COMMENTS OF CHAD RAFETTO

These comments are submitted on behalf of Chad Rafetto. I am a current 3rd-year law student at New York University School of Law and an aspiring patent litigator. I am submitting a draft of a note on patent eligibility that I am in the process of writing to fulfill my substantial writing requirement at NYU. The piece proposes a legislative reform for § 101 with an emphasis on repurposing the doctrine to shift the exclusionary work currently being done by § 101 to the other doctrines of patentability. The goal is that this will open up the patent system to all forms of technology while still retaining enough bite to reject undesirable patents. For the purposes of the PTO's questions, the most relevant section of my paper is "Why § 101 Is Problematic and Requires Reform."

Professor Rochelle Dreyfuss is my faculty advisor for this piece, though the opinions that I express are entirely my own. I would like to thank Professor Dreyfuss as well as NYU School of Law as a whole for giving me the knowledge and opportunity to submit this comment.

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INTRODUCTION

A bedrock principle of patent law is that an invention must be useful, novel, and nonobvious to be patentable. Respectively, §§ 101, 102, and 103 of the Leahy-Smith America Invents Act impose these requirements for patentability.[1] However, a fourth category—patentable subject matter or patent eligibility, which is also found in § 101—has taken on renowned importance in the last decade.

The number of times the Supreme Court has recently addressed patentable subject matter far outpaces any other doctrine of patent law. Since 2010, the Supreme Court has heard four § 101 cases[2] and denied granting *certiorari* in several others.[3] These Supreme Court decisions have narrowed the field of what inventions are eligible for a patent.[4] Further, despite significant legislative reform to other doctrines of patentability in 1952[5] and 2011,[6] the substance of patent eligibility law has remained largely unchanged since the 1790's.[7] So, why the sudden shift and is this shift desirable?

The focus of this paper is to advocate for a legislative overhaul of § 101 because the current patentable subject matter doctrine is legally flawed and hindering innovation. The proposal involves creating a laundry list of all of the types of technologies that are patent eligible

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[1] *See* 35 U.S.C. §§ 101–03.

[2] *Bilski v. Kappos*, 561 U.S. 593 (2010); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012); *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576 (2013); *Alice v. CLS Bank Int'l,* 573 U.S. 208 (2014).

[3] *HP Inc. v. Berkheimer*, 140 S. Ct. 911 (2020); *Hikma Pharms. USA Inc. v. Vanda Pharms. Inc.*, 140 S. Ct. 911 (2020); *Athena Diagnostics, Inc. v. Mayo Collaborative Servs., LLC*, 140 S. Ct. 855 (2020).

[4] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 21, 23 (2019).

[5] *See* Patent Act of 1952, Pub. L. No. 82-593, 66 Stat. 792 (1952).

[6] *See* Leahy-Smith America Invents Act ("AIA"), Pub.L. 112-29, 125 Stat. 284 (2011).

[7] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 8, 26 (2019); Garrett Tobin, *Is the U.S.P.T.O. Turning Alice Into EPC Article 52?*, 62 Ariz. L. Rev. 1121, 1122 (2020).

and shifting the exclusionary work currently being done by the subject matter doctrine to other areas of patent law. On the legal front, this proposal aims to prevent a blending of doctrines—and relatedly a blending of questions of fact and questions of law—and ameliorate the conflicting case law on § 101. As a matter of policy, the goal is to restore America to the 'gold standard'[8] of patentability by opening up the patent system to all types of innovation.

This paper has three main sections: 1) describing modern patent jurisprudence, 2) identifying the issues with the current patent law doctrine, and 3) describing the proposal. The first section will discuss the history of the doctrine from the Burger Court decisions through the modern day. It also describes the current *Alice* two-step test for patent eligibility. The second section, which is most relevant for the PTO's information gathering purposes, details how the current doctrine is both legally flawed as well as harming innovation. Particularly, this section describes how other countries' patent regimes are now surpassing the United States own patent system. The last section describes how a legislative change is necessary to create a clear doctrine and return the United States to the gold standard of patent law. Specifically, this paper advocates for a § 101 that has a laundry list of patent eligible technological areas to shift more of the work currently being done by § 101 to the other elements of patentability such as novelty and obviousness.

I. MODERN PATENT JURISPRUDENCE

The Constitution gives Congress the power "[t]o promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."[9] This has served as the basis of our patent system which

[8] Kevin Madigan & Adam Mossoff, *Turning Gold into Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, 24 Geo. Mason L. Rev. 939, 940–41 (2017).
[9] U.S. Const. art. 1, § 8, cl. 8.

gives inventors the right to exclude others from their patented invention as a quid pro quo for the public disclosure of their inventions. By disclosing the inventions, the storehouse of knowledge available to the public increases and more innovation can occur.[10] In exchange for this disclosure, an inventor or group of inventors are given a patent which incentives them to undergo the costs of researching, developing, and creating new inventions.[11]

In order to get a patent, the invention must meet all of the elements of patentability. This includes that the invention must be useful, new, and nonobvious.[12] Additionally, the invention must be described sufficiently in order to ensure that it is actually disclosed to the public.[13] Last, and the focus of this paper, the invention must also meet the patentable subject matter requirement.[14] Although patentable subject matter is listed last in this paragraph, it is typically a threshold issue[15] that is decided first when either prosecuting or litigating a patent.

The statute for patentable subject matter allows a patent for any "process, machine, manufacture, or composition of matter" that fulfills the other requirements of patentability.[16] However, the case law states that even if an invention falls within one of these enumerated

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[10] Mark A. Lemley et. al., *Life After Bilski*, 63 Stan. L. Rev. 1315, 1328 (2011) (discussing the storehouse of knowledge available to the public and how patents add to this storehouse).

[11] *See Kewanne Oil Co. v. Bicron Corp.*, 416 U.S. 470, 480 (1974); Rebecca Lindhorst, *Two-Stepping Through Alice's Wasteland of Patent-Eligible Subject Matter: Why the Supreme Court Should Replace the Mayo/Alice Test*, 69 Case W. Res. L. Rev. 731, 735 (2019).

[12] 35 U.S.C. § 101–03 (2012).

[13] 35 U.S.C. § 112 (2012).

[14] 35 U.S.C. § 101 (2012).

[15] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 9 (2019) ("This statutory intent is and has been for over 200 years to set a low threshold bar to patentable subject matter, which the Supreme Court decades ago had recognized when stating that this includes "anything under the sun made by man,"43 and yet, in direct contrast to the 35 U.S.C. § 101 statute, its legislative history and Congress's intent, recent Supreme Court jurisprudence now puts a very high bar on this threshold § 101 inquiry of what subject matter is even patent eligible.").

[16] 35 U.S.C. § 101.

categories; any law of nature, physical phenomenon, or abstract idea is not patentable.[17] These three judicially-made carve outs are where the lion's share of the argumentation occurs.

One of the main policy rationales behind this rule is one of preemption:[18] We want to allow the building blocks of science to enter the public domain, and then grant patents on the downstream products that utilize these building blocks.[19] But, if we allow patents on the building blocks themselves—what the Supreme Court has identified as laws of nature, physical phenomenon, or abstract ideas—then innovation will be impeded because the patentee can exclude these downstream products or increase the costs of innovation by licensing the right to produce these products at supracompetitive prices.[20] Thus, one of the goals of patent law is to appropriately award inventors without overly preempting future innovation.

Patentable subject matter has been in flux recently with the Roberts Court hearing four cases between 2010–14.[21] Prior to this string of cases, the last time the Supreme Court heard a patentable subject matter case was forty years ago and that Court, the Burger Court, also heard four cases in the preceding decade.[22] This might suggest that patentable subject matter is cyclical to a certain extent—as science advances, it presents new challenges for the legal system.

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[17] *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) ("The laws of nature, physical phenomena, and abstract ideas have been held not patentable."); *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972); *Funk Brothers Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948).

[18] Rebecca Lindhorst, *Two-Stepping Through Alice's Wasteland of Patent-Eligible Subject Matter: Why the Supreme Court Should Replace the Mayo/Alice Test*, 69 Case W. Res. L. Rev. 731, 746 (2019) ("The Court's analysis of patent eligibility is driven by a concern of preemption.").

[19] *See* Mark A. Lemley et. al., *Life After Bilski*, 63 Stan. L. Rev. 1315, 1328–29 (2011) (discussing the patenting of building blocks and what qualifies as a building block); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 88–89 (2012) (identifying the building blocks concept).

[20] *See* Mark A. Lemley et. al., *Life After Bilski*, 63 Stan. L. Rev. 1315, 1328–29 (2011) (discussing the issues of patenting the building blocks).

[21] *Bilski v. Kappos*, 561 U.S. 593 (2010); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012); *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576 (2013); *Alice v. CLS Bank Int'l*, 573 U.S. 208 (2014).

[22] *Gottschalk v. Benson*, 409 U.S. 63 (1972); *Parker v. Flook*, 437 U.S. 584 (1978); *Diamond v. Chakrabarty*, 447 U.S. 303 (1980); *Diamond v. Diehr*, 450 U.S. 175 (1981).

Professor Rochelle Dreyfuss discusses how this is not especially surprising: "As new technological opportunities emerge, it is inevitable that there will be questions about how the law applies. It happened when the power of steam was first exploited, when the effects of oxygen were discovered, when it became possible to manipulate electric current, and when differential solubility was understood. The recent rapid development of new sciences—such as molecular biology, genomics, electrical engineering, and information and communication technology—creates many fresh challenges."[23] The next two sections will discuss how patentable subject matter jurisprudence developed during the Burger Court and during the Roberts Court.

