Privacy by Design: A New Model of Artificial Intelligence Data Transparency via Auditing, Certification, and Safe Harbor Regimes*, 46 FORDHAM URB. L. J. 428 (2019).

without human intervention novel, non-obvious, useful, and innovative processes and inventions, this Court should review the important question of whether the Patent Act restricts the statutory term “inventor” to human beings.¹⁵

B. Hundreds of Billions In AI Investment Capital Has Already Been Staked On Investments That Include Potentially Life-Saving Medicines

In narrowly focusing on dictionary definitions of the word “inventor” or “individual” to exclude AI systems owners from patent protection, the Decision Below effected a tremendous public policy change that will affect not just hundreds of billions in U.S. investments but also crucial innovations favoring public welfare. This unwarranted exclusion of AI from the role of “inventor takes no account of how AI innovations occur or the impact on the U.S. economy. The global AI market was valued at nearly \$59.7 billion in 2021 and is estimated to reach \$422.4 billion by 2028.”¹⁶ The number of AI-related patents issued has increased from 3,267 in 2017 to 18,753 in 2021.”¹⁷

Because the Federal Circuit’s decision is the last word on this controversy and no other cases will be emerging

15. See generally Shlomit Yanisky-Ravid & Xiaoqiong Liu, *When Artificial Intelligence Systems Produce Inventions: The 3A Era and an Alternative Model for Patent Law*, 39 CARDOZO L. REV. 2215 (2018).

16. Rose A. Zeck, *Analysis: Patents Forecast Widespread Reach of AI Tech in 2023*, *Bloomberg L.*, Nov. 13, 2022, <https://news.bloomberglaw.com/bloomberg-law-analysis/analysis-patents-forecast-widespread-reach-of-ai-tech-in-2023>.

17. *Id.*

from other federal circuit courts to facilitate this Court's review, this Court should act now to protect U.S. industry and avoid years of damage due to potential Congressional gridlock. Ninety four percent of business leaders agree that AI is critical to their success over the next five years.¹⁸ IBM reports that 68% of US businesses have either already deployed AI or exploring ways to do so.¹⁹ AI is now integrating into most aspects of life, increasing efficiencies and human capacities.²⁰ American industries depend heavily on the development, use, and commercialization of AI. AI systems are at the core of emerging tech, providing rapid and accessible services to a diverse array of fields.²¹ In the pharmaceutical industry, advanced AI systems play a major role in all phases of drug development, from

18. Nitin Mittal et al., *Fueling the AI Transformation: Four Key Actions Powering Widespread Value from AI, Right Now*, DELOITTE (2022), <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/deloitte-analytics/us-ai-institute-state-of-ai-fifth-edition.pdf>

19. *See* IBM Global AI Adoption Index 2022, <https://www.ibm.com/downloads/cas/GVAGA3JP>

20. *See* Janna Anderson & Lee Rainie, *Artificial Intelligence and the Future of Humans*, PEW RESEARCH CENTER (Dec 10, 2018), <https://www.pewresearch.org/internet/2018/12/10/improvements-ahead-how-humans-and-ai-might-evolve-together-in-the-next-decade/>; Darrell West & John Allen, *How Artificial Intelligence Is Transforming the World*, BROOKINGS INSTITUTE (Apr 24, 2018), <https://www.brookings.edu/research/how-artificial-intelligence-is-transforming-the-world/>.

21. Darrell West & John Allen, *How Artificial Intelligence Is Transforming the World*, BROOKINGS INST. (Apr 24, 2018), <https://www.brookings.edu/research/how-artificial-intelligence-is-transforming-the-world/>.

drug design and product development to clinical trial monitoring and pharmaceutical manufacturing.²² In the realm of drug discovery, AI is a game changer. Drug development is one of the riskiest and most expensive processes, costing over \$2 billion per drug developed, with a failure rate of up to 90%.²³ AI can mitigate drug discovery costs and greatly facilitate innovation. AI can autonomously identify new compounds with the desired pharmacological makeup. In *de novo* drug design, AI generates novel molecular structures from atomic building blocks with no prior relationships.²⁴ AI systems have been able to identify the optimal mRNA sequences in just 16 minutes, and have even discovered a novel antibiotic, chosen out of more than 100 million molecules, to provide ground-breaking remedies to certain superbugs.²⁵

Recent investment in AI drug discovery has more than doubled annually, topping \$2.4 billion in 2020 and \$5.2 billion in 2021.²⁶ AI has proven invaluable in identifying,

22. See Debleena Paul et al., *Artificial Intelligence in Drug Discovery and Development*, 2021 DRUG DISCOVERY TODAY 80, 85 (2021).

