HOMOGRAPHY OF INVENTORSHIP: DABUS AND VALUING INVENTORS

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ABSTRACT

On July 28, 2021, the Device for the Autonomous Bootstrapping of Unified Sentience ("DABUS") became the first computer to be recognized as a patent inventor. Due to the advocacy of DABUS's inventor, Dr. Stephen Thaler, the world's definition of "inventor" has finally fractured – dividing patent regimes between recognition of machine inventorship and lack thereof. This division has sparked many scholarly conversations about inventorship contribution, but none have discussed the implications of a homographic inventorship.

This Article addresses the implications of international homographic inventorship – where countries have different notions and rules concerning patent inventorship – and the consequences for failing to understand the divergences that could result in patent invalidation. This Article adds to the literature by addressing Thaler's tireless inventorship advocacy, highlighting that Thaler uses his position of privilege to argue for inventorship acknowledgement of his machine and simultaneously to relinquish his own inventorship recognition. To emphasize, there is no existing caselaw except the DABUS case where a potential inventor has argued for the acknowledgement of another inventor and simultaneously relinquished their own recognition – whether that unacknowledged inventor was human or not human. Thaler's advocacy amplifies the need for continued conversation regarding closing the patent inventorship gap for women and underrepresented minorities of color, who are too often tokenized and marginalized in STEM and in the patent process.

By bringing the definition of inventor to the forefront, the DABUS case represents more than just a case of AI inventorship: it is a potential gateway to provide language and arguments to

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frame conversations about inventorship equity. In particular, the unique instance of Thaler's inventorship advocacy for his machine prompts questions about why inventors from privileged positions do not advocate for inventors from historically marginalized backgrounds. Based on a review of patent case law and sociology studies concerning power dynamics and communal recognition, this Article provides recommendations to address this issue and accelerate the stagnant process of achieving inventorship equity.

INTRODUCTION

Due to the advocacy of Dr. Stephen Thaler, the world's definition of "inventorship"—who gets to be recognized as inventors of a patented invention[1]—has finally fractured, dividing patent regimes between recognition of machine inventorship and lack thereof. On July 28, 2021, the South African Intellectual Property Office granted a patent for an invention "autonomously generated by an artificial intelligence" system nicknamed DABUS (Device for the Autonomous Bootstrapping of Unified Sentience).[2] Dr. Thaler, DABUS's inventor, had filed international and national patent applications wherein he listed DABUS as the sole inventor.[3] On July 30, 2021, the Federal Court of Australia overruled the decision of the Australian Patent Office rejecting the application and held that DABUS could be an inventor under the Australian Patents Act.[4] These decisions shook the foundation of inventorship, forever blurring the inventive line between man and machine.

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[1] *See generally* Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C. L. REV. 1079 (2016) (discussing the concept and requirements of patent inventorship within the context of computer creations).

[2] *See* Catherine Cotter, *The Edge of Glory?: Will DABUS 'Success' in South Africa and Australia be Repeated in the UK?*, LEXOLOGY: LENS (Aug. 10, 2021), https://www.lexology.com/library/detail.aspx; *see* Cos. & Intell. Prop. Comm'n, *Patent Journal Including Trade Marks, Designs and Copyright in Cinematographic Films*, 54 PAT. J. 1, 255 (July 2021) (listing DABUS as the sole named inventor and Stephen L. Thaler as the applicant).

[3] *E.g.*, U.S. Patent Application No. 16/524,350; Austl. Patent Application No. 2019363177; S. Afr. Patent No. ZA 2021/03242; PCT Int'l Application No. PCT/IB2019/057809 (showing that Stephen Thaler only listed himself as the applicant).

[4] Eileen McDermott, *DABUS Scores Again with Win on AI Inventorship Question in Australia Court*, IPWATCHDOG (Aug. 2, 2021), https://www.ipwatchdog.com/2021/08/02/dabus-scores-win-ai-inventorship-question-australia-court/id=136304/.

Dr. Thaler's advocacy demonstrates the power of a person using their position of privilege to argue for inventorship of another. Although artificial intelligence (AI) inventorship rights have been a hotly-debated topic in recent scholarship,[5] there is little discussion about how these decisions create the homograph of inventorship where two identically-spelled words have different meanings.[6] Because of Dr. Thaler's decision to advocate for his AI, the definition of "inventor" now objectively and drastically differs between the United States and Australia, with the former rejecting and the latter recognizing AI inventorship.[7] In effect, the DABUS decisions have turned inventorship into a homograph – creating two different meanings for the word.

With patent revocation as a potential consequence of improper inventorship, this definitional schism may wreak havoc on international and national phase patent applications.[8] Creating this homograph of inventorship ensures the essentiality of local counsel to navigate the minefield of software inventorship. This split proves how important

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[5] *See, e.g.*, Abbott, *supra* note 1 (arguing that computers should be recognized as inventors, in part, due to the scientific advancements that could result from such recognition); Rita Matulionyte, AI as an Inventor: Has the Federal Court of Australia Erred in DABUS? (Nov. 30, 2021) (unpublished), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3974219 (arguing that AI systems are insufficiently autonomous to claim inventorship); Anna Carnochan Comer, Note, *AI: Artificial Inventor or the Real Deal?*, 22 N.C. J.L. & TECH. 447 (2021) (arguing that without adequate protections for AI-generated inventions in the United States, inventors will have to either falsely claim themselves as inventors or keep AI-invented methods and products as trade secrets).

[6] *Homograph*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/homograph (last visited Sept. 3, 2021) ("[O]ne of two or more words spelled alike but different in meaning or derivation or pronunciation (such as the *bow* of a ship, a *bow* and arrow).").

[7] *See* McDermott, *supra* note 4 (explaining that Australia's definition of inventor includes an artificial inventor); Emily J. Tait, Matthew W. Johnson & Carl A. Kukkonen III, *Reboot Required: Artificial Intelligence System Cannot Be Named As An Inventor Under U.S. Patent Law, USPTO Says*, JONES DAY: INSIGHTS (May 2020), https://www.jonesday.com/en/insights/2020/05/reboot-required-artificial-intelligence-system-cannot-be-named-as-an-inventor-under-us-patent-law-uspto-says (showing that an inventor cannot be an artificial intelligence system in the United States).

[8] DONALD A. DEGNAN & LIBBY A. HUSKEY, HOLLAND & HART LLP, INVENTORSHIP: WHAT HAPPENS WHEN YOU DON'T GET IT RIGHT? 9 (2006), https://www.hollandhart.com/files/InventorshipWhatHappens.pdf ("If inventorship is wrong, the entire chain of title, as well as the agreements based upon it, are tainted.").

communal inventor support is to the patent inventorship process. This goes far beyond a case questioning AI inventorship. The ongoing DABUS litigation provides language and arguments to frame conversations about inventorship equity.[9]

Few have recognized how the advocacy of Dr. Thaler has significantly altered the discussion surrounding the patent gap, which refers to the demographic differences between those present in a setting and those (1) included as inventors in patent application filings and (2) who own and can leverage patents.[10] By advocating for inventorship recognition for an entity with no legal rights, Dr. Thaler proves that recognition of and advocacy for others plays a vital role in the inventorship determination process. By using his privilege to advocate on behalf of another, Dr. Thaler fought to ensure that the entity who conceived of the inventive concept received recognition.[11] This notion of advocating for recognition of others – and the power imbalance of inventor recognition – can no longer be overlooked in conversations about the STEM patent

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[9] *See e.g.*, Robert E. Colletti & Mark Basanta*, A Split Develops: Can Artificial Intelligence Invent Stuff?*, HAUG PARTNERS (Dec. 1, 2021), https://www.haug partners.com/article/a-split-develops-can-artificial-intelligence-invent-stuff/#:~:text=The%20U.S.%20Decision,must%20be%20a%20natural%20perso n. (showing that Dr. Thaler would rather fight for inventorship recognition for what he believes is the true inventor – DABUS – than recognize himself as an inventor while believing he was undeserving of the title).

[10] *What the Patent Gap Tells Us about Diversity in Innovation*, VENTUREWELL (Nov. 10, 2020), https://venturewell.org/patent-gap/ ("[P]atent holders in the U.S. today are overwhelmingly white, male, and wealthy."). *See also* Miriam Marcowitz-Bitton, Yotam Kaplan & Emily Michiko Morris, *Unregistered Patents & Gender Equality*, 43 HARV. J. L. & GENDER 47, 51 (2020) ("A number of empirical studies indicate that women own fewer patents compared to men, and female inventors file for fewer patents compared to their male counterparts."); INST. FOR WOMEN'S POL'Y RSCH, EQUITY IN INNOVATION: WOMEN INVENTORS AND PATENTS 5 (2016) (showing underrepresentation of women in patent inventorship, including that "[a]mong college graduates, women are generally less likely than men to apply for a patent, regardless of race and ethnicity").

[11] Ryan Abbott, *Artificial Inventors*, ARTIFICIAL INVENTOR PROJECT, https://artificialinventor.com/dabus/ (last visited Dec. 23, 2021) ("Arguably, DABUS may be considered 'sentient' in that any chain-based concept launches a series of memories (i.e., affect chains) that sometimes terminate in critical recollections, thereby launching a tide of artificial molecules. It is these associated memory sequences, and the accompanying simulated neurotransmitter rush, that are considered equivalent to subjective feelings in humans (i.e., sentience). In this way, DABUS has an emotional appreciation for what it conceives.").

gap.[12] This creates a unique opportunity to add language and arguments to frame conversations about patent inventorship equity.

The current literature primarily advocates for incentive structures and educational opportunities to close patent gaps related to a perceived or calculated underrepresentation of a group of inventors.[13] But these attempts at motivation only apply if the inventor is powerful enough to apply for a patent on behalf of their inventorship group. For example, most inventors at universities or in industry do not have the power to apply for a patent; they are part of a hierarchical order of inventors and managers, with those higher in the hierarchy granted decision power to apply for a patent and name inventors on that patent.[14] Additional incentives to patent, such as a monetary bonus or name recognition, would not impact the patent rate of inventors who cannot apply for a patent due to the structure of their employment.

The unique instance of Dr. Thaler's inventorship advocacy for his machine prompts questions about why inventors from privileged positions do not advocate for inventors in less privileged positions – many of whom are from historically marginalized backgrounds. It is decidedly frustrating that there is no legal parallel for Dr. Thaler's advocacy for DABUS in the patent gap legal caselaw. Before DABUS, there has not been a case where an inventor higher on the patent-decision hierarchy has openly advocated for an overlooked inventor's recognition in court, especially not when

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[12] *See generally* Michael Lovorn et al., *Who's in Control? Teachers from Five Countries Share Perspectives on Power Dynamics in the Learning Environment*, 11 J. RSCH. INT'L EDUC. 70 (2012).