A. § 101 under the Burger Court: "Oh *Diehr*, we have a problem"

When the Burger Court heard its first patentable subject matter case, *Gottschalk v. Benson* in 1972,[24] the law was superficially similar to today in that any "process, machine, manufacture, or composition of matter"[25] less any law of nature, physical phenomenon, or abstract idea was patentable.[26] However, unlike modern times, patentable subject matter was treated as a very low bar in part because the Committee Reports for the 1952 Act stated that "anything under the sun that is made by man" was intended to be patentable.[27] But, also similar

[23] Rochelle C. Dreyfuss & James P. Evans, *From Bilski Back to Benson: Preemption, Inventing Around, and the Case of Genetic Diagnostics*, 63 Stan. L. Rev. 1349, 1353 (2011) (footnotes omitted).
[24] *Gottschalk v. Benson*, 409 U.S. 63 (1972).
[25] 35 U.S.C. § 101.
[26] *Funk Brothers Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948).
[27] S.Rep.No.1979, 82d Cong., 2d Sess., 5 (1952); H.R.Rep.No.1923, 82d Cong., 2d Sess., 6 (1952); *see also* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 9 (2019) ("This statutory intent is and has been for over 200 years to set a low threshold bar to patentable subject matter, which the Supreme Court decades ago had recognized when stating that this includes "anything under the sun made by man,"43 and yet, in direct contrast to the 35 U.S.C. § 101 statute, its legislative history and Congress's intent, recent Supreme Court jurisprudence now puts a very high bar on this threshold § 101 inquiry of what subject matter is even patent eligible.").

to modern times, the Burger Court was challenged by then-emerging technologies and whether or not these technologies were patentable.[28]

In 1972, the Court heard *Gottschalk v. Benson*[29] which was the Court's first ruling on the patentability of software.[30] The claimed invention was a program to convert numbers from binary coded decimals to pure binary format.[31] This is a process that can be done either mentally or on any generic computer by using a standard equation.[32] The Court identified the invention as an algorithm because the invention was merely a programmed version of the equation.[33]

The Supreme Court invalidated this patent as an abstract idea because the invention was merely a mathematical algorithm applied on an ordinary computer as opposed to a practical application of the algorithm.[34] To allow this patent would grant the right to exclude the algorithm itself and "wholly pre-empt the mathematical formula" regardless of the purpose for which the formula was being applied.[35] This highlights the Supreme Court's focus on the preemptive effect on granting a patent: The "upstream" algorithm itself was not patentable but the "downstream" practical applications that utilized the algorithm might be patent eligible.

In 1978, the court was once again tasked with determining the patentability of a mathematical algorithm in *Parker v. Flook*.[36] Flook's invention dealt with updating alarm limits

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[28] Christopher B. Seaman & Sheena X. Wang, *An Inside History of the Burger Court's Patent Eligibility Jurisprudence*, 53 Akron L. Rev. 915, 916 (2019) ("The current quandary regarding patent eligibility is nothing new, however. In the 1970s and early 1980s, the Supreme Court was similarly challenged by inventors' attempts to obtain patent rights to a number of then-emerging technologies, including computer software and genetically-modified organisms.").

[29] *Gottschalk v. Benson*, 409 U.S. 63 (1972).

[30] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 10 (2019).

[31] *See Gottschalk v. Benson*, 409 U.S. 63, 64 (1972).

[32] *See Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

[33] *See Gottschalk v. Benson*, 409 U.S. 63, 65 (1972).

[34] *Gottschalk v. Benson*, 409 U.S. 63 (1972).

[35] *Gottschalk v. Benson*, 409 U.S. 63, 72 (1972).

[36] *Parker v. Flook*, 437 U.S. 584 (1978).

during a catalytic conversion process of hydrocarbons—a process widely used in the petrochemical and oil refinery industry.[37] An alarm limit occurs when one of the conditions of the conversion, such as temperature or pressure, has exceeded a threshold.[38] By sounding an alarm, someone is notified that the reaction has become inefficient or even dangerous.[39] The invention entails taking a measurement, calculating the applicable alarm limit using an equation, and then updating the alarm limit accordingly.[40] The only difference between Flook's invention and the prior art was the use of a mathematical algorithm in the second step.[41]

The Court began by stating that a patentable subject matter issue under § 101 is a distinct and different analysis than a novelty or obviousness issue under §§ 102–03.[42] The court then rejected two arguments made in favor of granting the patent: 1) that there was less preemption of the use of the algorithm than in *Gottschalk v. Benson* because the application was confined to the petrochemical industry and 2) the post-solution activity of adjusting the alarm limit made it more than a patent on merely an algorithm.[43] The court's rejection of the first argument has been understood to mean that you cannot get a patent by claiming a broad, preemptive concept but applying it to a narrow industry—such as the petrochemical industry in this case. As for the second argument, the court stated that a skilled draftsman of a patent would be able to clear the

[37] *See Parker v. Flook*, 437 U.S. 584, 585, 594 (1978).
[38] *See Parker v. Flook*, 437 U.S. 584, 585 (1978).
[39] *See Parker v. Flook*, 437 U.S. 584, 585 (1978).
[40] *See Parker v. Flook*, 437 U.S. 584, 585 (1978).
[41] *See Parker v. Flook*, 437 U.S. 584, 585 (1978).
[42] *See Parker v. Flook*, 437 U.S. 584, 588 (1978) ("This case turns entirely on the proper construction of § 101 of the Patent Act, which describes the subject matter that is eligible for patent protection. It does not involve the familiar issues of novelty and obviousness that routinely arise under §§ 102 and 103 when the validity of a patent is challenged.")
[43] *See Parker v. Flook*, 437 U.S. 584, 589–90 (1978) ("He does not seek to "wholly preempt the mathematical formula," since there are uses of his *590 formula outside the petrochemical and oil-refining industries that remain in the public domain. And he argues that the presence of specific "post-solution" activity—the adjustment of the alarm limit to the figure computed according to the formula—distinguishes this case from *Benson* and makes his process patentable. We cannot agree.")

post-solution activity hurdles for nearly any invention and the skill of the draftsman should not dictate whether or not something is patent eligible.[44] The court ultimately rejected the patent because there was not an "inventive concept" that was sufficient to transform the invention from an unpatentable principle to a patent eligible application of that principle.[45]

Under the Burger Court, this case represented the highwater mark for using § 101 to prevent or invalidate patents. But, the next two cases were thought to restore the doctrine to being a low bar and effectively overrule *Flook*.[46]

The Court next heard *Diamond v. Chakrabarty* in 1980.[47] The invention in *Chakrabarty* was a genetically engineered bacteria that was capable of breaking down crude oil.[48] It was intended to be used as a means for cleaning up oil spills.[49] Notably, the bacteria was not naturally occurring and the court deemed it a man-made creation.[50]

The Court allowed a patent for this live, human-made micro-organism because it was the product of man and not of nature.[51] In making this decision, the Court made a few statements about the broad scope of patentable subject matter. First, the court stated "Congress plainly contemplated that the patent laws would be given wide scope."[52] The court then emphasized how the legislative history also supports a broad construction because "[t]he Committee Reports

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[44] *See Parker v. Flook*, 437 U.S. 584, 591 (1978).
[45] *See Parker v. Flook*, 437 U.S. 584, 594 (1978) ("Conversely, the discovery of such a phenomenon cannot support a patent unless there is some other inventive concept in its application.").
[46] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 10 (2019) (*Chakrabarty* and *Diehr* effectively overruled *Flook*); Ognjen Zivojnovic, *Patentable Subject Matter After Alice-Distinguishing Narrow Software Patents from Overly Broad Business Method Patents*, 30 Berkeley Tech. L.J. 807, 814 (2015) ("Even though *Diehr* did not explicitly overrule *Flook*, the two cases are difficult, if not impossible, to harmonize.").
[47] *See Diamond v. Chakrabarty*, 447 U.S. 303 (1980).
[48] *See Diamond v. Chakrabarty*, 447 U.S. 303, 305 (1980).
[49] *See Diamond v. Chakrabarty*, 447 U.S. 303, 305 (1980).
[50] *See Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).
[51] *See Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).
[52] *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980).

accompanying the 1952 Act inform us that Congress intended statutory subject matter to "include anything under the sun that is made by man.""[53] Last, the court emphasized that the innovations covered by patent law are unforeseeable and broad language was used for exactly that reason.[54] Because patent law deals with inventions that have yet to be discovered, the statute should not be read narrowly because it can be unpredictable what scientists may invent next.

Finally, in 1981 the Court heard *Diamond v. Diehr* which was another patent related to a computer program.[55] The invention in *Diehr* was "a process for molding raw, uncured synthetic rubber into cured precision products."[56] Because the perfect cure includes monitoring several factors, *Diehr* utilized the Arrhenius equation—which was known in the field—applied via a programmed computer to achieve the ideal result.[57] The contribution of this invention in relation to the prior art was that it was able to measure the temperature *inside of the mold* and then feed this data into the computer to get improved curing results.[58]

Though this case was very similar to *Flook,* which denied Flook's patent application, the Court granted the patent in *Diehr* because "the respondents here do not seek to patent a mathematical formula. Instead, they seek patent protection for a process of curing synthetic rubber."[59] The court also discussed the preemptive effects of granting this patent and noted that the patent did "not seek to pre-empt the use of that equation. Rather, [the inventors sought] only

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[53] *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (citation omitted).

[54] *See Diamond v. Chakrabarty*, 447 U.S. 303, 316 (1980) (citations omitted) ("A rule that unanticipated inventions are without protection would conflict with the core concept of the patent law that anticipation undermines patentability. Mr. Justice Douglas reminded that the inventions most benefiting mankind are those that "push back the frontiers of chemistry, physics, and the like." Congress employed broad general language in drafting § 101 precisely because such inventions are often unforeseeable.").

[55] *See Diamond v. Diehr*, 450 U.S. 175 (1981).

[56] *Diamond v. Diehr*, 450 U.S. 175, 177 (1981).

[57] *See Diamond v. Diehr*, 450 U.S. 175, 177 (1981).

[58] *Diamond v. Diehr*, 450 U.S. 175, 178–79 (1981).

[59] *Diamond v. Diehr*, 450 U.S. 175, 187 (1981).

to foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process."[60] So, the *Diehr* court drew the distinction that while abstract ideas, laws of nature, and physical phenomenon cannot be patented, "an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection."[61]

Diehr also stated that patentable subject matter is a distinct and separate inquiry from novelty and that novelty is an inappropriate consideration when deciding patentable subject matter.[62] Specifically, the Court stated "the question therefore of whether a particular invention is novel is "wholly apart from whether the invention falls into a category of statutory subject matter.""[63] The Court supported this statement by citing the structure of the statute as well as the legislative history.[64]

Given the similarities of this case to *Flook*, it was thought that *Diehr* effectively overturned *Flook* despite both cases remaining good law.[65] Professor Shahrokh Falati states there were two main takeaways following *Diehr*: "First, that abstract principles are not patent eligible, and yet practical applications of those principles are patent eligible, and second that prior art and

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[60] *Diamond v. Diehr*, 450 U.S. 175, 187 (1981).