23. See Bowen Lou & Lynn Wu, *AI on Drugs: Can Artificial Intelligence Accelerate Drug Development? Evidence from a Large-Scale Examination of Bio-Pharma Firms*, 45 MIS QUARTERLY 1451, 1454 (2021).

24. See Varnavas D. Mouchlis et al., *Advances in De Novo Drug Design: From Conventional to Machine Learning Methods*, INT. J. OF MOLECULAR SCI., Feb. 2021, at 1, 1.

25. *Id.*

26. See Margaret Ayers et al., *Adopting AI in Drug Discovery*, BCG (Mar. 29, 2022), <https://www.bcg.com/publications/2022/adopting-ai-in-pharmaceutical-discovery>.

diagnosing, forecasting, and analyzing diseases.²⁷ According to a 2021 estimate, AI applications in the U.S. healthcare sector would create \$52 billion in future annual savings.²⁸ AI is predicted to be heavily involved in cancer patient diagnosis and treatment.²⁹ Between 1995 and 2019, over 7,433 AI-related pharmaceutical and biotechnology patents were identified.³⁰ Continuous investment and development of AI will lead to life-saving discoveries that the Patent Act should protect.

C. The Problem Of AI Patentability Has Lingered For Many Years And With New AI Tools Proliferating, Clear Guidance From This Court Is Necessary To Determine An AI Invention's Patentability

This Court should grant review because the problem of AI patentability is not academic. For many years it has lingered unresolved. For example, in 2019 Siemens was frustrated in seeking patent protection for multiple AI-generated inventions due to an inability to identify

27. See generally Abhaya Bhardway et al., *Artificial Intelligence in Biological Sciences*, 12 LIFE 1430, (2022).

28. See Anu M. Sebastian & David Peter, *Artificial Intelligence in Cancer Research: Trends, Challenges and Future Directions*, 12 LIFE 1991, 1996 (2022), <https://doi.org/10.3390/life12121991>.

29. See *id.* at 1991.

30. Bowen Lou & Lynn Wu, *AI on Drugs: Can Artificial Intelligence Accelerate Drug Development? Evidence from a Large-Scale Examination of Bio-Pharma Firms*, 45 MIS QUARTERLY 1451, 1458 (2021).

a human inventor.³¹ In 1983, an AI program known as Eurisko “invent[ed] new kinds of three-dimensional microelectronic devices ... novel designs and design rules have emerged.”³²

As AI technology progresses and disseminates, AI-generated inventions will proliferate. Pharmaceutical and entertainment industries heavily rely on AI to generate intellectual property outputs.³³ Use of AI inventions is poised to explode due to lower costs and wider-adoption among non-specialists.³⁴ OpenAI’s releases of accessible Dall-e and Chat GPT-4 are already demonstrating real-world value.³⁵ AI facilitated development of the COVID-19

31. See WIPO *AI Created Inventions*, <https://www.wipo.int/meetings/en/docdetails.jsp?doc%5Fid=454861>

32. See Douglas B. Lenat & William R. Sutherland, *Heuristic Search for New Microcircuit Structures: An Application of Artificial Intelligence*, 3 *AI MAG.* 17, 17 (1982).

33. See Bowen Lou & Lynn Wu, *AI on Drugs: Can Artificial Intelligence Accelerate Drug Development? Evidence from a Large-Scale Examination of Bio-Pharma Firms*, 45 *MIS QUARTERLY* 1451, 1454 (2021); See Me, Myself, and AI, *Ai and the Covid-19 Vaccine: Moderna’s Dave Johnson*, *MIT SLOAN MGMT. REV.*, (July 13, 2021), <https://sloanreview.mit.edu/audio/ai-and-the-covid-19-vaccine-modernas-dave-johnson/>.