[13] *See, e.g.*, Emily Deruy, *In University Sexual Harassment Cases, a Chilling Power Dynamic*, MERCURY NEWS (Dec. 7, 2017), https://www.mercurynews.com/2017/12/07/in-university-sexual-harassment-cases-a-chilling-power-dynamic/ ("Professors wield enormous influence over their students' lives, meaning many students choose not to report abuse because they don't want to jeopardize future opportunities."); Amy C. Madl & Lisa Larrimore Ouellette, *Policy Experiments to Address Gender Inequality Among Innovators*, 57 HOUS. L. REV. 813 (2020) (discussing possible patent gender gap solutions of increasing workplace transparency, promoting worker mobility, providing pipeline programs, and increasing incentives for female inventors).

[14] *See, e.g.*, *Frequently Asked Questions*, UNIV. OF MINN. TECH. COMMERCIALIZATION (Oct. 23, 2019, 9:31 AM), https://research.umn.edu/units/techcomm/university-inventors/frequently-asked-questions (stating that "[f]inal responsibility for all protection and licensing decisions rests with the University," rather than the inventor, including the University's decision to file a patent application).

simultaneously voiding his own claim to inventorship.[15] DABUS brings this possibility to the limelight; scholars and advocates must address the communal nature and power dynamics behind patent inventorship to better address the patent gap.[16]

Dr. Thaler's fight for inventorship recognition for DABUS[17] highlights three areas not currently at the forefront of the patent inventorship discussion: (1) advocates for patent inventorship recognition can be more powerful than previously recognized – changing forever the international definition of inventorship; (2) due to the cases brought forth by Dr. Thaler, scholars and advocates should embrace the opportunity to advance discussions about power dynamics and communality of inventorship that affect patent inventorship credit; and (3) there is no existing caselaw except the DABUS case where a potential inventor has argued for the acknowledgement of another inventor and simultaneously relinquished their own recognition – whether that unacknowledged inventor was human or not human.[18] Exploring motivations and implications of someone in power advocating to share credit may help illuminate methods for closing gaps in patent inventorship.[19]

This Article initiates a needed discussion on advocacy's role in closing the patent gap by looking to the advocacy used for the AI inventor, DABUS. Section II reviews the general international patent process. Section III discusses the current status of the DABUS inventorship discussion as of November 2021. Section IV highlights how Dr. Thaler

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[15] It should be noted that PETA did argue for a monkey's copyright ownership, but PETA would not have been the owner of the copyright had the monkey failed in the quest for copyright ownership. *See* Naruto v. Slater, 888 F.3d 418 (9th Cir. 2018).

[16] *See* Holly Fechnder & Matthew S. Shapanka, *Closing Diversity Gaps in Innovation: Gender, Race and Income Disparities in Patenting and Commercialization of Inventions*, 19 TECH. & INNOVATION 727, 727 (2018) ("Fewer than 20 percent of all U.S. patents today list a woman as an inventor. Among college graduates, fewer than half as many African Americans and Hispanics hold patents, compared to their white counterparts."). Exploring motivations to close the patent gap should not be equated to advocacy for, or against, patents as a means to promote innovation or reward innovators. Patents, like other commodities, have value within certain communities and patent inventor recognition can come with both tangible and intangible rewards. What is important to note is that these rewards and the patent process should not be inherently more attractive to people of a certain race or gender.

[17] Abbott, *supra* note 11.

[18] Advocacy has happened in copyright law, but not in other intellectual property regimes. *See* Naruto v. Slater, 888 F.3d 418 (9th Cir. 2018).

[19] *See* Fechnder & Shapanka, *supra* note 16.

changed the definition of inventorship - explaining the homography of inventorship in South Africa, Australia, Europe, and the United States and the implications for improper inventorship. Section V explores how Dr. Thaler's advocacy prompts questions about why inventors from privileged positions do not advocate for inventors from historically marginalized backgrounds. Section V also illuminates opportunities to provide language and arguments to frame conversations about the narrative of inventorship. The powerful nature of the DABUS decisions cannot be overlooked; the advocacy strategies, if paralleled by others, can be used to address the inequities of patent gaps and accelerate the process of pursuing inventorship equity.[20]

I. GENERAL PATENT PROCESS

A patent is granted to a person who is the first to publicly teach a person having ordinary skill in the art to make something novel.[21] A patent owner has the right to exclude others from making, using, selling, and offering to sell their invention.[22] This negative right only extends to the country where the owner holds the patent.[23] For example, for United States patents, the owner can prevent others from making, using, selling, and offering to sell their invention in the United States for the life of the patent.[24] However, a United States patent cannot be asserted against someone who is exclusively making, using, selling, and offering to sell the invention outside of the United States.[25] Therefore, if an owner has the

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[20] *Id.*

[21] *See* 35 U.S.C. § 101 (2012) ("Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor.").

[22] *See* 35 U.S.C. § 154(d)(1)(A)(i) (2020) (stating that patent owners may also exclude others from "importing the invention into the United States, and, if the invention is a process . . . exclude others from using, offering for sale or selling throughout the United States, or importing into the United States, products made by that process").

[23] *See Protecting Intellectual Property Rights (IPR) Overseas*, U.S. PAT. & TRADEMARK OFF. (Nov. 1, 2019, 1:40 PM), https://www.uspto.gov/ip-policy/ipr-toolkits ("Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in other countries must apply for a patent in each of the other countries or in regional patent offices.").

[24] 35 U.S.C. § 154(d)(1)(A)(i) (2020).

[25] The concept of inducement or other secondary liability for patent infringement will not be discussed in this article.

resources and believes the invention is valuable enough, the owner will usually file patent applications in multiple countries.[26]

Although an applicant may file separate patent applications in each country, the Patent Cooperation Treaty ("PCT") process provides the easiest method of pursuing patent protection in multiple countries.[27] The PCT "assists applicants in seeking patent protection internationally for their inventions" by allowing them to file one international application that applicants can subsequently use to seek protection in multiple countries.[28] When filing the PCT application, the applicant declares the applicant, an address for correspondence, and the inventors on the PCT request form.[29]

The PCT application forms the basis for all subsequent national stage applications.[30] After filing the PCT application, an applicant has approximately eighteen months to select countries in which to seek patent protection and to file national stage applications in those countries based on the disclosure in the PCT application.[31] Unless amended for typographic issues, the description of the invention and the content of the patent application in these countries is identical to the substance of the

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[26] Tomás Llamas, *Protecting Inventions by Patent in Multiple Countries*, ABG INTELL. PROP., https://abg-ip.com/protecting-inventions-by-patent-multiple-countries/ (last visited Sept. 3, 2021).

[27] *Id.*

[28] *PCT – The International Patent System*, WORLD INTELL. PROP. ORG., https://www.wipo.int/pct/en/ (last visited Sept. 3, 2021). It should be noted that just because an applicant submits a PCT application as one application, multiple inventions could be contained in that application. Attorneys and owners may decide to divide the application into multiple patents at various stages of patent prosecution.

[29] *See PCT Request Form PCT/RO/101*, WORLD INTELL. PROP. ORG. (July 2020), https://www.wipo.int/export/sites/www/pct/en/forms/request/ed_request.pdf.

[30] *See Protecting your Inventions Abroad: Frequently Asked Questions About the Patent Cooperation Treaty (PCT)*, WORLD INTELL. PROP. ORG. (Apr. 2020), https://www.wipo.int/pct/en/faqs/faqs.html ("[A]fter the end of the PCT procedure, usually at 30 months from the earliest filing date of your initial application, from which you claim priority, you start to pursue the grant of your patents directly before the national (or regional) patent Offices of the countries in which you want to obtain them."); *id.* ("[T]he written opinion will form the basis of the international preliminary report on patentability (IPRP Chapter I) which will be provided, together with its English translation at the end of the international phase to the national (or regional) patent Offices.").

[31] *See id.* ("[Y]ou have up to 18 months more than if you had not used the PCT to reflect on the desirability of seeking protection in foreign countries, to appoint local patent agents in each foreign country, to prepare the necessary translations and to pay the national fees.").

PCT application.[32] All of these patent applications together are considered a patent family.[33]

When filing in multiple countries, attorneys generally hire foreign patent counsel to prosecute the application under the laws and regulations in the foreign country.[34] The foreign counsel will advise primary counsel about how to amend claims to comply with their country's regulations, assist in filing the nationally-required paperwork and fees, and potentially help to translate the patent application into the language of examination, if necessary.[35] Essentially, the foreign counsel guides the primary counselor through the patent process from the time the application is filed at the national phase to the time it issues, is abandoned, or expires.[36] In addition to helping with formal paperwork, foreign counsel will also inform the primary counsel about next steps in the patent process, prepare arguments if the country is an examining country, and disclose allowance procedures.[37] Foreign counsel generally assumes that primary counsel is moderately versed in the generalities of patent law, but not any country-specific rules and regulations.[38]

It is imperative for foreign and primary counsel to communicate and ensure they properly navigate differences between the patent laws and

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[32] *DOCDB Simple Patent Family,* EUR. PAT. OFF. (Feb. 7, 2020), https://www.epo.org/searching-for-patents/helpful-resources/first-time-here/patent-families/docdb.html ("The technical content covered by the applications is considered to be identical.").

[33] *See id.* ("A simple patent family is a collection of patent documents that are considered to cover a single invention. . . . Members of a simple patent family will all have exactly the same priorities.").

[34] *See* WORLD INTELL. PROP. ORG., *supra* note 30 ("The fees you will need to pay as you enter the national phase represent the most significant pre-grant costs. They can include fees for translations of your application, national (or regional) Office filing fees and fees for acquiring the services of local patent agents or attorneys.").

[35] *See id.* ("[A]ppoint local patent agents in each foreign country, to prepare the necessary translations and to pay the national fees.").

[36] *See, e.g.*, *PCT National Phase Entry in Australia*, LAMINAR IP – PATENT ATT'YS, https://www.laminarip.com/national-phase-entry-australia (last visited Dec. 23, 2021) ("Our Australian Patent Attorneys can assist patent owners and foreign attorneys with entering the Australian National Phase of a PCT application.").

[37] *Id*.