[61] *Diamond v. Diehr*, 450 U.S. 175, 187 (1981) (emphasis in original).

[62] *See Diamond v. Diehr*, 450 U.S. 175, 189 (1981) ("It has been urged that novelty is an appropriate consideration under § 101. . . . Section 101, however, is a general statement of the type of subject matter that is eligible for patent protection "subject to the conditions and requirements of this title." Specific conditions for patentability follow and § 102 covers in detail the conditions relating to novelty.").

[63] *Diamond v. Diehr*, 450 U.S. 175, 189 (1981) (citation omitted).

[64] *See Diamond v. Diehr*, 450 U.S. 175, 189 (1981) ("Section 101, however, is a general statement of the type of subject matter that is eligible for patent protection "subject to the conditions and requirements of this title." Specific conditions for patentability follow and § 102 covers in detail the conditions relating to novelty."); *Diamond v. Diehr*, 450 U.S. 175, 189 (1981) ("The legislative history of the 1952 Patent Act is in accord with this reasoning" and then stating how the Senate Report and Revision Notes make clear they distinct and separate).

[65] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 10 (2019) (*Chakrabarty* and *Diehr* effectively overruled *Flook*); Ognjen Zivojnovic, *Patentable Subject Matter After Alice-Distinguishing Narrow Software Patents from Overly Broad Business Method Patents*, 30 Berkeley Tech. L.J. 807, 814 (2015) ("Even though *Diehr* did not explicitly overrule *Flook*, the two cases are difficult, if not impossible, to harmonize.").

issues related [sic] novelty, obviousness or inventiveness play no role in determining patent eligibility under 35 U.S.C. §101."[66]

B. Roberts Court § 101 Case Law: *Bilski* and Beyond

In the years following the Burger Court decisions, many patent lawyers considered patentable subject matter to remain a low bar[67] and serve only as a "coarse filter"[68] and thousands of patents were issued in computer software and biotechnology innovations.[69] The Roberts Court heard the first patentable subject matter case in nearly thirty years[70] when it heard *Bilski v. Kappos* in 2010 and then proceeded to hear three more cases in the next four years.[71] As with the Burger Court, the Roberts Court was tasked with applying patent law to new forms of technology such as the expansion of business method patents to computers,[72] diagnostics,[73] isolated DNA segments,[74] and automated settlement risk mitigation programs.[75] Additionally, preemption appears to have remained a concern for the Roberts Court. It has been suggested that preemption remained a strong concern in part because Non-Practicing Entities had begun to

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[66] Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 12 (2019).
[67] Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 9 (2019) ("This statutory intent is and has been for over 200 years to set a low threshold bar to patentable subject matter").
[68] *Research Corporation Tech, Inc. v. Microsoft Corp.*, 627 F.3d 859, 869 (Fed. Cir. 2010).
[69] Christopher B. Seaman & Sheena X. Wang, *An Inside History of the Burger Court's Patent Eligibility Jurisprudence*, 53 Akron L. Rev. 915, 917 (2019) ("These decisions ultimately opened the door to thousands of patents covering computer software and biotechnology innovations.").
[70] The Supreme Court nearly heard *Laboratory Corporation of America Holdings v. Metabolite Laboratories, Inc.* in 2006, but then the writ of certiorari was dismissed as improvidently granted. 548 U.S. 124, 125 (2006).
[71] *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012); *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576 (2013); *Alice v. CLS Bank Int'l,* 573 U.S. 208 (2014).
[72] *See Bilski v. Kappos*, 561 U.S. 593 (2010).
[73] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66 (2012).
[74] *See Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576 (2013).
[75] *See Alice v. CLS Bank Int'l*, 573 U.S. 208 (2014).

make a business around acquiring broad patents solely to demand royalties or sue for damages against practicing companies as opposed to actually producing the patented inventions.[76]

In the nearly 30 years between *Diehr* and *Bilski*, § 101 covered a very broad field of inventions and was a low threshold to clear, but in four short years the court would drastically shrink what inventions were patentable subject matter. The Supreme Court significantly narrowed the doctrine[77] despite the substance of patent eligibility law remaining largely unchanged since the 1790's.[78] While new legislation significantly changed other aspects of patent law in 1952[79] and 2011,[80] patentable subject matter had remained largely unchanged. Nonetheless, the Supreme Court took action.

In *Bilski*, the Supreme Court heard a case about whether or not business methods were patentable subject matter.[81] The claimed invention was for hedging—i.e. "a procedure for instructing buyers and sellers how to protect against the risk of price fluctuations."[82] The claimed invention gives a series of steps for an individual to follow and then a mathematical formula to create the desired hedge for a business transaction.[83]

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[76] *See* Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 540 (2020) (identifying preemption concern with NPEs).

[77] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 21 (2019) (footnote omitted) ("As it stands, the four recent Supreme Court decisions have dramatically narrowed the scope of patent protection for innovation-dependent industries by significantly expanding the judicially-created exceptions to subject matter that is listed in the statute as eligible for a patent.").

[78] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 8, 26 (2019); Garrett Tobin, *Is the U.S.P.T.O. Turning Alice Into EPC Article 52?*, 62 Ariz. L. Rev. 1121, 1122 (2020).

[79] *See* Patent Act of 1952, Pub. L. No. 82-593, 66 Stat. 792 (1952).

[80] *See* Leahy-Smith America Invents Act ("AIA"), Pub.L. 112-29, 125 Stat. 284 (2011).

[81] *See Bilski v. Kappos*, 561 U.S. 593 (2010).

[82] *See Bilski v. Kappos*, 561 U.S. 593, 598 (2010).

[83] *See Bilski v. Kappos*, 561 U.S. 593, 599 (2010).

The Supreme Court in *Bilski* addressed the Federal Circuit's machine or transformation test, so some background on that test is necessary. In *State Street Bank & Trust v. Signature Financial Group*, the Federal Circuit had adopted a "machine or transformation" test to determine whether something was patentable subject matter.[84] The invention in *State Street* was a data processing accounting system to manage mutual fund investment structures. The court cited *Diehr* for the proposition that abstract ideas must be reduced to a practical application and produce a useful, concrete, and tangible result in order to be patentable.[85] The court then created the machine or transformation test where the "transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm[.]"[86]

At the Federal Circuit in *Bilski*, the court expanded this machine or transformation test and held "[a] claimed process is surely patent-eligible under § 101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing."[87] The Supreme Court struck this as the ultimate test and instead stated that it was merely a clue.[88] The Court justified this by citing *Chakrabarty* for the proposition that a categorical rule about what is patentable would be contrary to the purposes of patent law because patent law deals with

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[84] *See State St. Bank & Tr. Co. v. Signature Fin. Grp., Inc*, 149 F.3d 1368 (Fed. Cir. 1998), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008).

[85] *See State St. Bank & Tr. Co. v. Signature Fin. Grp., Inc*, 149 F.3d 1368, 1373 (Fed. Cir. 1998), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (citation omitted) ("In *Diehr*, the Court explained that certain types of mathematical subject matter, standing alone, represent nothing more than abstract ideas until reduced to some type of practical application, i.e., "a useful, concrete and tangible result."").

[86] *State St. Bank & Tr. Co. v. Signature Fin. Grp., Inc*, 149 F.3d 1368, 1373 (Fed. Cir. 1998), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008).

[87] *In re Bilski*, 545 F.3d 943, 954 (Fed. Cir. 2008) (en banc).

[88] *See Bilski v. Kappos*, 561 U.S. 593, 604 (2010) ("This Court's precedents establish that the machine-or-transformation test is a useful and important clue, an investigative tool, for determining whether some claimed inventions are processes under § 101. The machine-or-transformation test is not the sole test for deciding whether an invention is a patent-eligible "process."").

unforeseeable inventions.[89] So, it would be difficult or impossible to predict the proper categories for inventions that have not yet been discovered. Also, if the machine or transformation was taken literally, it would go against some prior case law.[90]

While the Supreme Court refused to categorically define the machine or transformation test as the sole test, it also took another stand against categorical rules: The Court refused to rule that business methods as a class were not patentable, but agreed that this particular patent was an ineligible attempt to patent an abstract idea.[91] The Court ruled it was an abstract idea based on precedent from *Benson*, *Flook*, and *Diehr* and notably said that "*Flook* stands for the proposition that the prohibition against patenting abstract ideas "cannot be circumvented by attempting to limit the use of the formula to a particular technological environment" or adding "insignificant postsolution [sic] activity."[92] Thus, highlighting that the preemption concern cannot be avoided by limiting an idea to a certain environment and also showing that despite what many believed, *Flook* was still alive and well.

Two years later, the Court heard *Mayo Collaborative Services v. Prometheus Laboratories* which involved a patent for a diagnostic device.[93] The invention was a process that determined the appropriate amount of thiopurine drugs to give a patient in the treatment of autoimmune diseases.[94] Because everyone metabolizes thiopurine drugs differently, the invention sought to create a process in which thiopurine could be correlated to an individual's

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[89] *See Bilski v. Kappos*, 561 U.S. 593, 605 (2010) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 315 (1980)) ("A categorical rule denying patent protection for "inventions in areas not contemplated by Congress ... would frustrate the purposes of the patent law.'").

[90] *See Bilski v. Kappos*, 561 U.S. 593, 659 (2010) (Breyer, J., concurring) (identifying cases where the machine or transformation test would reach the opposite result of the court).

[91] *See* Bilski v. Kappos, 561 U.S. 593, 609 (2010).

[92] *Bilski v. Kappos*, 561 U.S. 593, 610–11 (2010) (quoting *Diamond v. Diehr*, 450 U.S. 175, 191–92 (1981)).

[93] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66 (2012).

[94] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 73–74 (2012).

metabolite level—a product of one's metabolism—which would then aid the doctor in administering the correct amount of the drug.[95] The process consisted of three steps: administer the drug, observe the relevant correlation, and determine the appropriate dosage response based on the correlation.[96]

The Court took issue with this patent because its only contribution was to inform doctors about this natural law or correlation they had observed and then use conventional steps that were already known and widely used by doctors to implement the natural law.[97] The Court ultimately ruled that it was not eligible subject matter because the claims did not do "significantly more" or "add *enough*. . . to qualify as patent-eligible processes that *apply* natural laws[.]"[98] Rather, the invention was just the natural law clothed in known steps.