34. See Global total corporate artificial intelligence (AI) investment from 2015 to 2021, <https://www.statista.com/statistics/941137/ai-investment-and-funding-worldwide/>

35. See Lisa Eadicicco, *You’ll Be Seeing ChatGPT’s Influence Everywhere This Year*, *CNET* (Jan.14, 2023), <https://www.cnet.com/tech/services-and-software/chatgpt-is-going-to-be-everywhere-in-2023/>

vaccine.³⁶ Pharmaceutical companies such as AlphaFold, Exscientia, and Atomwise utilize AI to accelerate drug discovery.³⁷ Evotec, a German biotechnology company, announced a Phase 1 clinical trial on a new anticancer molecule discovered by using Exscientia’s “Centaur Chemist” AI design platform.³⁸ Insilico Medicine announced a new AI-developed drug for Idiopathic Pulmonary Fibrosis.³⁹ AI systems have also become indispensable resources in cheminformatics by predicting

36. See Pfizer, *How a Novel ‘Incubation Sandbox’ Helped Speed Up Data Analysis in Pfizer’s COVID-19 Vaccine Trial*, https://www.pfizer.com/news/articles/how_a_novel_incubation_sandbox_helped_speed_up_data_analysis_in_pfizer_s_covid_19_vaccine_trial; *Me, Myself, and AI, Ai and the Covid-19 Vaccine: Moderna’s Dave Johnson*, MIT SLOAN MGMT. REV., (July 13, 2021).

37. See e.g., Demis Hassabis, *Putting the Power of AlphaFold Into the World’s Hands*, DEEPMIND (July 22, 2021), <https://www.deepmind.com/blog/putting-the-power-of-alphafold-into-the-worlds-hands>; *Our Mission*, EXSCIENTIA, <https://www.exscientia.ai/our-mission> (last visited Jan. 17, 2023); *How AtomNet Technology Improves Drug Design Using Convolutional Neural Networks*, ATOMWISE (Dec. 2, 2015), <https://blog.atomwise.com/introducing-atomnet-drug-design>.

38. See Neil Savage, *Tapping into the Drug Discovery Potential of AI*, NATURE, <https://www.nature.com/articles/d43747-021-00045-7>.

39. See *From Start to Phase 1 in 30 Months: AI-discovered and AI-designed Anti-fibrotic Drug Enters Phase I Clinical Trial*, INSILICO (Feb. 24, 2022), <https://insilico.com/phase1>

toxicity,⁴⁰ bioactivity,⁴¹ and protein structure.⁴²

II. Absent This Court's Review, The Decision Below Will Nullify U.S. Patent Protection For AI-Generated Inventions, Harming Innovation, Creativity, Competition and Investments

Under current USPTO practice, if the Decision below is left undisturbed and the Court does not recognize AI inventorship, there will be no inventor, resulting in no patent protection, and no technology ownership. This result was never intended by Congress, nor required by any language of the Patent Act. Because of this USPTO construction which will be perpetuated unless this Court or Congress acts, the Decision Below nullifies patent protection for all AI-generated inventions by voiding the recognition of AI as an autonomous "inventor." This nullification, in turn, voids the economic incentive of patent protection expected AI system owners. Economic loss

40. See Jiarui Chen et al., *Chemical Toxicity Prediction Based on Semi-Supervised Learning and Graph Convolutional Neural Network*, J. CHEMINFORMATICS, Nov. 2021, at 1, 2.

41. See Marcos V.S. Santana & Floriano P. Silva-Jr., *De Novo Design and Bioactivity Prediction of SARSCoV2 Main Protease Inhibitors Using Recurrent Neural NetworkBased Transfer Learning*, BMC CHEMISTRY, Feb. 2021, at 1, 18.