[38] *See, e.g.*, Lucy Padget, *How do you apply for an international patent?*, GAZETTE (Mar. 29, 2021), https://www.thegazette.co.uk/all-notices/content/103915 ("Clients communicate with their local counsel who in turn coordinates and instructs the foreign counsel to ensure all arguments are presented consistently.").

regulations in various countries.[39] To understand this process for inventorship, I interviewed nineteen patent attorneys, two patent agents, and one PCT representative.[40] Although counsel, agents, and representatives reported filing different claims and assignments based on foreign regulations, none of the interviewees reported filing different national stage applications with different inventorship based on how inventorship is defined in each country, or even discussing the definition of inventorship of another country – before or after the advent of the DABUS litigation. The DABUS case law is the first case to bring this oversight to the forefront: patent inventorship does not have a single, international definition.[41]

II. DABUS AND THE COURTS: AN OVERVIEW

Until July 28, 2021, patent offices seemingly agreed that an inventor must be a natural-born human.[42] Through the advocacy of Dr. Stephen Thaler, both South Africa's Companies and Intellectual Property Commission and Australia's Federal Court allowed a patent with non-natural-born human inventorship.[43] This Section discusses the history of

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[39] *See id.* ("However, local patent procedure is complex and difficult to navigate, and some mistakes and omissions are fatal. All countries impose strict procedural deadlines, and many countries impose other obligations, such as disclosure requirements for material relevant to patentability (for example, the US and Israel) or use of indigenous bioresources (for example, Brazil).").

[40] These conversations were conducted under a promise of anonymity. I interviewed sixteen United States-based attorneys, two United States-based patent agents, and one intellectual property attorney from England, Australia, and Spain, respectively.

[41] *See* Imogene Ireland & Jason Lohr, *'Dabus': the AI Topic That Patent lawyers Should be Monitoring*, MANAGING IP (Sept. 9, 2020), https://www.managingip.com/article/b1n8q624s4vyv4/dabus-the-ai-topic-that-patent-lawyers-should-be-monitoring ("What is particularly interesting about these decisions is that, until they were given, there was little guidance – or debate – addressing inventorship of inventions made using AI in the US, UK, or Europe as a whole.").

[42] *See* Meshandren Naidoo, *In a World First, South Africa Grants a Patent to an Artificial Intelligence System*, QUARTZ AFR. (Aug. 9, 2021), https://qz.com/africa/2044477/south-africa-grants-patent-to-an-ai-system-known-as-dabus/ (describing South Africa's DABUS decision as the only to accept the patent application, while other "patent offices around the world" rejected the application).

[43] *See* Alexandra Jones, *Artificial Intelligence Can Now be Recognized as an Inventor After Historic Australian Court Decision*, ABC (Aug. 2, 2021, 1:55 AM), https://www.abc.net.au/news/2021-08-01/historic-decision-allows-ai-to-be-recognised-as-an-inventor/100339264; *see also* Ed Conlon, *DABUS: South Africa*

the patent processes surrounding DABUS, the current state of the DABUS patent applications, and Dr. Thaler's advocacy efforts.

A. DABUS Patent Applications

Dr. Stephen Thaler patented his invention, DABUS, on September 24, 2019.[44] DABUS is configured to provide data about interconnecting neural models and to identify geometries and topologies of chains of those neural modules.[45] Using "generative machine intelligence," DABUS can allegedly independently conceive of inventions and judge the merit of its self-conceived ideas by identifying the conceived invention as novel and salient after receiving training in general knowledge in the field.[46] Essentially, according to Dr. Thaler, DABUS is a machine configured to conceive of and identify an invention.[47]

According to Dr. Thaler, DABUS conceived of at least two inventions: a fractal-shaped food container and a neural flame.[48] While the patent application for DABUS was still pending, Dr. Thaler filed a PCT application directed to these two inventions and listed DABUS as the sole inventor.[49] Dr. Thaler then filed national phase patent applications claiming priority to this PCT in seventeen countries and patent regions, all listing DABUS as the sole inventor.[50] In some countries, Dr. Thaler split

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Issues First-ever Patent with AI Inventor, MANAGING IP (July 29, 2021), https://www.managingip.com/article/b1sx9mh1m35rd9/dabus-south-africa-issues-first-ever-patent-with-ai-inventor.

[44] U.S. Patent No. 10,423,875 (issued Sept. 24, 2019).

[45] *See id.* (claiming "[a] system for avoiding processing bottlenecks from occurring while providing data about states of a plurality of interconnecting neural modules representing an environment in order to identify positions, geometries, and topologies of chains of the interconnecting neural modules").

[46] *See Frequently Asked Questions*, ARTIFICIAL INVENTOR PROJECT, https://artificialinventor.com/frequently-asked-questions/ (last visited Nov. 12, 2021) ("The inventions were conceived by a generative machine intelligence, judging merit of its own self-conceived ideas based upon its own cumulative experience.").

[47] *See* Thaler v. Comptroller-Gen. Pats., Designs & Trade Marks, [2020] EWHC (Pat) 2412, [2020] WLR(D) 526 ("The inventions were conceived by a generative machine intelligence, judging merit of its own self-conceived ideas based upon its own cumulative experience.").

[48] PCT Int'l Application No. PCT/IB2019/057809 (filed Sept. 17, 2019).

[49] *Id.*

[50] *See Patents and Applications*, ARTIFICIAL INVENTOR PROJECT,

the national phase application into two applications, separately claiming the inventions directed to the food container and the neural flame.[51]

Since filing these patent applications in 2019, none of the seventeen national patent offices has rejected the patent as unallowable for its content.[52] In other words, thus far every patent system found the content of the applications to be novel, not obvious, and patent-worthy. But a patent cannot be granted just because the invention is patentable; the patent application must also comply with all rules and regulations of the patent office.[53] Here, rules of inventorship, not content of the application, are being disputed by patent offices around the world.[54]

B. DABUS Patent Outcomes

Patent examiners and courts have split on whether their national rules and regulations allow a patent to issue with a non-human inventor.[55] In the summer of 2021, both South Africa's Companies and Intellectual Property Commission and Australia's Federal Court allowed the patent to issue with non-human inventorship.[56] The Australian Federal Court determined that "the inventor can be non-human."[57] Although the Commissioner of Patents for Australia is appealing this decision, AI can currently be an inventor in Australia.[58]

Conversely, the United States Patent and Trademark Office (USPTO) says patent applications must list a human inventor to issue as a

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https://artificialinventor.com/patent-applications/ (last visited Nov. 12, 2021). Because this essay discusses the homograph of inventorship, the analysis in this section will be limited to the current decisions in countries which examine in English and where this application was filed in English. The Germany decision and appeal process will not be discussed herein.

[51] *See id.*

[52] *See id.*

[53] *See* Manual of Patent Examination and Procedure § 1810 (9th ed. Rev. 4, June 2020) [hereinafter MPEP] (explaining rules and regulations of filing date requirements for patent applications).

[54] *See, e.g.*, Thaler v. Comptroller-Gen. Pats., Designs & Trade Marks, [2020] EWHC (Pat) 2412, [2020] WLR(D) 526.

[55] The country-specific laws and outcomes for the DABUS patent applications are discussed more completely *infra*, Section IV.

[56] *See* Conlon, *supra* note 43; *see also* Jones, *supra* note 43.

[57] *See* Jones, *supra* note 43.

[58] *See Commissioner to Appeal Court Decision Allowing Artificial Intelligence to be an Inventor*, AUSTL. GOV'T: IP AUSTL. (Aug. 30, 2021), https://www.ipaustralia.gov.au/about-us/news-and-community/news/commissioner-appeal-court-decision-allowing-artificial-intelligence.

patent.[59] The European Patent Office (EPO) reached a similar decision.[60] And the United Kingdom Intellectual Property Office (UKIPO) not only ruled that, because DABUS was not a person, the patent could not issue, but also determined that, if DABUS was a person, Dr. Thaler could not apply for the patent on behalf of DABUS without providing proof of a derivation of right.[61]

C. Dr. Thaler's Advocacy

Dr. Thaler appealed the patent rejections. He argues that he is fighting this battle to convince "humanity that [his] creative neural architectures are compelling models of cognition, creativity, sentience, and consciousness."[62] In his U.K. appeal, Dr. Thaler argued that "[i]nventorship should not be restricted to natural persons. A machine which would meet inventorship criteria if a natural person should also qualify as an inventor."[63] Further, Dr. Thaler alleged in his U.S. complaint for declaratory and injunctive relief that DABUS meets the inventorship criteria.[64] Thaler acknowledged that, if he named himself as the inventor, the patents would have likely already issued both in Europe and in the United States.[65] Although Dr. Thaler conceived of and programmed DABUS, he does not believe that he is not the inventor of the subsequent ideas conceived of by DABUS. This dispute between the courts and Dr. Thaler will have serious implications for AI inventorship: if DABUS cannot be named as the inventor, either all AI-generated inventions would

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[59] *In re* Application of Application No. 16/524,350, Dec. Comm'r Pat. 7 (Apr. 22, 2020) (stating that "a machine does not qualify as an inventor under the patent laws").

[60] *See EPO Publishes Grounds for Its Decision to Refuse Two Patent Applications Naming a Machine as Inventor*, EUR. PAT. OFF. (Jan. 28, 2020), https://www.epo.org/news-events/news/2020/20200128.html; *see also Thaler v Commissioner of Patents* [2021] FCA 879 (30 July 2021) 4 (Austl.).

[61] BL O/741/19, Dec. U.K. Int'l Pat. Off. 6 (Dec. 4, 2019).

[62] *See* Jones, *supra* note 43.

[63] Thaler v. Comptroller-Gen. Pats., Designs & Trade Marks, [2020] EWHC (Pat) 2412, [2020] WLR(D) 526.

[64] Complaint for Declaratory and Injunctive Relief, Thaler v. Iancu at 1–2, No. 1:20-cv-00903-LMB-TCB (E.D. Va. Aug. 6, 2020).

[65] *See id.* at 7 ("Had Plaintiff listed himself as the inventor for the Applications he would have two issued patents or be well on his way to that outcome.").

enter the public domain once disclosed or a natural person who does not meet the inventorship criteria will be improperly listed on the patent.[66]

By refusing to list himself as an inventor, Dr. Thaler has created the first case where legal systems have split an international constant of inventorship: the human constant. Thaler is recognizing another entity – his computer – as an inventor and crediting the inventor as he deems appropriate. These actions, as shown in Sections IV and V below, advance the conversations of international inventorship and privileges of inventorship recognition.