In coming to this ruling, the court emphasized a lot of prior, significant case law. First, the court referenced *Flook* for the proposition that patent eligibility should not depend on the ability of the drafter.[99] Then, it cited *Benson* to caution against "upholding patents that claim processes that too broadly pre-empt the use of a natural law."[100] Lastly, it referenced *Flook* for the proposition that there needs to be an ""inventive concept," sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself."[101] In finding this inventive concept, the Court stated that "the § 101 patent-eligibility inquiry and, say, the § 102 novelty inquiry might sometimes overlap."[102] The Court mentioned this overlap without

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[95] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 73–74 (2012).
[96] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 78–79 (2012).
[97] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 79–80 (2012).
[98] *Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 77 (2012).
[99] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 72 (2012).
[100] *Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 72 (2012).
[101] *Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 72–73 (2012); *See* Jeffrey A. Lefstin, *Inventive Application: A History*, 67 FLA. L. REV. 565, 641 (2015) ("*Mayo*'s 'inventive concept' came directly from *Parker v. Flook*.").
[102] *Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 90 (2012).

overruling *Diehr* which specifically stated that § 101 subject matter determinations are separate and distinct from § 102 novelty determinations.[103] This is one of the examples of conflicting case law in the § 101 inquiry that will be addressed later

If there was any doubt that *Flook* was alive and well post-*Bilski*, *Mayo* ensured its viability. Ironically, the court also warned "that too broad an interpretation of this exclusionary principle could eviscerate patent law,"[104] which is exactly what is happening in the modern day.

One year after *Mayo*, the Court heard *Association for Molecular Pathology v. Myriad Genetics*.[105] The invention in *Myriad* was the discovery of the location and sequence of two genes that had been linked to breast and ovarian cancer.[106] *Myriad* then attempted to patent the isolated DNA and synthetically created complementary DNA ("cDNA") sequences of the genes.[107]

The court ruled that an isolated naturally occurring DNA segment is not patent eligible because it is a product of nature, but an isolated cDNA segment is patent eligible because it is not naturally occurring, but rather is created synthetically.[108] This is notable because the Court did not focus on the "inventive concept" approach from *Mayo*, but rather focused on the *Chakrabarty* test of whether it was an invention by man or an invention from nature.[109]

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[103] *See Diamond v. Diehr*, 450 U.S. 175, 189 (1981) ("It has been urged that novelty is an appropriate consideration under § 101. . . . Section 101, however, is a general statement of the type of subject matter that is eligible for patent protection "subject to the conditions and requirements of this title." Specific conditions for patentability follow and § 102 covers in detail the conditions relating to novelty.").
[104] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 71 (2012).
[105] *See Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576 (2013).
[106] *See Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 579–80 (2013).
[107] *See Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 579–80 (2013).
[108] *See See Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 580 (2013).
[109] *See Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).

Despite the IP community's outrage following *Mayo*,[110] the Court doubled down on the *Mayo* approach in *Alice v. CLS Bank International*.[111] The invention in *Alice* was "a computerized scheme for mitigating "settlement risk"—*i.e.*, the risk that only one party to an agreed-upon financial exchange will satisfy its obligation. In particular, the claims are designed to facilitate the exchange of financial obligations between two parties by using a computer system as a third-party intermediary."[112] So, the computer system served as a means to help ensure that both sides of the transaction could and would perform their end of the bargain.

The Court reaffirmed the rejection of this patent because it was an abstract idea.[113] The Court cited *Mayo* for the creation of the following two-step test which has remained the modern standard: 1) Is the claim drawn to a law of nature, physical phenomenon, or abstract idea? and 2) If yes, do the other elements amount to significantly more such that there is an inventive concept?[114] The court stated that the abstract idea of mitigating settlement risk applied on an ordinary computer "is not "*enough* " to transform an abstract idea into a patent-eligible invention."[115] The court also highlighted that "the concern that drives this exclusionary principle [is] one of pre-emption." [116]

While the Burger Court came out of its foray into patentable subject matter with the opinion that anything under the sun was patent eligible[117], the Roberts Court—despite dealing with substantially the same statute—drastically narrowed what inventions counted as patent

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[110] *See* Gene Quinn, *Killing Industry: The Supreme Court Blows* Mayo v. Prometheus, IPWATCHDOG (Mar. 20, 2012), http://www.ipwatchdog.com/2012/03/20/supreme-court-mayo-v-prometheus/id=22920/.
[111] *See Alice v. CLS Bank Int'l*, 573 U.S. 208 (2014).
[112] *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 213 (2014).
[113] *See Alice v. CLS Bank Int'l*, 573 U.S. 208, 212 (2014).
[114] *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 217–18 (2014).
[115] *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 226 (2014).
[116] *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014).
[117] *See Diamond v. Chakrabarty*, 447 U.S. 303, 316 (1980).

eligible.[118] Further, the Court elaborated very little on the two-step test it created under *Alice* and *Mayo* such that the Federal Circuit's guiding principle is to determine what is "enough" to transform a law of nature, physical phenomenon, or abstract idea into a patent-eligible invention.

II. WHY § 101 IS PROBLEMATIC AND REQUIRES REFORM

Patentable subject matter is a difficult and problematic doctrine that pleases almost nobody. Judge O'Malley of the Federal Circuit Court of Appeals wrote that it might be the "most baffling concept" in all of patent law and that even the famed Judge Learned Hand would find it difficult.[119] Judge Chen of the Federal Circuit has said that intervention in the patentable subject matter doctrine "could help clarify a lot of things."[120] And the Supreme Court has asked the Solicitor General for the third time in as many years if it is time to revisit patentable subject matter.[121]

While the doctrine is disliked by many and confusing to all, it is also legally flawed and bad policy. Legally, the doctrine has developed to become a blending of doctrines such that patentable subject matter now considers other elements of patentability in its analysis. This is both duplicative as well as conflates questions of law and questions of fact. Additionally, the case law that makes up the doctrine has many conflicting assertions. As a matter of policy, the current doctrine is not serving to incentivize innovation, but rather is causing America's IP

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[118] *See* Grant E. Gibson, *Berkheimer: An Overcorrection in the Law of Patentable Subject Matter*, 28 Tex. Intell. Prop. L.J. 211, 216 (2020) (footnotes omitted) ("Recently though, the Supreme Court has pivoted, and narrowed its interpretation of what is patent eligible.").

[119] *Realtime Data LLC v. Reduxio Sys., Inc.*, 831 F. App'x 492, 492–93 (Fed. Cir. 2020).

[120] *Could IP Actually Soothe U.S.-China Tensions?*, Law.com (Jan. 22, 2021, 8:17 PM), https://www.law.com/2021/01/22/could-ip-actually-soothe-u-s-china-tensions-gearing-up-for-feb ruarys-patent-palooza-wc-paul-hastings-latham-will-defend-covid-ip-suits/.

[121] *Supreme Court Asks SG's Views on Patent Eligibility—Again*, Law.com (May 03, 2021, 11:36 AM), https://www.law.com/litigationdaily/2021/05/03/supreme-court-asks-sgs-views-on-patent-eligibility-again-407-17661/?kw=Supreme%20Court%20Asks%20SG%27s%20Views%20on%20Patent%20Eligibility%26mdash%3BAgain&utm_source=email&utm_medium=enl&utm_campaign=litdailymorningupdate&utm_content=20210504&utm_term=tal.

regime to slip behind that of other countries. The doctrine also applies inequitably to technological areas and has the potential to stall future areas of advancement.

A. Legal Issues

1. It is an amalgamation of other doctrines

Patentable subject matter has begun to blend with some of the other doctrines of patentability—namely obviousness and novelty—such that it is no longer its own test.[122] In *Mayo*, the Supreme Court acknowledges that there is an overlap between subject matter and novelty[123] despite not overruling *Diehr* which said the exact opposite 30 years prior.[124] The Federal Circuit goes even a step further and recognizes the overlap between subject matter, novelty, and nonobviousness.[125] Judge Chen of the Federal Circuit says that one of the "big challenges with American patent eligibility law is this mixing of novelty questions in the patent eligibility inquiry."[126]

Not only is this overlap duplicative,[127] but it is also problematic because it shifts questions of novelty—a factual issue—and nonobviousness—a legal issue which almost always

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[122] Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 535 (2020) ("This study also explores the correlation between § 101 rejections and the other statutory rejections because the *Alice* decision implicates novelty, obviousness, written description, enablement, and claim definiteness under the Patent Act.").

[123] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 90 (2012) ("the § 101 patent- eligibility inquiry and, say, the § 102 novelty inquiry might sometimes overlap.").

[124] *See Diamond v. Diehr*, 450 U.S. 175, 189 (1981) ("It has been urged that novelty is an appropriate consideration under § 101. . . . Section 101, however, is a general statement of the type of subject matter that is eligible for patent protection "subject to the conditions and requirements of this title." Specific conditions for patentability follow and § 102 covers in detail the conditions relating to novelty.").

[125] *See Realtime Data LLC v. Reduxio Sys., Inc.*, 831 F. App'x 492, 497 (Fed. Cir. 2020) (stating novelty and nonobviousness are not "wholly divorced from some aspects of the § 101 inquiry").

[126] Scott Graham, *Could IP Actually Soothe U.S.-China Tensions? + Gearing Up for February's Patent-Palooza + W&C, Paul Hastings, Latham Will Defend COVID IP Suits*, Law.com (Jan. 22, 2021, 8:17 PM), https://www.law.com/2021/01/22/could-ip-actually-soothe-u-s-china-tensions-gearing-up-for-feb ruarys-patent-palooza-wc-paul-hastings-latham-will-defend-covid-ip-suits/.

[127] Paxton M. Lewis, *The Conflation of Patent Eligibility and Obviousness: Alice's Substitution of Section 103*, 2017 Utah L. Rev. OnLaw 13, 14 (2017) (arguing that the second step of *Alice* is duplicative with obviousness).

contains underlying factual issues—to the court to decide as a matter of law. This blurs the distinction between questions of law and questions of fact and could cause judicial interference with a jury's fact finding role.[128]

The vantage point from which to analyze the doctrines also differs. Novelty and obviousness are "rarely issues appropriate for resolution on the pleadings"[129] whereas subject matter is often handled at the motion to dismiss stage.[130] So, this blending may force courts to handle novelty or obviousness issues earlier in the judicial process than they would typically come up.