42. See ShanShan Hu et al., *Predicting Drug-Target Interactions from Drug Structure and Protein Sequence Using Novel Convolutional Neural Networks*, BMC BIOINFORMATICS, Dec. 2019, at 1, 1; see also Debleena Paul et al., *Artificial Intelligence in Drug Discovery and Development*, 2021 DRUG DISCOVERY TODAY 80, 85 (2021). BMC Bioinformatics, Dec. 2019, at 1, 1; see also Debleena Paul et al., *Artificial Intelligence in Drug Discovery and Development*, 2021 Drug Discovery Today 80, 85 (2021)

associated with a lack of patent protection disincentivizes AI investment, hindering the development of science and useful arts, and ultimately affecting public welfare and the innovation-reliant U.S. economy. The denial of patent protection to AI inventions contradicts the goals of patent laws to promote technology development and innovation, to encourage disclosure of valuable inventions, and to support the commercialization of inventions.⁴³ This patent nullification is a result never intended by Congress, nor warranted by any language in the Patent Act.

A. U.S. Patent Law Goals Are Consistent With Recognizing AI As The “Inventor”

Recognizing AI as the “inventor” and the owner of the AI system as the patent’s “owner” is a common-sense solution that furthers the goals of the Patent Act. The patent system’s purpose is to “encourage both the creation and public disclosure of new and useful advances in technology.”⁴⁴ Patent protection is essential to the promotion of science, art, and public benefit.⁴⁵ Denying AI system owners fair returns for AI-generated patents will create the opposite result by impeding AI development and shutting down innovation.

The Constitution empowered Congress to enact patent law to “promote the Progress of Science and

43. Dan L. Burk & Mark A. Lemley et al., *Life After Bilski*, 63 STAN. L. REV. 1315, 1326 (2011).

44. *See Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55 (1998).

45. *See Id.*

useful Arts.”⁴⁶ Patent laws target a dual purpose: (1) to incentivize innovation⁴⁷ and (2) to ensure public access to technical knowledge.⁴⁸ The patent system is crucial to overall U.S. innovation because disseminating scientific and technical information avoids duplication of existing inventions and permits inventors to build on existing patents to create new inventions.⁴⁹

i. Recognizing AI Patents Fosters Immediate Investment In Technology

In the wake of *Thaler*, Corey Salsberg, head of Global Affairs and Vice President at Novartis predicted that companies will not create pharmaceutical products using AI if they are unable to patent them.⁵⁰ Economic incentives

46. U.S. CONST. Art. 1, § 8, cl. 8.

47. See Richard A. Posner, *The Law & Economics of Intellectual Property*, 31 J. AM. ACAD. ARTS & SCI. 5, 6 (2002) (“[W]ithout exclusive rights, there will be insufficient incentives to invest in improving property: if you cannot be assured of being able to reap where you have sown, you won’t sow, and the land will lie fallow.”).

48. See Richard A. Posner, *Intellectual Property: The Law and Economics Approach*, 19 J. ECON. PERSP. 57, 60 (2005).

49. See Mimi S. Afshar, *Artificial Intelligence and Inventorship-Does the Patent Inventor Have to Be Human?*, 13 HASTINGS SCI. & TECH. L. J. 55, 64 (2022).

50. See Suzi Morales, *Can Artificial Intelligence Invent Things? A Curious Legal Case Could Have Big Implications for Business*, OBSERVER (Sept. 21, 2022), <https://observer.com/2022/09/can-artificial-intelligence-invent-things-a-curious-legal-case-could-have-big-implications-for-business/> (*Thaler* sends “a message to industry that you can’t use AI in R&D in these ways, even if it’s more effective than a human researcher”).

like patents drive behavior. Incentives drive where venture capital firms invest, what products technology companies pursue, and even which classes undergraduates choose.⁵¹

Patents drive U.S. economic growth. According to the USPTO, patent intensive industries accounted for nearly \$9 trillion of U.S. GDP in 2019.⁵² Patents incentivize R&D investments.⁵³ The business sector was the largest funder of U.S. R&D, accounting for \$531.9 billion of the 2020 total of \$707.9 billion.⁵⁴ Total U.S. R&D funding coming from the business sector increased from 66.6% in 2010 to 75.1% in 2020.⁵⁵ Research and development of AI systems are incentive dependent.⁵⁶ There is a direct link between economic incentives and technology development.⁵⁷

51. See *Spulber infra* note 63 at 306, (“Inventors would not devote effort and make investments in R&D unless they expect to obtain economic returns.”).