III. INVENTOR HOMOGRAPHY: UNDERSTANDING INVENTORSHIP SCHEMES IN LIGHT OF DABUS

The current worldwide inventorship dispute highlights an overlooked issue in patent law: the homograph of inventorship. Patent inventorship – that is, who should receive credit as an inventor on a patent – is defined differently in laws, regulations, and court systems throughout the world. Many countries' regulations leave the term "inventor" undefined, allowing vague cultural understandings to inform the national definition of inventorship.[67] Attorneys choosing to rely solely on their domestic definition of the term "inventor" in foreign-originated applications – without clarifying whether the definition of inventor is different in the domestic and foreign country – seems to border on bad faith – or at least lazy diligence. Until the DABUS decisions in South Africa and Australia in the summer of 2021, these differences may have gone undetected. Even if all appeals in the DABUS cases eventually resolve to recognize AI inventorship, the recognition of disparate inventorship regulations must remain.[68] DABUS highlights that the lexicography of countries' patent offices and courts have created a homograph.

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[66] *See id.* ("This means that AI-generated inventions will enter the public domain once disclosed. . . . Alternately, future patent applicants may attempt to circumvent the new standard by inaccurately listing a natural person who does not meet inventorship criteria.").

[67] *Thaler v Commissioner of Patents* [2021] FCA 879 (30 July 2021) 13, 18 (Austl.).

[68] This outcome seems unlikely given the recent ruling in the Eastern District of Virginia, denying patent inventorship for DABUS. *See* Ryan Davis, *Only Humans, Not AI, Can Be An Inventor, Va. Judge Rules*, LAW360 (Sept. 2, 2021, 10:19 PM), https://www.law360.com/ip/articles/1418666/only-humans-not-ai-can-be-an-inventor-va-judge-rules (stating that the Virginia judge ruled that "artificial intelligence cannot be listed as an inventor on a patent application" under U.S. patent law).

Like "bat" the animal and "bat" the wooden stick used in baseball, the term "inventor" is spelled the same in many countries (either directly or through translation) but has different practical definitions. The fact that a word could have different meanings in different countries should not be surprising, even across countries where the majority of residents are native English speakers.[69] The PCT application even acknowledges the possibility that the term "inventor" could have different meanings based on the eventual national phase countries chosen in the pre-DABUS world.[70] Nevertheless, practitioners and legal scholars have not grappled with the possibility that this has finally come to fruition.

In my research, including twenty-two conversations I have had with various practitioners throughout the world, no one has ever filed a patent family[71] with different inventors based on the definition of inventors in foreign countries.[72] Although practitioners recognize the gravity of improperly naming inventors on patent applications, the homography of inventorship was – and is – being overlooked in practice. This Section delves into a brief description of the laws constructing inventorship in some countries and regions at issue in the DABUS decision, including South Africa, Australia, the European Union, and the United States. This Section also discusses different consequences of improper inventorship

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[69] *See, e.g.*, *Words with Opposite Meanings in Different Regions*, STACK EXCH.: ENG. LANGUAGE & USAGE (Aug. 31, 2010), https://english.stackexchange.com /questions/1999/words-with-opposite-meanings-in-different-regions (showing, for example, that "table" means to "suspend consideration of a pending motion" in the United States, but it "is a proposal to begin consideration of a proposal" in the United Kingdom).

[70] *See* WORLD INTELL. PROP. ORG., *Chapter 5: Filing an International Application*, *in* PCT APPLICANT'S GUIDE – INTERNATIONAL PHASE, Rule 4.6(c) (2021), https://www.wipo.int/pct/en/guide/ip05.html ("What must be done if the inventors are not the same for all designated States? The PCT permits different inventors to be indicated for different designated States where, in this respect, the requirements of the national laws of the designated States are not the same.").

[71] Recall that a "patent family" is the term used to describe the collection of patents documents for a single invention. *DOCDB Simple Patent Family,* EUR. PAT. OFF., *supra* note 32.

[72] These conversations were conducted under a promise of anonymity. I interviewed sixteen United States-based attorneys, two United States-based patent agents, and one intellectual property attorney from England, one from Australia, and one from Spain. Two attorneys did report considering filing inventorship in different countries due to chain of priority issues, but not due to different inventorship standards.

from different countries, showing that improperly naming inventors on patents could have serious consequences for patent validity.[73]

A. South Africa

South Africa was the first country in the world to grant a patent with an AI system as an inventor.[74] South Africa does not have a full examination process wherein an examiner determines whether the invention described in the patent is novel in light of existing art.[75] Instead, the patent depository system of South Africa uses a formality examination process—meaning that patents are examined only to ensure formal requirements are followed, like forms are properly filled out and all necessary pieces of the patent application are present—before granting the patent.[76]

Under the South African Patents Act 57 of 1978, the act that governs South African patent law, a patent application must list the names and addresses of the inventors.[77] However, the law fails to define the term "inventor."[78] "Inventor" typically means an entity who has contributed an inventive feature of the invention, such that the invention would not have been devised without that contribution.[79]

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[73] *See, e.g.*, Adrian Hocking, *Excluded Inventor Destroys European Patent*, ALBRIGHT IP (Apr. 4, 2018), https://www.albright-ip.co.uk/2018/04/excluded-inventor-destroys-european-patent/ ("On 17 January 2018, the European Patent Office (EPO) revoked a key patent granted to the Broad group (EP 2771468), which claimed priority from US patents, the first of which was filed in December 2012. The reason? A discrepancy between the applicants on the patent and those listed on the priority documents.").

[74] *See* Naidoo, *supra* note 42.

[75] *See* Ramon Pereira & Gizela Lombard, *Phase 1 of South Africa's IP Policy: What You Need to Know*, ADAMS & ADAMS, https://www.adams.africa/insights/phase-1-south-africas-ip-policy-need-know/ (last visited Dec. 29, 2021).

[76] *See* Meshandren Naidoo, The CRISPR Patent Landscape: A South African Perspective 43, 43 n.179, 44 (2020) (LLM mini-dissertation, University of Kwazulu-Natal); *see also* Anthipi Pouris & Anastassios Pouris, *Patents and Economic Development in South Africa: Managing Intellectual Property Rights*, 107 S. AFR. J. SCI. 1, 5–6 (Nov. 1, 2011) (showing that, just checking for the proper payments and forms has led to "software patents slip[ping] through the process illegally").

[77] *See* Patents Act 57 of 1978 § 10 (S. Afr.).

[78] *Id.* § 2 (defining terms used within the Act, not including "inventors").

[79] *See* Jaco Theunissen & Christina Louw, *Patent Inventorship – Not Always So Patently Clear*, GO LEGAL (June 25, 2018), https://www.golegal.co.za/patent-application-inventorship/ ("Firstly, one must identify the inventive concept in the

The South African law does suggest that the inventor must be a person, but not necessarily a natural person. The law states that "[a]n application for a patent in respect of an invention may be made by the inventor or by any other person acquiring from him the right to apply . . . ."[80] This language lacks qualification that the "person" needs to be a "*natural* person." Still, "inventor" in South African patent law presumably referred to "a natural person who conceives of something novel in the context of patentability criteria"[81] before the DABUS case was actively presented in any court. Even knowing that "[t]he invention was autonomously generated by an artificial intelligence," the South African patent system granted the national phase application.[82] Thus, the granting of the DABUS patent challenged the presumed meaning of "inventor" under South African law as one encompassing only natural persons to possibly include AI inventors.

B. Australia

The inventorship test in Australia is similar to the test in South Africa. Like South Africa, there is no codified definition of the term "inventor."[83] Nevertheless, "it is generally accepted that an inventor is a person who has made an inventive contribution to at least one claim of a patent application or patent."[84] Australia's Patents Act 1990 states that "a patent for an invention may only be granted to a person who . . . is the inventor," requiring some degree of personhood.[85] Much like South Africa's law, Australia's Patents Act does not explicitly qualify that the person needs to be a natural person. Furthermore, the inventor must have a name and address according to Patent Regulations 3.2C(2).[86]

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patent or patent application and, secondly, determine who was responsible for the inventive concept.").

[80] *See* Patents Act 57 of 1978 § 27 (S. Afr.).

[81] Theunissen & Louw, *supra* note 79.

[82] Sam Udovich, *Recent Developments in Artificial Intelligence and IP Law: South Africa Grants World's First Patent for AI-Created Invention*, NAT'L L. REV. (Aug. 3, 2021), https://www.natlawreview.com/article/recent-developments-artificial-intelligence-and-ip-law-south-africa-grants-world-s (quoting PCT Int'l Application No. PCT/IB2019/057809 (filed Sept. 17, 2019)).

[83] *See* Jack Redfern & Phil Berns, *Australia: Who is an Inventor and Why Should I Care?*, MONDAQ (Nov. 11, 2012), https://www.mondaq.com/australia/patent/205146/who-is-an-inventor-and-why-should-i-care.

[84] *Id.*

[85] *Patents Act 1990* (Cth) s 15 (Austl.).

[86] *Patent Regulations 1991* (Cth) reg 3.2C(2) (Austl.).