Further, § 103 states that "the claimed invention as a whole" is to be analyzed for purposes of obviousness.[131] Whereas in step two of *Alice*, the claimed invention can be dissected into its individual components and analyzed as a whole.[132] So, obviousness is determined by looking at the claimed invention in the aggregate compared to prior art and determining how much of an advancement has occurred. However, when determining subject matter, the invention can be dissected further than just viewing it in the aggregate; for example, the court can analyze the individual steps or components of the invention. If obviousness is blending into the subject matter inquiry, this may allow courts to analyze obviousness in light of the individual steps or components of the invention—something that the statute does not permit.

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[128] Jeffrey A. Lefstin et. al., *Final Report of the Berkeley Center for Law & Technology Section 101 Workshop: Addressing Patent Eligibility Challenges*, 33 Berkeley Tech. L.J. 551, 574 (2018) ("Moreover, by intermingling nonobviousness (§ 103) and enablement or written description (§ 112) considerations into the subject matter inquiry, the *Mayo/Alice* decisions short-circuited the factual inquiries and structure mandated by the 1952 Act.").

[129] *Realtime Data LLC v. Reduxio Sys., Inc.*, 831 F. App'x 492, 497 (Fed. Cir. 2020).

[130] Jeffrey A. Lefstin et. al., *Final Report of the Berkeley Center for Law & Technology Section 101 Workshop: Addressing Patent Eligibility Challenges*, 33 Berkeley Tech. L.J. 551, 561 (2018)("Courts now routinely confront § 101 invalidity motions at the very outset of, and throughout, many patent cases.").

[131] 35 U.S.C. § 103.

[132] *See Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208 (2014) ("If so, the Court then asks whether the claim's elements, considered both individually and "as an ordered combination," "transform the nature of the claim" into a patent-eligible application.").

The combination of these discrepancies opens the door for a judge to decide a question that is meant to go to the jury, decide that question earlier in the litigation process than it would otherwise be addressed, and to decide the question from a newfound vantage point.

In addition to the legal errors identified above, combining these other elements of patent law bring rising transactional costs to patent litigation—a field that already can be quite expensive.[133] Because of the blending of doctrines, some courts effectively require arguments about § 102 and § 103 during the § 101 analysis.[134] Because novelty (§ 102) and obviousness (§ 103) require identifying and collecting the prior art for a patent, this is almost always a more costly part of litigation than § 101.[135] So, § 101 arguments become more costly. While allowing more cases to be resolved earlier in the proceedings on § 101 grounds could decrease the total cost of patent litigation, this argument is undercut by the increasing costs of the § 101 dispute due to the additional §§ 102–03 arguments that need to be prepared. Plus, if the case moves past the § 101 inquiry, these novelty and obviousness arguments may have to be presented a second time which typically occur before a jury.

2. The case law is inconsistent

The Supreme Court and the Federal Circuit cannot get on the same page with patentable subject matter. Since the Federal Circuit holds a unique position as it is—usually—the final say

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[133] *See* Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 542 (2020) (footnote omitted) ("A negative consequence of blurring the eligibility and prior art distinctions in patent law is increased transaction costs in both patent litigation and patent examination, as patent eligibility counterclaims (or through motions to dismiss under Rule 12(c)) and PTO § 101 rejections play an increasingly important role.").

[134] *See* Matthew Bultman, *Gilstrap Changes Playing Field with Patent Eligibility Rule*, LAW360 (Aug. 14, 2019, 7:44 PM), https://www.law360.com/articles/1188573/gilstrap-changes-playing-field-with-patent-eligibility-rule [https://perma.cc/7MME-NY3L] ("There are a number of courts, the Eastern District of Texas included, with local rules requiring defendants to present invalidity contentions based on anticipation and obviousness early on in a case.").

[135] *See* Jason M. Schultz & Brian J. Love, *Brief of* Amici Curiae *Law, Business, and Economics Scholars in Support of Respondents in* Alice Corp. Pty. Ltd. v. CLS Bank International, et al., 4 N.Y.U. J. INTELL. PROP. & ENT. L. 358, 366 (2015).

on patent jurisprudence, it is beneficial if it is in unison with the Supreme Court. However, currently the Supreme Court's own case law is inconsistent. This poses an implementation problem for the Federal Circuit, and the district courts, because there is no clear way to interpret the Supreme Court's precedent.

One demonstration of the inconsistency occurs in *Mayo*. The Supreme Court discusses how the *Diehr* process was patentable because it was an invention which was "(1) continuously monitoring the temperature on the inside of the mold, (2) feeding the resulting numbers into a computer, which would use the Arrhenius equation to continuously recalculate the mold-opening time, and (3) configuring the computer so that at the appropriate moment it would signal "a device" to open the press."[136] However, the *Mayo* court juxtaposes this with the *Flook* process which was not patentable because it was an invention which was "(1) measuring the current level of the variable, e.g., the temperature; (2) using an apparently novel mathematical algorithm to calculate the current alarm limits; and (3) adjusting the system to reflect the new alarm-limit values."[137]

At surface level, both of these inventions utilize only a measuring step, a computation step, and then an action step. However, one was deemed patentable whereas the other was not. There is widespread agreement that *Flook* and *Diehr* are inconsistent with each other,[138] yet neither case has been overturned or repealed. This leaves courts struggling to determine the correct interpretation of the law. While this is not a new problem as *Flook* and *Diehr* were

[136] *Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 80 (2012).
[137] *Id.* at 81.
[138] *See* Ognjen Zivojnovic, *Patentable Subject Matter After Alice-Distinguishing Narrow Software Patents from Overly Broad Business Method Patents*, 30 Berkeley Tech. L.J. 807, 814 (2015) ("Even though *Diehr* did not explicitly overrule *Flook,* the two cases are difficult, if not impossible, to harmonize.").

decided over 40 years ago, people had assumed *Flook* was effectively overturned after *Diehr*.[139] It was not until the Supreme Court decided *Bilski* and *Mayo* and referenced *Flook* in each opinion that people definitively knew that *Diehr* did not effectively overturn *Flook*.

Mayo is also inconsistent with *Diehr* with regard to whether or not novelty is relevant in the § 101 analysis. *Diehr* clearly states that novelty is not a relevant consideration and gives an analysis based on both the structure of the act[140] as well as the legislative history for why this is so.[141] *Mayo* on the other hand admits that novelty and patentable subject matter may overlap, but states that this is out of necessity without providing any statutory basis for why this is permissible.[142] In doing so, *Mayo* did not overturn *Diehr* nor has it been read to effectively overturn *Diehr*. There is simply no way to reconcile these two cases on this point.

An example of a disconnect between the Supreme Court and the Federal Circuit is how the two courts handle physical phenomenon cases. The Supreme Court did not apply the *Alice* Two-Step in *Myriad*—a case dealing with physical phenomena—even though it had been sandwiched by a law of nature case, *Mayo*, and an abstract idea case, *Alice*, that were both subject to the *Alice* Two-Step.[143] The Federal Circuit nonetheless applied the *Mayo* Two-Step in

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[139] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 11 (2019) ("In 1978, the Supreme Court decided *Flook*, a decision that was effectively later overruled by the Court in two subsequent decisions in *Chakrabarty* and *Diehr*.").

[140] *See Diamond v. Diehr*, 450 U.S. 175, 189 (1981) ("It has been urged that novelty is an appropriate consideration under § 101. Presumably, this argument results from the language in § 101 referring to any "new and useful" process, machine, etc. Section 101, however, is a general statement of the type of subject matter that is eligible for patent protection "subject to the conditions and requirements of this title." Specific conditions for patentability follow and § 102 covers in detail the conditions relating to novelty.").

[141] *See Diamond v. Diehr*, 450 U.S. 175, 190–91 (1981) ("The legislative history of the 1952 Patent Act is in accord with this reasoning" and then lists how the committee reports and revision notes reflect this understanding).

[142] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 90 (2012) ("We recognize that, in evaluating the significance of additional steps, the § 101 patent-eligibility inquiry and, say, the § 102 novelty inquiry might sometimes overlap. But that need not always be so. And to shift the patent-eligibility inquiry entirely to these later sections risks creating significantly greater legal uncertainty, while assuming that those sections can do work that they are not equipped to do.").

[143] *See Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576 (2013).

a physical phenomenon case in *Ariosa Diagnostics v. Sequenom*—a case dealing with noninvasive testing of fetuses in pregnant women using cell-free fetal DNA.[144] The Supreme Court has never corrected the decision, so it might now be implied that there is agreement with the Federal Circuit. However, absent affirmative indication, it is unclear whether or not applying the *Alice* two-step in physical phenomenon cases is what the Supreme Court had in mind.

Furthermore, the *Alice* Two-Step is not the only aspect of subject matter that is being applied inconsistently. The underlying principles of patentable subject matter are also not uniformly used. One of those is that the ability to get a patent cannot depend on the skill of the drafter.[145] However, *McRo v. Bandai Namco Games* was a case about a patent to automatically synchronize lip movement and facial expressions for animated characters.[146] The Federal Circuit said "processes that automate tasks that humans are capable of performing are patent eligible if properly claimed."[147] This seems to suggest that artful claiming can be a differentiating factor despite the Supreme Court's contrary language in *Flook* and *Mayo*. As with whether or not the *Alice* two-step applies in physical phenomenon cases, the Supreme Court has been silent so it is unclear what the applicable law is here.

[144] 788 F.3d 1371 (Fed. Cir. 2015).
[145] *See Parker v. Flook*, 437 U.S. 584, 593 (1978); *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 72 (2012).
[146] *See McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1303 (Fed. Cir. 2016).
[147] *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1313 (Fed. Cir. 2016).

B. Policy Issues

1. The "Coarse Filter" of § 101 is foreclosing innovation and harming America's Patent Regime

Mark Twain once said "A country without a patent office and good patent laws was just a crab, and couldn't travel any way but sideways or backwards."[148] The United States Patent System is on its way to becoming a crab. The United States used to be the gold standard of patent law which led to widespread innovation. However, the coarse filter of patentable subject matter has been flipped onto its head.