52. ANDREW A. TOOLE ET AL., INTELLECTUAL PROPERTY AND THE U.S. ECONOMY: THIRD EDITION, USPTO, <https://www.uspto.gov/sites/default/files/documents/uspto-ip-us-economy-third-edition.pdf>

53. See JOHN PALFREY, INTELLECTUAL PROPERTY STRATEGY 8 (2012).

54. See *Recent Trends in U.S. R&D Performance*, NAT’L CTR. FOR SCI. AND ENG’G STAT., <https://www.ncses.nsf.gov/pubs/nsb20225/recent-trends-in-u-s-r-d-performance> (last visited Dec. 13, 2022).

55. *Id.*

56. See *id.* at 314 (“[the patent grant] provides the basis from further developing the invention, commercializing the technology, introducing innovations to the market.”)

57. Paul Mozur, *Beijing Wants A.I. to Be Made in China by 2030*, N.Y. TIMES (July 20, 2017), <https://www>.

AI innovation necessitates significant investments of financial and human resources.⁵⁸ Weak intellectual property protections are credited, for example, with a lack of software investment in China.⁵⁹ Investors demand predictability. Uncertainty promotes risk-adverse behavior.⁶⁰ Voiding patents for AI-generated innovations will undermine investor confidence.

The AI industry has been expected to flourish over the next decade.⁶¹ However, the significant policy changes signaled by the Decision Below may alter that rosy outlook. Company executives and scholars have already begun to voice concerns over the legal status of AI-generated inventions. Creative output is likely to decrease without

[nytimes.com/2017/07/20/business/china-artificial-intelligence.html?mcubz=0&_r=0](https://www.nytimes.com/2017/07/20/business/china-artificial-intelligence.html?mcubz=0&_r=0)

58. Larry F. Darby and Joseph P. Fuhr, *Innovation and National Broadband Policies: Facts, Fiction and Unanswered Questions*, 20 MEDIA L. & POL'Y 3, 10-11 (2011).

59. See Mingzhi Li et al., *Strategies for Developing China's Software Industry*, 1 MIT INFO. TECH. AND INT'L. DEV. 61, 61-73 (2003), available at <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN021294.pdf>

60. ELIZABETH WEBSTER, *THE ECONOMICS OF INTANGIBLE INVESTMENT* 22 (1999).

61. Zion Market Research, \$422.37+ Billion Global Artificial Intelligence (AI) Market Size Likely to Grow at 39.4% CAGR During 2022-2028, BLOOMBERG, June 27, 2022, <https://www.bloomberg.com/press-releases/2022-06-27/-422-37-billion-global-artificial-intelligence-ai-market-size-likely-to-grow-at-39-4-cagr-during-2022-2028-industry>

patent protection for AI-generated inventions.⁶²

Looking at AI-generated inventions through the lens of law and economics, creative AI output should be eligible for patent protection. Patent eligibility will immediately spur AI inventors, investors and developers to create new patentable inventions.⁶³ If DABUS and other AI systems, are ineligible as “inventors” for patent protection, companies are disincentivized from investing in AI systems that invent.⁶⁴

The Decision Below stripping AI systems of “inventor” status cuts against a foundational policy of the US patent system, forcing organizations to decide between prioritizing efficiency by using AI to develop new products or returning to inefficient methods reliant solely on human workers with potentially patentable outputs.⁶⁵ Stripping

62. See Tim W. Dornis, *Artificial Intelligence and Innovation: The End of Patent Law As We Know It*, 23 YALE J. L. & TECH. 97, 136 (2020).

63. Daniel Spulber, *How Patents Provide the Foundation of the Market For Inventions*, 11 J. COMP. L. & ECON. 271, 325 (2014) (“Without such protections, companies resort to secrecy and vertical integration, which can cause competitive pressures to reducing incentives to invent and to innovate.”).