Before *Polwood v Foxworth*,[87] the current leading Australian patent case, the test for inventorship was different from the understanding of inventorship in South Africa.[88] Previously, "[t]he test of inventorship had been expressed as whether an alleged inventor's contribution, either solely or jointly with others, had a material effect on the final concept of the invention."[89] *Polwood* shifted the inventorship analysis to a two-part inquiry looking at an identification of the invention and then a determination about who contributed to it.[90] Australian courts and the Australian Patent Office, known as IP Australia, ask "whether the person's contribution beneficially affected the final concept of the claimed invention and . . . whether that final conception would have been less efficient without their contribution."[91] Notably, the inventor's contribution need not necessarily be inventive, but it must be a contribution that was material and that enhanced the invention in a way that would not have occurred without that inventor's contribution.[92]

Unlike South Africa, Australia does formally examine patent applications.[93] During the examination process for a DABUS-inventor patent, IP Australia initially rejected the application for naming a non-human inventor.[94] Dr. Thaler appealed the initial rejection of his patent application from the Deputy Commissioner of Patents, alleging that he properly named the inventor on the patent application and that, as a result, the patent should be allowed to issue.[95]

Justice Beach reversed the decision and clarified that patent protection is possible, even when the invention is the product of a non-human inventor, as long as the patent application still meets all of the other

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[87] *Polwood Pty. Ltd. v Foxworth Pty. Ltd.* (2008) 165 FCR 527 (Austl.).
[88] *Id.*; COLIN BODKIN, PATENT LAW IN AUSTRALIA 36130 (Thomson Reuters 3d ed., 2018).
[89] BODKIN, *supra* note 88, at 36120.
[90] *Id.* at 36130.
[91] *Id.* at 36120.
[92] *Id.* at 36140.
[93] *Examination of a Standard Patent*, AUSTL. GOV'T: IP AUSTL. (May 30, 2016), https://www.ipaustralia.gov.au/patents/applying-patent/standard-patent-application-process/examination-standard-patent.
[94] *See Thaler v Commissioner of Patents* [2021] FCA 879 (30 July 2021) 1–2 (Austl.)
(explaining that the Deputy Commissioner had alleged that, because DABUS was not a person, Dr. Thaler could not name DABUS as the sole inventor on the application and expect the application to issue).
[95] *See id*.

requirements for patentability.[96] Therefore, current Australian patent law allows patent protection for inventions generated through an AI system, subject to complying with other requirements of patentability.[97]

C. United States and European Union

Unlike Australia and South Africa, the United States defines the term "inventor" in its statutes. "The term 'inventor' means the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention."[98] A co-inventor is an individual "who invented or discovered the subject matter of a joint invention."[99] Furthermore, United States caselaw shows that only natural persons can be inventors.[100] Similarly, the European Patent Office relies on caselaw to exclude non-humans from the title of "inventor" on a patent application.[101] Many member states of the European Patent Organization "explicitly define the inventor as being the natural person who creates an invention."[102]

The laws concerning inventorship in Australia and the United States were similar before the DABUS schism.[103] Furthermore, although the test for U.S. inventorship hinges on evaluating an individual's contribution to the overall conception of the invention, rather than a material effect test, the tests generally result in the same set of inventors, and attorneys are advised to use a strict test for multi-country patent applications.[104] However, the inventor is "defined by national legislation

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[96] *See id.* at 13 ("[N]one of these provisions exclude an inventor from being a non-human artificial intelligence device or system.").
[97] *See id.* at 40 ("[I]n my view the name of the inventor can be a non-human. The Commissioner is incorrect in saying that you cannot have a non-human inventor.").
[98] 35 U.S.C. § 100(f) (2012).
[99] 35 U.S.C. § 100(g) (2012).
[100] *In re* Application of Application No. 16/524,350, Dec. Comm'r Pat. 7 (Apr. 22, 2020) (citing Burroughs Welcome Co. v. Barr Labs., Inc., 40 F.3d 1223, 1227–28 (Fed. Cir. 1994)).
[101] Eur. Pat. Off., Grounds for Decision: App. No. 18 275 163.6, 7 (Jan. 27, 2020).
[102] *Id.*; *see also id.* at 7 n.16 (citing laws of Lithuania and Estonia).
[103] *Authorship vs. Inventorship*, LENS (Feb. 12, 2013), https://support.lens.org/help-resources/other-articles/authorship-vs-inventorship/ ("In Australia, the laws surrounding inventorship are similar to those in the United States.").
[104] *See id.* ("When naming inventors on patent applications it is advisable that the most stringent test for inventorship is applied in order to avoid any penalties that may occur from the incorrect naming of inventors.").

in individual EU member countries" in Europe.[105] That means inventorship could have differed between individual European Union member countries, even though every country would recognize the patent granted by the European Union as valid.[106]

D. Consequences of Inventorship Errors

Although the definition of "inventor" may be unclear, improperly declaring inventorship on an application or patent may have serious consequences. In all of the countries and regions discussed above, a patent could be deemed invalid for improper inventorship.[107] Consequences may be more severe based on intent.[108] However, this intent is generally proven by a person attempting to sue for inventorship rights.[109] There is no case

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[105] *Id.*

[106] *See id*. ("The EPC allows a system by which a patent application is examined by a single patent office (EPO), resulting in patent rights granted only in designated European countries. . . . Ultimately, although a patent may issue from the European Patent Office (EPO) and have identical claims in each designated country, the determination of inventorship is made on a country-by-country basis.").

[107] *See* Sarah Pike, *Inventorship and Patent Applications*, WHITE SW COMP. L. (2019), https://computerlaw.com.au/doku.php?id=inventorship (concluding that "a patent may be held invalid if more or less than the true inventors are named"); *see also* Hocking, *supra* note 73; Alex Wolcott, Christopher Adams & Jeremy Dutra, *Failure to Name Joint Inventors May Bar Patentability*, GLOBAL IP & TECH. (May 20, 2018), https://www.iptechblog.com/2018/05/failure-to-name-joint-inventors-may-bar-patentability/.

[108] *See* Patents Act 57 of 1978 §§ 81–85 (S. Afr.) (stating penalties under the Act); Pike, *supra* note 107 (showing that inventorship can be corrected if there was no deceptive intent).

[109] To establish inventorship, the omitted inventor must rebut by clear and convincing evidence the presumption that the named inventors on the patent are the true and only inventors. Finkelstein v. Mardkha, 495 F. Supp. 2d 329, 337 (S.D.N.Y. 2007); Polyzen, Inc. v. Radiadyne, L.L.C., No. 5:11–CV–662–D, 2012 WL 4049841, at *1 (E.D.N.C. Aug. 21, 2012); Hernandez v. Frazier, No. SA-11-CA-9-FB, 2012 WL 12895540, at *6 (W.D. Tex. Sept. 24, 2012), *report and recommendation adopted in part, rejected in part*, No. SA-11-CV-0009-DAE, 2013 WL 12142355 (W.D. Tex. Mar. 25, 2013) ("An alleged, unnamed inventor must prove his inventorship by clear and convincing evidence."). *See also Hernandez*, at *7 ("Omission of an inventor can invalidate a patent unless the omission was an error 'without any deceptive intention." (quoting Acromed Corp. v. Sofamor Danek Grp., 253 F.3d 1371, 1379 (Fed. Cir. 2001)).

of a person suing on behalf of a non-human person for patent inventorship recognition.[110]

The consequences of a computer being overlooked for inventorship recognition are unclear. A court or patent office could determine that the recognition of inventorship is immaterial to the allowability and standing of a patent application or patent because the computer can neither declare inventorship nor dispute the outcome. However, a court may also review the power imbalance between man and machine in law, as well as the recent DABUS decisions, and consequently (1) declare that the applicant was attempting to defraud the court by not naming a computer inventor and (2) fail to provide a remedy to preserve validity of the patent. In the first scenario, the court or patent office erases the importance of proper inventorship recognition. In the second, the importance of proper inventorship is held in such high regard that the failure to properly name the AI/computer inventor constitutes grounds for invalidating the patent, especially when the laws fail to provide alternative remedies for such lack of recognition.

DABUS highlights the opacity of inventorship definitions and the serious potential consequences of an undiligent patent filing. The increasing severity of consequences based on intent of the offending party demonstrates how power dynamics play into the decision to properly attribute inventors. Section V will further discuss how DABUS brings power imbalance issues regarding decisions to patent and control over inventorship to the forefront.

IV. DABUS AND INVENTORSHIP: EXPANDING THE NARRATIVE OF INVENTORSHIP ADVOCACY

Dr. Thaler's advocacy of patent inventorship recognition for another entity changes the traditional narrative of patent inventorship. The narrative of obtaining a patent should not be analyzed as a singular, self-driven feat, but should instead be examined as a communal accomplishment. Dr. Thaler's work demonstrates that entities in positions of power are not only capable of advocating for others, but also can do so at the potential detriment of their own prestige.

Although theoretically possible, this advocacy work was never present in previous patent caselaw. The seemingly unique instance of

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[110] *But see* Naruto v. Slater, 888 F.3d 418, 420–21 (9th Cir. 2018) (stating that PETA sued on behalf of a monkey for copyright infringement based on photographs taken by the monkey).

Thaler's inventorship advocacy for his machine prompts questions about why inventors from privileged positions fail to regularly advocate for inventors from historically marginalized backgrounds. By changing the language surrounding the patent inventorship narrative, instead of using singularly-focused narratives of patent motivation, the conversation surrounding closing patent gaps should include recognition and burden-shifting based on observed power dynamic differences between entities in the inventive team.[111]

As a scientist and patent attorney, it is alarming to see Dr. Thaler's efforts to cede his inventorship credentials to a machine and to fight for the inventorship credentials of this machine in a monumentally time-consuming and expensive effort when there is no case of a professor acting similarly on behalf of a graduate student.[112] Too often, students sue their former universities and faculty advisors because they are overlooked in the patent application and do not receive the credit they deserve.[113] Treated more like cogs in a machine than humans, students often report being uncredited on their work and unable to speak up about the abuses they perceive and endure at graduate school.[114]

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[111] *Cf. Power*, GOOD THERAPY (Nov. 27, 2019), https://www.goodtherapy.org/learn-about-therapy/issues/power ("Power is a person's ability to exert influence and control. Power dynamics describes how power affects a relationship between two or more people."); Michael Barnett & Raymond Duvall, *Power in International Politics*, INT'L ORG., Winter 2005, at 39, 42 (Feb. 15, 2005) ("[P]ower is the production, in and through social relations, of effects that shape the capacities of actors to determine their circumstances and fate. This general concept entails two crucial, analytical dimensions: the kinds of social relations through which power works.").

[112] *See Notable IP Disputes about Student and Faculty Inventions*, IPADVOCATE.ORG (2019), http://ipadvocatefoundation.org/forum/dispute-64034.cfm.

[113] *See id.*; Kyle Grimshaw, *A Victory for The Student Researcher: Chou v. University of Chicago*, 1 DUKE L. & TECH. REV. 1 (2001).