The coarse filter idea used to mean that patentable subject matter was a low threshold to achieve. Thus, all inventions but the building blocks of science (i.e. laws of nature, physical phenomenon, or abstract ideas) would pass through. However, now this coarse filter is being used more frequently to exclude technologies from patent law. As a result, there is more preemption and whole industries are being filtered out from the patent system. There is more preemption because patentable subject matter asks the question "are inventions of this general kind patent eligible" whereas the other doctrines of patentability focus on the specific claimed invention. So, a rejection on subject matter grounds sends a signal to all inventions of that "general kind" whereas a rejection on one of the other grounds relates only to the invention at hand. Thus, rejections based on subject matter grounds have a larger preemptive effect.

If it is thought that patents are not available in a certain field, it incentivizes the hoarding of information in the form of trade secrets as opposed to the sharing of information that occurs from the patent system. While the goal of the patent system is to allow the building blocks of

[148] MARK TWAIN, A CONNECTICUT YANKEE IN KING ARTHUR'S COURT 107 (1889); *see* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 3 (2019).

science to enter the public domain and then allow patents on the downstream products of these building blocks, without a certainty that these downstream products will be patentable, there is little incentive to invest in the building blocks.

a) America is losing its "gold standard"

The United States used to be the "gold standard" for patent protection and was the world leader for promoting and securing innovation.[149] However, the recent changes to patentable subject matter have raised doubts about whether patents will continue to be available for cutting edge advances[150] such as "artificial intelligence, blockchain technology, quantum computing, and personalized medicine."[151] Since the Supreme Court's four cases on patentable subject matter from 2010–2014, the number of patents rejected or invalidated on subject matter grounds

[149] *See* Kevin Madigan & Adam Mossoff, *Turning Gold into Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, 24 Geo. Mason L. Rev. 939 (2017) ("Compared to other countries, the United States has long had a "gold standard" patent system. The U.S. has led the world in securing stable and effective property rights in cutting-edge innovation; most recently, in protecting biotech and computer software inventions.").

[150] *See* Kevin Madigan & Adam Mossoff, *Turning Gold into Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, 24 Geo. Mason L. Rev. 939, 941 (2017) ("Unfortunately, as commentators have pointed out, this legal test is rife with indeterminacy, creating substantial doubt as to whether long-term research and development ("R&D") expenditures can be recaptured through stable and effective property rights in technological innovation."); Rebecca Lindhorst, *Two-Stepping Through Alice's Wasteland of Patent-Eligible Subject Matter: Why the Supreme Court Should Replace the Mayo/Alice Test*, 69 Case W. Res. L. Rev. 731, 758 (2019) ("The *Mayo/Alice* two-step has bred uncertainty and fear in American inventors and investors."); Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 528 (2020) ("Since the Supreme Court ruling in *Alice Corp. v. CLS Bank*, 2 the industry has been confronting uncertainties in the prosecution of patent applications and in patent enforcement as a result of the law governing patent eligibility, which arguably harms innovation.").

[151] Christopher B. Seaman & Sheena X. Wang, *An Inside History of the Burger Court's Patent Eligibility Jurisprudence*, 53 Akron L. Rev. 915, 918 (2019) (footnotes omitted).

has skyrocketed.[152] One study found that out of a sample of 104 patent eligibility cases before the Federal Circuit post–*Alice*, the patent was found to be valid only 7.7% of the time.[153]

There have also been reduced numbers of patent applications in certain fields: "Before *Alice*, there were, on average, 392 patent applications filed per month in broad bioinformatics, within which ninety patent applications were in narrow bioinformatics. After *Alice*, there were about 339 patent applications filed per month in broad bioinformatics, and the patent applications filed in narrow bioinformatics decreased to 81. Business methods-patent applicants filed 4,206 patent applications per month on average before *Alice* but filed 3,843 patent applications per month after *Alice*. Software-patent applicants, on average, filed 8,780 patent applications per month before *Alice* but filed 7,910 patent applications per month after *Alice*. The total patent applications also decreased by 10.64% after *Alice*. From 2012 to 2016, about 26% of the total patent applications were filed in software. About 12% were in business methods and about 1% were in broad bioinformatics."[154]

While the United States is dealing with this uncertainty, other countries are continuing to develop and perhaps even surpassing the United States in being the world leader for patent protection.[155] A recent study tracked over 17,000 United States patent applications that were

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[152] *See* Jeffrey A. Lefstin et. al., *Final Report of the Berkeley Center for Law & Technology Section 101 Workshop: Addressing Patent Eligibility Challenges*, 33 Berkeley Tech. L.J. 551, 561 (2018) (finding that pre–*Mayo* there were approximately five § 101 invalidity determinations per year and post-*Mayo* that number had risen to approximately one hundred a year); Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 535 (2020) (finding that post-*Alice* the number of § 101 rejections for business methods, bioinformatics, and software patents have increased).

[153] Paul R. Gugliuzza & Mark A. Lemley, *Can A Court Change the Law by Saying Nothing?*, 71 Vand. L. Rev. 765, 767 (2018) (finding that out of 104 post-*Alice* cases at the Federal Circuit only 7.7% were found to be valid subject matter).

[154] Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 562–63 (2020).

[155] *See* Kevin Madigan & Adam Mossoff, *Turning Gold into Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, 24 Geo. Mason L. Rev. 939, 941 (2017) ("Other jurisdictions, such as in Europe and China, are now granting patents for the same or related inventions and discoveries that are being rejected in the U.S.

rejected and then abandoned on eligibility grounds and found that nearly 10% of these were granted by the European Patent Office, China, or both.[156] A more specific example is *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*[157] which was denied a United States patent on eligibility grounds for a technology that utilized cffDNA to detect fetal abnormalities non-invasively; an advancement that no one denies is desirable. However, both the United Kingdom[158] and Australia[159] granted a patent for the very same technology. Most recently, a mechanical engineering patent, a technology type that is typically a safe haven for § 101 grounds, was invalidated by the Federal Circuit for being too similar to Hooke's Law.[160]

b) This has the effect of stalling innovation

Fewer patents do not necessarily mean that innovation is stalling. If the patent system was only invalidating, rejecting, or preventing applications for undesirable patents, then there could be an argument that our system is functioning optimally. However, that is not the case. It is difficult to determine whether or not the patent system is promoting or preventing innovation,[161] however, I think there are several key indications that innovation is being stalled.

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as ineligible for patent protection. This raises the question of whether these countries are positioning themselves to bypass the U.S. as the forerunners of innovation, especially in the research-intensive sectors of the innovation economy, such as in the life sciences, biotech, and high tech.").

156 *See* Kevin Madigan & Adam Mossoff, *Turning Gold into Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, 24 Geo. Mason L. Rev. 939, 941–42 (2017) ("It presents statistics on patent-eligibility decisions in U.S. courts and at the United States Patent and Trademark Office ("PTO"), and it presents for the very first time information from a database of 17,743 recently filed patent applications in the U.S., the European Patent Office ("EPO"), and China. All of these patent applications were rejected (and then abandoned) in the U.S. on the ground that they are ineligible for patent protection under § 101, but 1,694 of them were granted by the EPO, in China, or by both.").

157 788 F.3d 1371 (Fed. Cir. 2015).

158 *See Illumina, Inc. v. Premaitha Health PLC* [2017] EWHC (Pat) 2930, (Eng.).

159 *See Sequenom, Inc. V. Ariosa Diagnostics, Inc.* [2019] FCA 1011, (Austl.).

160 *See Am. Axle & Mfg., Inc. v. Neapco Holdings LLC*, 939 F.3d 1355, 1359-68 (Fed. Cir. 2019).

161 *See* Jeffrey A. Lefstin et. al., *Final Report of the Berkeley Center for Law & Technology Section 101 Workshop: Addressing Patent Eligibility Challenges*, 33 Berkeley Tech. L.J. 551, 582 (2018) ("The efficacy of the patent system is often difficult to measure.").

As has already been shown, other countries are allowing patents on technologies while the United States is rejecting the very same patents.[162] This is innocuous on its own because, again, it is possible that the United States system is filtering out the undesirable patents and the other countries are not. However, there is also evidence that other countries are now receiving more funding than the United States for innovation. For example, the United States received 77% of capital investments for software driven industries, such as Artificial Intelligence, in 2013, but only 50% in 2017.[163] Further, in 2017, 48% of the funding for Artificial Intelligence startup companies went to China whereas the United States received only 38%.[164] Because investment is crucial to developing certain technologies, less investment is likely to result in less innovation. The combination of other countries' patent systems allowing more protection coupled with the increasing funding they are receiving suggests that the two are correlated and thus the uncertainty in America's patent system is reducing funding and therefore reducing innovation.

In fact, the uncertainty in America's patent system has had an effect. The recent doctrinal shift in subject matter jurisprudence has caused uncertainty across the board for individuals in the patent community—including companies, investors, inventors, prosecutors, examiners, and

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[162] *See* Kevin Madigan & Adam Mossoff, *Turning Gold into Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, 24 Geo. Mason L. Rev. 939, 941–42 (2017) ("It presents statistics on patent-eligibility decisions in U.S. courts and at the United States Patent and Trademark Office ("PTO"), and it presents for the very first time information from a database of 17,743 recently filed patent applications in the U.S., the European Patent Office ("EPO"), and China. All of these patent applications were rejected (and then abandoned) in the U.S. on the ground that they are ineligible for patent protection under § 101, but 1,694 of them were granted by the EPO, in China, or by both.").

[163] *See* Jackie Snow, *China's AI Startups Scored More Funding than America's Last Year*, MIT TECH. REV. (Feb. 14, 2018), https://www.technologyreview.com/f/610271/chinas-ai-startups-scored-more-funding-than-americas-last-year/.

[164] *See* Jackie Snow, *China's AI Startups Scored More Funding than America's Last Year*, MIT TECH. REV. (Feb. 14, 2018), https://www.technologyreview.com/f/610271/chinas-ai-startups-scored-more-funding-than-americas-last-year/.

litigators.[165] As this pertains to investors, which are crucial for certain industries such as the life sciences which have high costs of innovation, this uncertainty becomes a risk. Investors want to avoid risk and are generally agnostic to what they invest in so long as it is profitable.[166] In a recent survey of 475 venture capital and private equity investors, 74% said that patent eligibility is a key reason to invest or not invest in a company's developing technology.[167] This has been demonstrated in a different study in which 33% of investors have said that patent eligibility laws caused their firms to shift their capital investment away from new software or new technology related to biotechnology, medical device, and pharmaceutical industries.[168] Even the Cleveland Clinic, a renowned research hospital, has shifted its research focus because they do not think certain areas are patentable.[169]

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[165] *See* Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 545 (2020); David O. Taylor, *Confusing Patent Eligibility*, 84 TENN. L. REV. 157 (2016).