64. See Mimi S. Afshar, *Artificial Intelligence and Inventorship-Does the Patent Inventor Have to Be Human*, 13 HASTINGS SCI. & TECH. L.J. 55, 64–65 (2022).

65. John Villasenor, *Patents and AI Inventions Recent Court Rulings and Broader Policy Questions*, BROOKINGS INST. (Aug 25, 2022), <https://www.brookings.edu/blog/techtank/2022/08/25/patents-and-ai-inventions-recent-court-rulings-and-broader-policy-questions/>.

AI innovations of patent protections increases investment risks, reducing critical investment capital and discourages innovation.⁶⁶

To maintain the goals of patent law and to ensure the U.S. economy remains a global innovation leader, AI should be recognized as an inventor to ensure that AI-generated inventions are eligible for patent protection and to ensure that the many people who created, invested in, or deployed AI as a tool for innovation are rewarded.⁶⁷

B. Recognizing AI Patents Fosters The Patent Act's Goal Of Encouraging Disclosure Of Trade Secrets To Stimulate Innovation and Competition

Interpreting AI to be an “inventor” would foster the Patent Act’s goal of encouraging disclosure of trade secrets to stimulate innovation and competition.⁶⁸ Absent

66. Including advancing economic prosperity and technology competitiveness.”NATIONAL SECURITY COMMISSION ON ARTIFICIAL INTELLIGENCE, THE FINAL REPORT, 2021, <https://www.nscai.gov/2021-final-report/>, (“To remain the world’s leader in AI, the U.S. government must renew its commitment to investing in America’s national strength—innovation. This will require making substantial new investments in AI R&D and establishing a national AI research infrastructure that democratizes access to the resources that fuel AI. . . America’s IP laws and institutions must be considered as critical components for safeguarding U.S. national security interests, including advancing economic prosperity and technology competitiveness.”).

67. See Yanisky-Ravid, *Generating Rembrandt*, *supra* note 10.

68. EMILY G. BLEVINS, CONG. RSCH. SERV., R47267 PATENTS AND INNOVATION POLICY (2022), <https://sgp.fas.org/crs/misc/R47267.pdf>

patentability, those in control of inventive AI systems are disincentivated from publicly sharing technical knowledge behind AI inventions. A patent registration discloses information on how to replicate the invention.⁶⁹ The Decision below also will have unintended disclosure consequences in the copyright law context.⁷⁰ This secrecy, frustrating the Patent Act’s goal of stimulating innovation by disseminating knowledge, is also likely to extend to “all other scientific fields that may benefit from the output of an artificial intelligence system.”⁷¹

C. The USPTO’s Failure To Grant Patent Protection To AI Inventors Puts The U.S. Economy At A Competitive Disadvantage And Drives Innovation Offshore

Patents fund innovation. Investors swarm to patent-friendly jurisdictions.⁷² A rejection of AI inventorship may put the United States at a competitive disadvantage to other countries and drive innovation offshore.⁷³ As Chief Judge Rader noted in *Classen Immunotherapies, Inc. v. Biogen IDEC*, “if one nation makes patent protection difficult,

69. World Intellectual Property Organization [WIPO], *Frequently Asked Questions: Patents Basics*, https://www.wipo.int/patents/en/faq_patents.html.

70. *Id.*

71. See *Thaler v. Comm’r of Patents*, para. 56, p. 12 [2021] FCA 879 (July 30, 2021), available at <https://www.judgments.fedcourt.gov.au/judgments/Judgments/fca/single/2021/2021fca0879>.

72. See *Spulber supra* note 63 at 310.

73. See *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 480 (1974).

it will drive research to another, more accommodating, nation.”⁷⁴ The European patent office made it more difficult to secure patents in the 1990’s, pushing investment and development into the United States. Chief Judge Rader warned: “the tide can turn against us, too . . . innovation investment [can go] elsewhere.”⁷⁵ Due to the globalization of capital, American technological dominance is not preordained. Proper incentives and strategic policies drive a country’s technological success.⁷⁶ National policy prioritizing research and development of AI systems is paramount for American economic success.⁷⁷

Patent protections for innovation and technological progress are the main drivers behind a country’s economic growth.⁷⁸ Policies welcoming technological investment have strong impacts.⁷⁹ WIPO has ranked

74. *Classen Immunotherapies, Inc. v. Biogen IDEC*, 659 F.3d 1057, 1075 (Fed. Cir. 2011).