[114] Chanda Prescod-Weinstein, *Are We Pressuring Students to Choose a Hostile STEM?*, INSIDE HIGHER ED (Oct. 11, 2019), https://www.insidehighered.com/advice/2019/10/11/do-minority-and-other-students-feel-pressured-stem-fields-opinion (discussing students who were chewed up and spit out); Erin Woo, *'A Toxic Culture of Overwork': Inside the Graduate Student Mental Health Crisis*, STAN. DAILY (Mar. 13, 2019), https://www.stanforddaily.com/2019/03/13/a-toxic-culture-of-overwork-inside-the-graduate-student-mental-health-crisis/ (discussing mental health crises); *A Cog in the Machine*, PRACTICING ANTHROPOLOGY (Sept. 30, 2020), https://practicinganthropology.sfaa.net/2020/09/30/a-cog-in-the-machine/ ("I am

Dr. Thaler fighting for DABUS's inventorship recognition highlights the communal and power dynamics associated with being named on a patent application in academia, showing that discussion surrounding communal and power dynamics must be incorporated into the language surrounding efforts to close the patent gaps. By incorporating the power dynamic narrative and communality of inventorship regarding the DABUS case into conversations about inventorship equity, the patent gap may begin to close. If, by using this narrative, universities can empower those inventors who are continuously overlooked, marginalized inventors can be more effective advocates for their patent group's inventorship.[115] This Section outlines the communality and power dynamics of patent inventorship in light of Dr. Thaler's advocacy of inventorship for DABUS to show how advocacy can increase equitable attribution for marginalized inventors.

A. Communality of Patent Inventorship

The majority of literature directed to closing the patent gap – the difference between representation at an institution or in a geographic location and the inventorship representation on patents from that institution or geographic location – focuses on a singular, self-determined path towards patent inventorship.[116] Whether discussing prestige for being

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a cog in the higher education machine. I have no illusions about my value to the institution. The institution sees me as disposable, replaceable, and secondary to their economic interests."); Joanna Hughes, *Four Ways to Relieve Stress in Graduate School*, KEYSTONE PHDSTUDIES, https://www.phdstudies.com/article/Four-Ways-to-Relieve-Stress-in-Graduate-School/ (last visited Dec. 29, 2021) (discussing feeling like a hamster on a wheel).

[115] *See* Katrina Schwartz, *How Classroom Culture Opens Up When Students Can 'Patent' Ideas*, KQED (Aug. 8, 2016), https://www.kqed.org/mindshift/45994/how-classroom-culture-opens-up-when-students-can-patent-ideas; *see also* Paul M. Swamidass, *Empowering Young Inventors: An Experimental Course on IP and Patent Application Drafting at Auburn University*, 35 J. TECH. TRANSFER 424 (2010).

[116] *See, e.g.*, Susie Allen, *How Big is the Gender Gap in Science Research Funding?*, KELLOGGINSIGHT (May 2, 2019), https://insight.kellogg.northwestern.edu/article/how-big-is-the-gender-gap-in-science-research-funding; Shraddha Chakradhar, *Not Only Who But What: NIH Funding Disparity Between Black and White Scientists Partly Driven by Research Topic*, STAT NEWS (Oct. 10, 2019), https://www.statnews.com/2019/10/10/nih-grants-funding-racial-disparity-research-topic/; Kathy Svitil, *Diversity Retreat at Caltech*, CALTECH (June 11, 2015), https://www.caltech.edu/about/news/diversity-retreat-caltech-47009; *Girls in STEM Conference*, GIRLSTART, https://girlstart.org/our-

named on a patent, peer recognition, or monetary rewards, there is an implication that the path to patent inventorship requires assertiveness on behalf of the inventor.[117] Some scholars do recognize team aspects of the invention process, acknowledging that "[i]nventions are often developed by teams of inventors" and suggesting that policies regarding inventorship may be viewed as a team pursuit.[118] However, few acknowledge the passive aspect of team inventorship, whereby most inventors are employed for the purposes of inventing and researching and, as part of their jobs, are incidentally named on patents. The passive means to obtain inventorship recognition may be overlooked in favor of the more prominent active advocacy cases because, with work-for-hire inventors, employers usually give very little benefit to named inventors.[119]

"The average (and median) patent application publication now lists three or more inventors."[120] Through being named on a patent, each of these inventors likely gains prestige for their creativity and inventiveness.[121] Whether induced, incentivized, or otherwise motivated, inventorship recognition does affect an inventor's credentials.[122] However,

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programs/girls-in-stem-conference/ (last visited June 30, 2021); Cassidy R. Sugimoto et al., *The Academic Advantage: Gender Disparities in Patenting*, PLOS ONE, May 27, 2015, at 1.

[117] *See, e.g.*, Svitil, *supra* note 116 ("In collaboration with several offices across the campus, we are developing and maintaining a strong network focused on outreach, recruitment, matriculation, and the eventual awarding of degrees to underrepresented minorities in the campus' graduate programs.").

[118] Michael Abramowicz & John F. Duffy, *The Inducement Standard of Patentability*, 120 YALE L.J. 1590, 1615 (2010).

[119] Lorna M. Velez-Gomez, *Minds at Work: Employed Inventors' Ideas for a Therapeutic Patent System*, 5 U.P.R. BUS. L. J. 46, 46 (2014) ("Employed inventors generally reserve no intellectual property rights and very limited monetary rights for themselves when they assign their patents to their employers."); Associated Press, *University of Missouri system settles patent lawsuit*, ABC NEWS (Dec. 29, 2020, 3:07 PM), https://abcnews.go.com/Health/wireStory/university-missouri-system-settles-patent-lawsuit-74952828.

[120] Dennis Crouch, *Continued Growth in the Number of Inventors*, PATENTLYO (Mar. 11, 2021), https://patentlyo.com/patent/2021/03/continued-growth-inventors.html.

[121] Mazhar Islam, Adam Fremeth & Alfred Marcus, *Signaling by Early Stage Startups: US Government Research Grants and Venture Capital Funding*, 33 J. BUS. VENTURING 35, 40 (2018) ("Startups that more actively patent their technologies are prioritized in VC funding decision and are able to raise more backing from investors.").

[122] *See* Jason Rantanen & Sarah E. Jack, *Patents as Credentials*, 76 WASH. & LEE L. REV. 311, 311 (2019) ("Our framework focuses on the idea of patents as credentials: formal abstractions of a person's inventive nature.").

just because being named as an inventor on a patent may positively impact a person's career prospects or monetary gains does not mean that the person who was named actively pursued the patent or any recognition therein.[123]

The linear nature of inventorship found in most literature follows a simple narrative: a person (or team) invents something new, the person discloses it to the patent office (including who invented the invention), and then the patent issues.[124] This implies that the person or team all actively pursued the patent and advocated to put their names on the application. However, in most cases, a team leader is in charge of publication decisions, including patents. The remaining members of the team are employed to invent and disclose, but not to decide whether to patent or whether to list their names as inventors on a patent application.[125] Although the remaining members may be affected by the eventual outcome of the team leader's decision, the members lack the control over the consequences of patenting and may be passive in the patent process.[126]

The DABUS cases bring this team member dynamic to the forefront. Dr. Thaler considers DABUS the true inventor of the inventions set forth in his patent applications and, therefore, Dr. Thaler chose to list DABUS as the sole inventor.[127] Dr. Thaler determined that DABUS deserved inventorship recognition without consulting DABUS, and

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[123] *See id.* at 342 ("[I]nventors are held up as occupying a special place in the advancement of the Republic."). The inventors could be actively pursuing a patent or a person who is required to be named on a patent pursued by a co-inventor. *See, e.g.*, William Honaker, *Getting A Patent: Who Should be Named as An Inventor?*, IPWATCHDOG (Oct. 12, 2020), https://www.ipwatchdog.com/2020/10/12/getting-a-patent-who-should-be-named-as-an-inventor/id=126026/ ("What's important to understand is that you must include as named inventors anyone who conceived of an invention in any claim . . . ."). Indeed, one person who is pursuing the patent must include anyone who conceived of an invention in any claim, regardless of whether those people are actively pursuing a patent. *Id.*

[124] Frederick W. Dingledy, *An Overview of Patent Prosecution*, 61 VA. LAW. 47 (2012); 37 C.F.R. § 1.76 (2018) (showing that the application data sheet filed in conjunction with a patent application requires every inventor to be named).

[125] *See* Mark B. Hershovitz, *Unhitching the Trailer Clause: The Rights of Inventive Employees and Their Employers*, 3 J. INTELL. PROP. L. 187, 203 (1995) ("Ingersoll-Rand did not pursue any of the concepts submitted by Ciavatta. As a result, Ciavatta lost all motivation to invent while employed by Ingersoll-Rand.").

[126] *See id*. (showing that an employer had control over the decision to pursue the patent process).

[127] *See In re* Application of Application No. 16/524,350, Dec. Comm'r Pat. 3–4 (Apr. 22, 2020).

DABUS never indicated a desire to be named as a patent inventor.[128] The AI is not advocating for patent inventorship, and likely would not have standing in U.S. courts if it was advocating for itself. DABUS can be viewed as a passive actor in this communal patent process. A single person – Dr. Thaler – is deciding inventorship for the overall patent. The DABUS case negates the previous narratives imposed on patent pursuits and, instead, promotes a communal narrative of inventorship.

Many inventors – AI and otherwise – may be entirely ambivalent about the patent process. For example, some scholars discuss prestige, signaling, and the incentive to share as motivations to pursue a patent.[129] But this suggests that each inventor listed on a patent was motivated to pursue the application because of an incentive. The team of DABUS and Dr. Thaler both contributed to the inventions in question. Based on that relative contribution, one member of this group (Dr. Thaler) is applying for patent protection on behalf of all members of that inventive group.[130]

Further, the DABUS case shows that the motivation to patent may exist for only one inventor in the inventor group. Due to patent application requirements, that one motivated inventor must be listed alongside all other inventors on the patent – promoting equal recognition of all inventors regardless of their motivations.[131] The inventor team may comprise entities who are excited, opposed, and ambivalent to patenting or otherwise unable to share their opinions.[132] The motivation of the entity who pursued the patent application cannot be attributed to all inventors on the patent application. This mixed motivation could affect both the quality of the patent application and the timing of disclosure, in that an unmotivated inventor may not put as much effort into describing their invention in the

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[128] BL O/741/19, Dec. U.K. Int'l Pat. Off. 2 (Dec. 4, 2019) ("[I]n what way has the right to the grant of a patent, which rests primarily with the inventor or actual deviser of the invention, been transferred to the applicant: is Mr Thaler entitled to apply for a patent in preference to DABUS simply because he is the owner of DABUS?").

[129] *See* Toshiko Takenaka, *Patents for Sharing*, 26 MICH. TECH. L. REV. 93, 94 (2019); *see also* Jonas Anderson, *Nonexcludable Surgical Method Patents*, 61 WM. & MARY L. REV. 637 (2020).

[130] Thaler is the owner/applicant and DABUS is the inventor.

[131] *See* Anderson, *supra* note 129, at 647 ("By simply enlarging the range of possible motivations for seeking patent protection beyond merely exclusive rights.").