[166] Jeffrey A. Lefstin et. al., *Final Report of the Berkeley Center for Law & Technology Section 101 Workshop: Addressing Patent Eligibility Challenges*, 33 Berkeley Tech. L.J. 551, 583 (2018) ("Ultimately, most investors are indifferent between investing in bioscience, software, or commodities—whichever offers the higher return will attract more capital.").

[167] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 38 (2019) ("Based on a survey of 475 venture capital and private equity investors to study the impact of the Court's eligibility cases on their firms' decisions to invest in companies developing technology, this study found that investors overwhelmingly believe patent eligibility is an important consideration when their firms decide whether to invest in companies developing technology, with 74% of investors agreeing that it is a key reason to invest or not to invest and 14% disagreeing.").

[168] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 39 (2019) ("33% of investors who focus on technologies reported that the new patent eligibility laws impacted their firms' investment behavior, with these investors reporting that they shifted their capital investments away from companies that were developing new software or new technology related to biotechnology, medical device, and pharmaceutical industries.").

[169] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 42–43 (2019) ("This Supreme Court created uncertainty in the patent eligibility law has had real-world practical consequences, including for example, the highly regarded Cleveland Clinic and other major public and private research and development focused institutions beginning to refrain from researching and developing certain types of innovative technologies because they cannot be patented.").

While the Supreme Court warned that applying the *Alice* Two-Step too strictly could eviscerate patent law and cautioned against such an application,[170] in practice that is precisely what happened. As a result, innovation in America is lagging behind that of other countries.

2. There is inequity in which types of technology are patentable

Innovations and inventions are often unforeseeable.[171] For this reason, the Supreme Court has refused to categorically ban certain fields of innovation from being patentable.[172] As Judge Rader put it in his dissent in *In re Bilski* (the precursor to the Supreme Court's *Bilski* decision), there is no reason "why . . . some categories of inventions deserve no protection."[173] The Supreme Court even retained the spirit of this by rejecting a categorical rule against business methods being patent eligible because it would go against the purpose of patent law.[174] However, in effect, certain industries are being foreclosed from the patent system in a discriminatory manner based on the current § 101 jurisprudence.[175]

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[170] *See Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 71 (2012).

[171] *See Diamond v. Chakrabarty*, 447 U.S. 303, 316 (1980) ("Congress employed broad general language in drafting § 101 precisely because such inventions are often unforeseeable.").

[172] *See Bilski v. Kappos*, 561 U.S. 593, 605 (2010) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 315 (1980)) ("A categorical rule denying patent protection for "inventions in areas not contemplated by Congress ... would frustrate the purposes of the patent law."").

[173] 545 F.3d 943, 1012 (Fed. Cir. 2008) (en banc) (Rader, J., dissenting); *See* Rochelle C. Dreyfuss & James P. Evans, *From Bilski Back to Benson: Preemption, Inventing Around, and the Case of Genetic Diagnostics*, 63 Stan. L. Rev. 1349, 1356 (2011).

[174] *See Bilski v. Kappos*, 561 U.S. 593, 605 (2010) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 315 (1980)) ("A categorical rule denying patent protection for "inventions in areas not contemplated by Congress ... would frustrate the purposes of the patent law."").

[175] *See* Jeffrey A. Lefstin et. al., *Final Report of the Berkeley Center for Law & Technology Section 101 Workshop: Addressing Patent Eligibility Challenges*, 33 Berkeley Tech. L.J. 551, 589 (2018) ("Several participants who specialize in prosecuting life sciences applications noted that it is now very difficult to obtain patents in particular inventive fields, such as purified products, methods of treatment using purified molecules, purified enzymes for industrial processes, enzyme variants, and personalized medicine diagnostics--fields where advances had been patentable for decades, or even centuries."); Oyvind Dahle, *The Absurdity of Patent Ineligible Categories: The Discrepancy Between the Ariosa and Cellzdirect Decisions Highlights the Problems Created by Formalistic Adjudication of Patent Eligibility*, 17 Wake Forest J. Bus. & Intell. Prop. L. 114, 119 (2016) ("The Supreme Court's decisions have excluded medical diagnostic methods from patentability.").

The current subject matter doctrine prevents patenting of inventions in certain fields not because the advances in these fields are not valuable or important to our society, but rather because these inventions do not map well on to the subject matter requirements for patent law.[176] *Alice* has particularly had a negative effect on software, business methods, and biotechnology patents.[177] Post-*Alice*, all three of these fields experienced more § 101 rejections and fewer patent applications.[178] Another study looked at the patent eligibility invalidation rates of over 800 patents before the Federal Circuit and found that 65% of software or IT patents were invalidated whereas only 50% of biotechnology or life sciences were invalidated.[179] This exemplifies just one example of the discrepancy across fields.

I am not suggesting that all patents should be granted at an equal rate, but if no technological field is categorically banned from a patent, then the subject matter rejection rates, as opposed to total rejection rates, should be comparable. The subject matter rejection rates should be similar because subject matter determinations are asking the question "are inventions of this general kind patent eligible" whereas the other elements of patentability determine whether the specific claimed invention meets the criteria for patentability. This ties in to the "coarse filter" aspect because a rejection on subject matter grounds has a broader preemptive

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[176] *See Bilski v. Kappos*, 561 U.S. 593, 605–06 (2010) (identifying that the Machine or Transformation Test "would create uncertainty as to the patentability of software, advanced diagnostic medicine techniques, and inventions based on linear programming, data compression, and the manipulation of digital signals.").

[177] *See* Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 533 (2020) ("In addition to software and business methods, *Alice* has negatively impacted patent eligibility in biotechnology (e.g., biocomputing and bioinformatics).").

[178] *See* Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 535 (2020).

[179] Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 548 (2020) (footnotes omitted) (" This finding is consistent with another study in which Lemley and Zyontz reviewed 808 decisions on patentable subject matter delivered by the Federal Circuit and the federal district courts. There, federal courts invalidated patents in 65.1% of the 724 software or IT cases, but only invalidated 50% of the seventy-six biotechnology or life science cases.").

effect as it signals that this type of technology may not be patent eligible, whereas a rejection on other grounds merely means that the specific claimed invention was not patent eligible.

One example of this inequality is in the field of diagnostics. In *Athena Diagnostics v. Mayo Collaborative Services*, *Mayo v. Prometheus*, and *Association for Molecular Pathology v. Myriad*, patents for diagnostic inventions were invalidated based on subject matter grounds.[180] This trio of cases has sent a signal to inventors that applying for a diagnostics patent is a risky business. The patent may not be granted at all. Alternatively, even if the patent is granted, it can be invalidated if one attempts to enforce it. If that is the case, then the inventor disclosed his invention to the public, but reaped none of the rewards of the patent. This in turn shifts the incentives in the field of diagnostics to seek out other forms of protection or to abandon research in that field altogether in favor of a more patent-friendly field. This is exactly what the Cleveland Clinic hospital system has done.[181] Accordingly, patentable subject matter is acting inapposite to the goals of the patent system by curtailing the sharing of information as opposed to facilitating its sharing.

III. PROPOSED LEGISLATIVE CHANGE: THE LAUNDRY LIST APPROACH

Patentable subject matter should be its own doctrine—one that the Federal Circuit and Supreme Court apply consistently—as opposed to a Frankenstein-esque amalgamation of subject matter, novelty, and obviousness. Furthermore, subject matter should further the goals of the patent system and encourage innovation as opposed to hindering the sharing of information and

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[180] *See* 915 F.3d 743 (Fed. Cir. 2019), cert. denied, 140 S. Ct. 855 (2020); 566 U.S. 66 (2012); 569 U.S. 576 (2013).

[181] *See* Shahrokh Falati, Ph.D., J.D., *To Promote Innovation, Congress Should Abolish the Supreme Court Created Exceptions to 35 U.S. Code S101*, 28 Tex. Intell. Prop. L.J. 1, 42–43 (2019) ("This Supreme Court created uncertainty in the patent eligibility law has had real-world practical consequences, including for example, the highly regarded Cleveland Clinic and other major public and private research and development focused institutions beginning to refrain from researching and developing certain types of innovative technologies because they cannot be patented.").

leading to reduced investment in United States companies that are attempting to push forward the frontiers of science and technology. Lastly, it should be a doctrine that abides by the bedrock principle of courts deciding questions of law and juries deciding questions of fact.

This paper proposes a patentable subject matter doctrine with solely inclusion categories—e.g. process, machine, manufacture, or composition of matter—and the creation of many more inclusion categories to accommodate advancing technologies. By eliminating the carve outs at the subject matter step, more of the exclusionary 'work' will be shifted to the utility, novelty, and nonobviousness requirements of patentability. This will prevent a blending of doctrines and ensure that subject matter, a question of law decided by the court, has minimal factual inquiries creeping into it. Additionally, eliminating the carve outs will prevent the current *Alice* two-step from re-entering into the jurisprudence because the carve outs will no longer have any significance. Furthermore, this proposal will advance the Supreme Court's policy goal of not allowing a patent on the building blocks of science because, contrary to what the Supreme Court thinks, the other sections of patentability are capable of preventing undesirable patents.

A. Why a Legislative Change?

In *Mayo*, the Supreme Court relied heavily on precedent in formulating it's new test and recognized "the role of Congress in crafting more finely tailored rules where necessary."[182] What has emerged under the patentable subject matter law is an unworkable standard, which is typically viewed as a signal for legislative intervention.[183] Additionally, the Supreme Court has

[182] *Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 92 (2012).

[183] *See* Rebecca Lindhorst, *Two-Stepping Through Alice's Wasteland of Patent-Eligible Subject Matter: Why the Supreme Court Should Replace the Mayo/Alice Test*, 69 Case W. Res. L. Rev. 731, 761–62 (2019).

refused to further clarify the doctrine by denying certiorari for a patent eligibility case eleven times[184] in the last three years.[185]

Beyond the possible signal for legislative intervention from the Supreme Court, there are three reasons why a legislative change is preferred. First, the Supreme Court does not have technical expertise and the underlying inventions of patent law can be quite complex. While Congress does not possess technical expertise either, it does have the ability to delegate and get input from a wider range of sources. Accordingly, Congress is better equipped to handle the technical aspects of patent law and the underlying technologies.