75. *Id.*

76. Executive Office of the President, *Artificial Intelligence, Automation, and the Economy* (2016) at 3, <https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/Artificial-Intelligence-Automation-Economy.PDF>

77. *Id.* at 27.

78. *Id.* at 1; *See Pfizer, Inc. v. Apotex, Inc.*, 488 F.3d 1377, 1380 (Fed. Cir. 2007) (Newman, J., dissenting) (“[A] nationally uniform, consistent, and correct patent law is an essential foundation of technological innovation, which is today the dominant contributor to the nation’s economy.”).

79. WIPO, *Global Innovation Index 2022*, <https://www.wipo.int/edocs/pubdocs/en/wipo-pub-2000-2022-section1-en-gii-2022-at-a-glance-global-innovation-index-2022-15th-edition.pdf>

the United States as the #2 most innovative country.⁸⁰ Because AI advancements lead to greater “productivity, high levels of employment, and more broadly shared prosperity,” investments in AI technology are paramount in maintaining global leadership.⁸¹ Global competition for AI primacy is already apparent. China, as an example, is investing billions of dollars to become, “the world’s premier artificial intelligence innovation center.”⁸² Other countries too, are taking a closer look at the AI inventorship question.⁸³ For these reasons, the Decision Below invalidating the recognition of AI inventors and AI-generated patents will have repercussions beyond the realm of technology and impair U.S. economic leadership.

III. Absent This Court’s Review, The Decision Below Creates Unfair Risks of Patent Invalidity For Legitimate Owners of Innovative AI.

The Decision Below puts AI inventors like Dr. Thaler in a difficult position. Claiming to be the true inventor, when the AI autonomously created the invention, risks

80. *Id.*

81. Executive Office of the President, *supra* note 76, at 3, <https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/Artificial-Intelligence-Automation-Economy.PDF>.

82. Mozur, *supra* note 57.

83. Patents have been issued to AI inventors in South Africa. Appeals are pending in the United Kingdom, the European Union, and Germany. Australia has denied an AI inventorship application. Patent applications with an AI inventor are pending in Brazil, Canada, China, India, Israel, Japan, New Zealand, Republic of Korea, Saudi Arabia, Singapore, Switzerland, and Taiwan.

later patent invalidation.⁸⁴ Disallowing patent protection for AI inventors and AI-generated inventions may lead to rewarding a person who is not the inventor.⁸⁵ If the individuals cannot accurately claim to be the inventor and if the AI system is excluded from “inventor” status, the current legal framework entirely fails to protect AI-generated inventions, resulting in patent invalidation.⁸⁶

All of this bureaucratic red tape is a tremendous drag on innovation. The USPTO has already granted patents for AI-generated inventions, without realizing that AI even had a role in its inventive process.⁸⁷ Entities submitting patent applications for AI generated systems currently name themselves as inventors to avoid the risk of patent invalidation; there is no place to mention AI on the patent application.⁸⁸ This Court’s review of the Decision Below would create clarity to prevent such inaccuracies in patent applications.

84. *See* 37 CFR § 1.63 (stating that an inventor has a duty affirm, under penalty of perjury, that they are the true inventor of the claimed subject matter of a patent application); *see also* 18 U.S.C. § 1001.

85. *See Thaler v. Vidal*, 43 F.4th 1207, 1210 (Fed. Cir. 2022).

86. *See Thaler v. Vidal*, 43 F.4th 1207, 1210 (Fed. Cir. 2022).

87. Jonathon Keats, John Koza Has Built an Invention Machine, POPULAR SCI., Apr. 18, 2006, <https://popsci.com/scitech/article/2006-04/john-koza-has-built-invention-machine/>.

88. *Id.*

CONCLUSION

For the reasons detailed above the Court should grant certiorari.

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