[132] Stuart J.H. Graham & Ted Sichelman, *Why Do Start-Ups Patent?*, 23 BERKELEY TECH. L.J. 1063, 1070 (2008) ("Yet, despite being able to list, describe, and explain all of these motivations for patenting, scholars are not quite sure which ones are the primary drivers.").

inventor disclosure form, or may delay in providing necessary information to the patent practitioner to file their application.[133] Nonetheless, the existence of the possibility of mixed motivations – a core piece of any group project – should be acknowledged in further patent advocacy literature.

B. Power Dynamics of Patent Inventorship

The motivations to patent cannot be divorced from the power dynamics of the context in which they exist. The relative strength of the motivations described above most likely affects whether a patentable invention is disclosed publicly and, if so, if it is first pursued as a patent application.[134] For example, if one inventor is more motivated to publicly disclose their invention in a prestigious publication than consult a patent attorney, they may jeopardize the potential to ever pursue patent protection of the invention.[135] This relative and comparative strength of patent application motivation cannot be thought of as purely the sum of emotions of all possible inventors, but must be evaluated in the context of relative power dynamics.[136]

Patenting an invention is a team activity.[137] The process from thought to discovery to disclosure is by no means a linear, singular process for most university laboratories and teams in industry.[138] Simultaneously,

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[133] Sanford E. Warren, Jr., *The Dangers of Delay in Filing Patent Applications*, IRMI (Nov. 2005), https://www.irmi.com/articles/expert-commentary/the-dangers-of-delay-in-filing-patent-applications#:~:text=Typically%2C%20U.S.%20patent%20law%20gives,delay%20in%20patenting%20an%20invention; Gene Quinn, *Tricks & Tips to Describe an Invention in a Patent Application*, IPWATCHDOG (Dec. 26, 2015), https://www.ipwatchdog.com/2015/12/26/tricks-tips-for-describe-an-invention-in-a-patent-application-2/id=64133/ (stating that it is important to "stop and think about different ways that [the] invention can be made or used, even if [the inventor] deem[s] them to be inferior").

[134] *See* Hershovitz, *supra* note 125, at 203 ("Ingersoll-Rand did not pursue any of the concepts submitted by Ciavatta.").

[135] *Tips to Help Keep Your Disclosure from Becoming Prior Art, Part 1: What Constitutes Disclosure?*, NUTTER UNCOMMON L.: IP L. BULL. (Sept. 6, 2018), https://www.nutter.com/ip-law-bulletin/Tips-to-Help-Keep-Your-Disclosure-from-Becoming-Prior-Art-Pt1.

[136] *See id*. at 203 (showing the power dynamics associated with patenting).

[137] Abramowicz & Duffy, *supra* note 118, at 1615 ("Inventions are often developed by teams of inventors, and thus it makes economic sense for the inducement standard to apply at more than the individual level.").

[138] *Id.* at 1615.

decisions about the process of disclosure, including the timing, method of presentation, and ultimate use determinations, are not decided equally among team members. This power dynamic of decision-making affects whether the team applies for a patent, discloses to a publication, or keeps the invention as a trade secret.[139] Moreover, the person making these decisions is often the person who renders the "final" value-recognition decision: who is named on the publication.

DABUS presents a case of ultimate power dynamics: Dr. Stephen Thaler, the inventor of DABUS, is unilaterally deciding that DABUS should be named as the patent inventor.[140] There is no affirmation of desire from DABUS. Further, there is no protest from DABUS asserting its rights to be on a patent application as an inventor. Dr. Thaler even recognizes that machines "do not have a legal personality or independent rights, and cannot own property."[141] There would be no repercussions if Dr. Thaler decided to leave DABUS off the patent application as an inventor and use his own name because DABUS cannot sue in court.[142] Nevertheless, Dr. Thaler is arguing for DABUS's right to be named as an inventor and sharing his privilege in the power dynamic with DABUS.[143]

The decision in the United Kingdom not to grant either U.K. national stage patent application hinged, in part, on this power dynamic and lack of consent from DABUS.[144] The United Kingdom Intellectual Property Office noted that "DABUS has no rights to its inventions and cannot enter into any contract to assign its right to apply for a patent to the applicant . . . . It is unclear, therefore, as to how precisely the applicant has derived the right to the inventions from their creator, DABUS."[145] Without any affirmation or dissention, Dr. Thaler alleges that he can apply for the rights to the patent because he owns DABUS.[146]

DABUS has no right or ability to file for a patent, but due to the rights and abilities of others, DABUS was eventually listed as the inventor on a patent application. Dr. Thaler believes that, because DABUS was the creative force behind the inventions in the patents, DABUS deserves the inventorship credit. DABUS cannot be incentivized to file a patent for any

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[139] *See id.*; *see also* Hershovitz, *supra* note 125, at 203.
[140] BL O/741/19, Dec. U.K. Int'l Pat. Off. 3 (Dec. 4, 2019).
[141] *Id*. at 5 (quoting the letter accompanying the filing).
[142] *See id.* at 3 (explaining inventors' and others' rights to be mentioned in applications).
[143] *See generally id*.
[144] *See id.* at 5.
[145] *Id.*
[146] *See id*. ("Mr Jehan argues that ownership of DABUS is sufficient.").

invention, even though DABUS is the inventor listed on the applications. Dr. Thaler, therefore, wields ultimate decision-making power in the patent process and determines both whether a patent application is filed and, based on his perception of the project, who is named as an inventor.

This decision-making power finds parallels in industrial and university environments. Employees, for example, may have very little control over whether their invention is filed as a patent and, if it is, whether they are initially named on a patent application as an inventor. Certainly, caselaw has shown that people can advocate for inventorship if they are overlooked in the initial patent filing.[147] However, employees do not always have full control over whether to file for the inventions they developed over the course of their employment.[148] In the university context, postdoctoral fellows are rarely able to retain ownership of their intellectual property contributions after leaving the university.[149] In the midst of signing release forms to attend college, many students sign documents obligating them to assign their intellectual property rights to their university.[150] Similarly, upon being hired, employees frequently sign employment agreements with intellectual property assignment clauses, wherein future conceptions of inventive ideas are owned by their employer.[151] If an employee does not want to assign their intellectual

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[147] Univ. of Colo. Found., Inc. v. Am. Cyanamid Co., 196 F.3d 1366, 1374–75 (Fed. Cir. 1999) (explaining that inventorship can be corrected if it is not fraud); Stark v. Advanced Magnetics, Inc., 119 F.3d 1551 (Fed. Cir. 1997).

[148] Henry Chesbrough, *The Logic of Open Innovation: Managing Intellectual Property*, 45 CA. MGMT. REV. 33, 43 (2003) ("Once a discovery or an invention is reported, the organization in which the invention took place (which is the legal owner of the discovery) must decide whether to file a patent on the idea.").

[149] *See* UNIV. CAL., BERKLEY, YOUR GUIDE TO INTELLECTUAL PROPERTY AS A STUDENT AT THE UNIVERSITY OF CALIFORNIA 1 (Dec. 20, 2016), https://ipira.berkeley.edu/sites/default/files/shared/docs/Student%20IP%20Guide%20Dec%202016.pdf ("Under law and policy, UC owns IP made by UC employees in the course and scope of their work.").

[150] *See Should College Students Get to Keep Their Patent Rights?*, IPTRADER.COM, http://www.iptrader.com/article/should_college_students_get_to_keep_their_patent_rights.aspx (last visited Dec. 29, 2021) ("Many universities even require students to sign release agreements that essentially force students to turn over their IP rights to the school.").

[151] *See* Tina A. Syring & Felicia J. Boyd, *Employer and Employee Ownership of Intellectual Property: Not as Easy as You Think*, THOMSON REUTERS: CORP. COUNS. CONNECT COLLECTION (Dec. 2014), https://store.legal.thomsonreuters

property rights at the time of invention, this document signed on condition of employment can be enforced in court.[152]

This does not mean that employees or students are never named on a patent application, but it could mean a gap exists between incentivized inventors and filing decision-makers. When applications are filed, applicants are heavily incentivized to properly list inventors in order to avoid a messy litigation process and potential patent invalidation.[153] The incentive structures to properly list inventors, however, are ineffective at generating ideas and do not overcome the structural barriers associated with filing for a patent.[154] In most places of employment, including STEM industry and university settings, a select person or group of people decides whether to file a patent application.[155] Not only are patent incentives not determinative of whether a patentable idea is conceived, but the incentives to patent for most of the invention "team" are not relevant to determine whether the patent is actually filed.

This incentive inventorship gap has a power dynamic issue at its core, where the patent motivations of the principal investigator, team

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.com/law-products/news-views/corporate-counsel/employer-and-employee-ownership-of-intellectual-property-not-as-easy-as-you-think.

[152] *See id*. ("If the employee was hired to create intellectual property as part of their job, the employer will be the owner of the intellectual property.").

[153] Patrick G. Gattari, *Determining Inventorship for US Patent Applications*, 17 INTELL. PROP. & TECH. L.J. 16, 18 (2005) ("Despite the incentives to include additional or fewer individuals than the true inventors on a patent, the consequences can obliterate any hoped-for benefit. A court may find a patent invalid when it names more or less than all of the true inventors. Therefore, the proper determination of inventorship is of paramount importance when filing a patent application.").

[154] Richard Eisneberg & Next Avenue, *What Workers Crave More Than Money*, FORBES (Sept. 27, 2016, 10:38 AM), https://www.forbes.com/sites/nextavenue/2016/09/27/what-workers-crave-more-than-money/?sh=2bfeecbb3150 (explaining that acknowledgement motivates more than money); Stephanie Plamondon Bair, *The Psychology of Patent Protection*, 48 CONN. L. REV. 297, 317 n.130 (2015) (citing Jeanne C. Fromer, *Expressive Incentives in Intellectual Property*, 98 VA. L. REV. 1745, 1790 (2012)) (noting how attribution can be a stronger motivator than money); Sandip H. Patel, Note, *Graduate Students' Ownership and Attribution Rights in Intellectual Property*, 71 IND. L.J. 481, 508 ("Because graduate students are not employees, they retain even less bargaining power regarding ownership rights than faculty.").

[155] *See* Emily A. Sample, Note, *Assigned All My Rights Away: The Overuse of Assignment Provisions in Contracts for Patent Rights*, 104 IOWA L. REV. 447 (2018); *see also* William P. Hovell, *Patent Ownership: An Employer's Rights to His Employee's Invention*, 58 NOTRE DAME L. REV. 863 (1983).

leader, or organization ultimately matter more than the motivations of any other person on the invention team. The administrator, principal investigator, and/or boss at an organization ranks higher on the patent decision hierarchy than a student or other employee and, because of this rank, has the most control over the patent process on the team.[156] If someone with decision-making power chooses to patent an invention that an employee or student conceived, they are legally obligated to name that employee or student as an inventor on the application.[157] However, the decision-maker can also choose not to file the application and, in some cases, can prevent the person who conceived of the invention from filing a patent application.[158]

How this power dynamic influences patent inventorship recognition is lacking from most scholarship surrounding the patent gap. Returns for innovation, such as monetary compensation or better reputational status within a community, only have the ability to affect patent application rates for people who have the ability to apply for a patent.[159] Preferences for an innovation's dissemination through patent application or secrecy assume that every inventor has the ability to choose to disclose their invention.[160] Rather, many people in a laboratory or industry setting are required to keep their inventions secret under a non-disclosure agreement[161] or other employment agreement until a person in

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[156] Orly Lobel, *My Ideas, My Boss's Property*, N.Y. TIMES (Apr. 13, 2014).

[157] *See* MPEP § 2157 (stating that the application "shall include, or be amended to include, the name of the inventor for any invention claimed in the application").

[158] *See* Hershovitz, *supra* note 125, at 203. This methodology of not patenting an invention creates trade secrets.

[159] *See* Katherine J. Strandburg, *Users As Innovators: Implications for Patent Doctrine*, 79 U. COLO. L. REV. 467, 477–78 (2008) ("[T]he most significant non-sale motivation for innovation is an inventor's intention to use the invention. . . . This 'return on investment' can take any form: monetary compensation for use, reputational enhancement from using or developing the invention, or simple enjoyment of using the invention or of the inventive process."); *see also* Anderson, *supra* note 129, at 697 ("The reputational effects of the patent plus any personhood benefits (pride, self-worth, etc.) may spur surgeon-inventors towards the goal of invention.").

[160] *See* Anderson, *supra* note 129, at 649 ("With no promise of a patent, inventors would prefer to practice the invention in secret rather than inform the public of the invention's existence.").

[161] *See e.g.*, *Non-Disclosure Agreement FAQs*, UNIV. TEX. ARLINGTON, https://resources.uta.edu/research/agreement-management/common-faqs/nda-

power gives them permission to publicly disclose the invention.[162] Incentives to share and a desire to increase "the freedom to operate and innovate" only apply to those who can act on those incentives and desires.[163] The discussion of reward incentives are less relevant to closing the patent gap for people in positions lower on the disclosure hierarchy.[164]

Although discussing accessibility is needed to close patent gaps, power dynamics within a company or lab often go unaddressed in the current literature. Lack of accessibility is discussed mostly in the context of affordability and the process of patent registration.[165] I recognize that the patent registration process is complex and unaffordable for some, and these issues must be rectified to achieve inventorship equity.[166]

However, the complexity and unaffordability of the patent process is unlikely to impact every invention – and every inventor who deserves attribution on the corresponding patent – equally. Out of the almost 400,000 patents issued in the United States in 2020, approximately

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faq.php (last visited Feb. 25, 2022); *Sample Confidentiality/Non-Disclosure Agreement*, UNIV. LA. LAFAYETTE, https://vpresearch.louisiana.edu/resdoc/sample-confidentialitynon-disclosure-agreement/371 (last visited Feb. 25, 2022).

[162] *See* Joshua A. Newberg & Richard L. Dunn, *Keeping Secrets in the Campus Lab: Law, Values and Rules of Engagement for Industry-University R&D Partnerships*, 39 AM. BUS. L.J. 187, 211 n.87 (2002) (citing Zahodnick v. Int'l Bus. Mach. Corp., 135 F.3d 911 (4th Cir. 1997)) ("In the employment context, a non-disclosure agreement is a promise by an employee to refrain from disclosing any trade secrets or other confidential information to which the employee has access during his or her employment.").

[163] *See* Takenaka, *supra* note 129, at 96.

[164] *See* Judith Warner & Danielle Corley, *The Women's Leadership Gap*, CTR. AM. PROGRESS (Nov. 20, 2018), https://www.americanprogress.org/article/womens-leadership-gap/. I will research whether this impacts patent gaps associated with gender, race, educational status, tenure status, and age in future Articles.

[165] Miriam Marcowitz-Bitton & Emily Michiko Morris, *The Distributive Effects of IP Registration*, 23 STAN. TECH. L. REV. 306, 309 (2020) ("High costs naturally present obstacles for those who cannot afford them and can prevent poorly funded creators from obtaining IP protection. . . . Bias is particularly likely to affect registration processes that are complex and highly discretionary and rely on a long list of substantively vague requirements; conversely, bias is less likely when the registration process is simpler and less discretionary in nature.").

[166] *See* Allie Porter, *Where are the Women? The Gender Gap Within Intellectual Property*, 28 TEX. INTELL. PROP. L.J. 511, 521 (2015).

seventy-three percent of them were assigned to companies.[167] Overall, less than ten percent of all patents are granted to individual inventors.[168] Therefore, the gaps in the patent process would most likely be attributed more to the power dynamics within the company than to the affordability of the patent process for an individual inventor. However, it does not address the notion that, because most women are not project-leads or full professors, their socialization is not necessarily relevant to whether they pursue a patent, as they have no patent decision-making power.[169] A woman's thoughts about commercialization of her idea are irrelevant to the pursuit of reducing the patent gap if the woman has no control over whether the idea is commercialized in the first place.[170]

The power dynamics surrounding inventorship determination are almost as striking as the decision to pursue the patent application at all. Until DABUS, the message behind intellectual property recognition disputes was clear: if the person making the decision about intellectual property inventorship does not include all team members, the team members will need to fight with someone of higher authority for recognition.[171] This power dynamic struggle when viewed in tandem with

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[167] Erin Duffin, *Number of Patents Issued in the United States from FY 2000 to FY 2020*, STATISTA (May 6, 2021), https://www.statista.com/statistics/256571/number-of-patent-grants-in-the-us/ ("In the fiscal year of 2020, a total number of 399,055 patents were granted at the U.S. Patent and Trademark Office. This is an increase from the fiscal year of 2000, when 182,218 patents were issued."); *see also Essential Takeaways from 2020's Q1 US Patent Assignment Data*, INQUARTIK (May 19, 2020), https://www.inquartik.com/blog/trends-2020-q1-us-patent-assignment-data/.

[168] *See* U.S. PAT. & TRADEMARK OFF., INDEPENDENT INVENTOR UTILITY PATENTS BY COUNTRY, STATE, AND YEAR (DECEMBER 2015); *see also* U.S. PAT. & TRADEMARK OFF., U.S. PATENT STATISTICS CHART CALENDAR YEARS 1963 – 2020.

[169] *See* Dan L. Burk, *Diversity Levers*, 23 DUKE J. GENDER L. & POL'Y 25, 31–32 (2015) (stating that women have been socialized to "take fewer risks, to push their projects less aggressively, and to think about commercialization of their work less often than their male counterparts").

[170] *See* Porter, *supra* note 166, at 521.

[171] *See, e.g.*, John C. Paul, D. Brian Kacedon & Robert C. MacKichan III, *Alleged Omitted Inventor with No Patent Ownership Fails to Adequately Allege Reputational Harm to Sue for Inventorship Correction*, FINNEGAN: LES INSIGHTS (Aug. 23, 2016), https://www.finnegan.com/en/insights/articles/alleged-omitted-inventor-with-no-patent-ownership-fails-to.html (highlighting a case where a PepsiCo scientist sued Pepsico "alleging that he had been erroneously omitted as a named inventor on a series of patent applications and an issued patent").

the communality of patent inventorship may help provide further reasons for patent gaps in work environments. For example, future quantification methods may show that race and gender patent gaps are higher for undergraduate and graduate students than for full professors in academia, or that patent gaps are higher for workers at a company than managers within the same company.[172]

DABUS is the first case showing a struggle opposite to the trend: someone is sharing their privilege to advocate for inventorship recognition of a lower-hierarchical being. What's more, DABUS would not have the ability to advocate for itself if it was left off the inventorship roster. Insight as to how this motivation could be harnessed in academia and industry through power dynamic shifts and communal patent views must be part of future conversations in patent gap recognition and reduction.

CONCLUSION

The DABUS inventorship decisions highlight more than the continued discussion of android personhood.[173] Dr. Thaler's advocacy shows the power of advocacy – not only such that inventorship conversations must be expanded to address the new homographic nature of international inventorship – but also to provide new language to address systemic gaps pervasive in the patent system.[174]

Dr. Thaler's advocacy prompts questions about why inventors from privileged positions do not advocate for inventors from historically marginalized backgrounds. Powerful people can and must use their privilege to advocate for the inventorship recognition of others. The conversation surrounding inventorship recognition must be reevaluated. The potential for change stems, not from narratives only requiring self-advocacy and self-motivation for patent inventorship representation, but from inclusive narratives highlighting group advocacy and privilege-sharing. No longer should scholars categorize all potential inventors as people with equal control over the recognition and publication of their

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[172] I will continue this research in future Articles.

[173] *See* Briana Hopes, *Rights for Robots? U.S. Courts and Patent Offices Must Consider Recognizing Artificial Intelligence Systems as Patent Inventors*, 23 TUL. J. TECH. & INTELL. PROP. 119, 127 (2021) ("Should artificial intelligence be granted legal personhood?").

[174] *See* Porter, *supra* note 166, at 521.

ideas.[175] Power dynamics and communal decisions must be incorporated into the narratives surrounding patent gap conversations.

By identifying and addressing power imbalances within STEM, society can begin to see a fuller patent gap picture. The homography of "inventorship," created from the varied DABUS patent application outcomes, exposes the true power of advocacy to achieve proper attribution in patent inventorship. Only by seeing the whole image – the metaphorical forest through the trees – can society progress to reduce patent gaps evident today.

[175] *See, e.g.*, Kakoli Majumder, *Foul Play in Scientific Publishing: The Phenomenon of Academic Papers Being Held Hostage*, EDITAGE INSIGHTS (Jan. 8, 2016), https://www.editage.com/insights/foul-play-in-scientific-publishing-the-phenomenon-of-academic-papers-being-held-hostage (showing that, when authorship disputes arise in papers, "[i]n many cases, supervisors make unreasonable demands to be included as an author in the papers of their PhD students, even when the majority of the work is done by the student").