Second, the Supreme Court and the Federal Circuit have repeatedly disagreed and sparred in developing patent law doctrines. Historically, the Federal Circuit has tried to impose bright line rules; however, the Supreme Court claims that the Federal Circuit is being "too rigid" and prefers more flexible standards.[186] When attempting to apply these flexible standards, the Federal Circuit lacks the guidance necessary to effectuate the Supreme Court's intended test. This has happened in other areas of patent law, and it is bound to continue to happen for subject matter if it goes down the judicial correction route.

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[184] *Berkheimer v. HP Inc.*, 881 F.3d 1360 (Fed. Cir. 2018), *cert. denied*, 140 S. Ct. 911 (2020); *Vanda Pharms. Inc. v. West-Ward Pharms. Int'l Ltd.*, 887 F.3d 1117 (Fed. Cir. 2018), *cert. denied*, 140 S. Ct. 911 (2020); *Athena Diagnostics, Inc. v. Mayo Collaborative Servs., LLC*, 915 F.3d 743 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 855 (2020); *Power Analytics Corp. v. Operation Tech., Inc.*, 748 F. App'x 334 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 910 (2020); *Cellspin Soft, Inc. v. Fitbit, Inc.*, 927 F.3d 1306 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 907 (2020); *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 983 (2020); *Trading Techs. Int'l, Inc. v. IBG LLC*, 767 F. App'x 1006 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 955 (2020); *Trading Techs. Int'l, Inc. v. IBG LLC*, 921 F.3d 1084 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 954 (2020); *SRI Int'l, Inc. v. Cisco Sys.*, 773 F. App'x 1090 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 1108 (2020); *Maxell, Ltd. v. Fandango Media, LLC*, 779 Fed. App'x 745 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 2509 (2020); *Reese v. Sprint Nextel Corp., 774 F. App'x 656* (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 2507 (2020).

[185] *See* Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of Alice on Patent Examiners and Patent Applicants*, 105 Minn. L. Rev. 527, 528 (2020).

[186] *See generally KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007); *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722 (2002).

Finally, patentable subject matter is a messy doctrine with conflicting case law.[187] It would be nearly impossible for a judicial change to effectuate a clear doctrine without essentially starting from scratch. However, a legislative change—particularly one with clear cut rules—can more effectively give patentable subject matter the "do-over" it requires.

B. The Proposal

Within patent law's current § 101, the four inclusion categories are "process, machine, manufacture, or composition of matter."[188] However, the only argumentation occurs on the carve out categories and presumably every invention that is currently patented falls within one of the inclusion categories. If an invention was not a process, machine, manufacture, or composition of matter it could not receive a patent under § 101. So, even if it was not stipulated in the prosecution or litigation of a patent, every patent that currently exists must fall into one of those categories. So, those inclusion categories—or perhaps fragmenting each of those categories into several more narrow categories—can provide some guiding precedent and examples for the court to follow at the outset. Essentially, all of the current kinds of patented technologies will be grandfathered in for patent eligibility purposes.

To determine what other categories will be present, the types of inventions with patent filings can be analyzed. This can be done by using the USPTO Patent Classification system. For example, there will be categories to reflect pharmaceuticals, diagnostics, medical devices, tech, software, etc. As it relates to the USPTO request for comments, each of the listed categories of quantum computing, artificial intelligence, precision medicine, diagnostic methods, and pharmaceutical treatments can be used as an inclusion category.

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[187] *See supra* Section II.A.2.
[188] 35 U.S.C. § 101.

In order to ensure that the carve outs do not once again become relevant from judge made law, the statute should also affirmatively negate the inclusion of these carve outs. For example, the statute could state that the sole criterion for patentable subject matter is whether or not the invention fits into one of these categories. It could even go further and specifically state that any relation of the invention to a law of nature, physical phenomenon, or abstract idea is not to play a role in the patentable subject matter analysis.

However, if the sole criterion is whether or not the patented invention falls into one of the categories, the statute will need some flexibility or else it may quickly become antedated. One way to do this would have the statute merely list "examples" of fields where patenting is legislatively approved and these examples can help guide the court when they contemplate new endeavors. Another route could be to include a discretionary catch-all category along the lines of "or other useful arts that satisfy the other elements of patentability." Since innovation is by definition dynamic and unpredictable, the catch-all category may be necessary so as to not exclude an invention because it is so innovative that it was not contemplated at the time of the legislative change.

As a practical matter, the emphasis on this proposal is to shift the work away from patentable subject matter and to the other elements of patentability, so the precise contours of what is and is not an inclusion category is not paramount. What is paramount is conveying that patentable subject matter is to return to its former status as a low bar, a seldom used coarse filter, and a threshold issue that is not meant to exclude any technological area even if it may exclude individual inventions.

If most of the screening function is going to be shifted from subject matter to the other elements of patentability, this raises the question of why even keep subject matter at all? One

advantage is comity with the other forms of IP protection as well as with international IP laws. For example, Article 27 of the TRIPS Agreement deals with patentable subject matter and states "patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application." Notably, "inventive step" and "capable of industrial application" are equated with nonobviousness and usefulness, respectively. So, this proposal would actually put US patent law in greater conformity with the TRIPS Agreement by making subject matter available broadly to anything which is new, nonobvious, and useful. The Copyright Act and Lanham Act also use this list format for their eligibility sections.

However, more importantly for this paper, the inclusion categories can be used to target fields, such as diagnostics, that have recently had patents rejected or invalidated at a high rate. This can create a presumption—or at least a boost of confidence for inventors—that patent protection is available in these fields. Essentially, the inclusion categories will serve as a signal that the inventions will no longer be rejected or invalidated on subject matter grounds because they are too similar to a law of nature, physical phenomena, or abstract idea. Though, the invention will still have to satisfy the other criteria of patentability. Additionally, the list would act as guidance and help courts see that material that is susceptible to being considered a law of nature is nonetheless considered by Congress to be patentable subject matter.

C. Applying New Proposal to Recent Supreme Court Cases

In *Mayo*, the Supreme Court said: "We recognize that, in evaluating the significance of additional steps, the § 101 patent-eligibility inquiry and, say, the § 102 novelty inquiry might sometimes overlap. But that need not always be so. And to shift the patent-eligibility inquiry entirely to these later sections risks creating significantly greater legal uncertainty, **while**

assuming that those sections can do work that they are not equipped to do."[189] The Supreme Court is wrong. These other sections are adequately equipped to perform the screening function that prevents undesirable inventions from being patented. This section will go through recent Supreme Court decisions and demonstrate how the same result could have been reached through other sections of patentability besides § 101.

In reaching the same result as the Court did, the emphasis is not on whether in the first instance the Court made the correct decision. The purpose of this is to show that the doctrine can be done in the same way without relying on § 101 as heavily as the Court currently does. This is important because since § 101 acts as a coarse filter, when decisions are rendered on a § 101 basis, there is a larger preemptive effect than for rejections based on the other sections. Whereas a patent being held invalid for novelty, obviousness, or written description means that the specific claim was not patentable, a patent rejected on subject matter grounds means that inventions of this general kind are not eligible for patent protection.

Professor Michael Risch previously conducted this same exercise in 2008 and discussed how the pre-2008 patentable subject matter case law could have been decided differently.[190] To avoid being duplicative, the analysis will focus on the post-2008 Supreme Court cases—*Bilski*, *Mayo*, *Myriad*, and *Alice*.

Bilski, in which the patent dealt with the business method of hedging, is unique because though the patent had been pending for eleven years, the USPTO had never examined the patent for any element of patentability except for subject matter.[191] The only arguments advanced in the

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[189] *Mayo Collaborative Servs. v. Prometheus Labs.*, Inc., 566 U.S. 66, 90 (2012) (emphasis added).

[190] *See generally* Michael Risch, *Everything Is Patentable*, 75 Tenn. L. Rev. 591 (2008).

[191] *In re Bilski*, 545 F.3d 943, 997 (Fed. Cir. 2008), *aff'd but criticized sub nom. Bilski v. Kappos*, 561 U.S. 593 (2010) (Newman, J., dissenting) ("Bilski's application, now pending for eleven years, has yet to be examined for patentability.").

respondent's brief, petitioner's brief, or even the Director of the PTO's amicus brief related to § 101 and the machine or transformation test. Because § 101 is a threshold test, the USPTO, the parties litigating the issue, and the courts never even reached the other doctrines nor were presented arguments on these other doctrines.[192] Despite this, both Judge Newman's dissent at the Federal Circuit and Judge Stevens concurrence at the Supreme Court level mentions § 112 for the proposition that the claim language was too broad to be supported by the invention itself.[193] Both of these judge's opinions seem to suggest that the majoritys' reasonings were conflating preemption with claim breadth. The former is a relevant backdrop to though not the test for § 101, but the latter is reserved for § 112. So, *Bilski* most likely could have been decided as a § 112 case in which the invention did not support the breadth of the patent's claims and thus the patent would be denied.

Mayo, a case about using thiopurines to treat autoimmune disease, was more straightforward than *Bilski* because the government actually argued that the invention was patentable subject matter, but that the patent is likely invalid under novelty or nonobviousness.[194] The government argued this point because the only element that was distinct from the prior art was the last step of the process which involved the doctor's mental inference.[195] Because of the

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[192] *See In re Bilski*, 545 F.3d 943, 976 (Fed. Cir. 2008), *aff'd but criticized sub nom. Bilski v. Kappos*, 561 U.S. 593 (2010) (Newman, J., dissenting) ("For example, we do not know whether the Bilski process would be found patentable under the statutory criteria, for they were never applied.").

[193] *See In re Bilski*, 545 F.3d 943, 996 (Fed. Cir. 2008), *aff'd but criticized sub nom. Bilski v. Kappos*, 561 U.S. 593 (2010) (Newman, J., dissenting) ("If a claim is unduly broad, or if it fails to include sufficient specificity, the appropriate ground of rejection is Section 112, for claims must "particularly point out and distinctly claim[ ]" the invention."); *Bilski v. Kappos*, 561 U.S. 593, 620 (2010) (Stevens, J., concurring) (citations omitted) ("It is true, as the Court observes, that petitioners' application is phrased broadly. But claim specification is covered by § 112, not § 101; and if a series of steps constituted an unpatentable idea merely because it was described without sufficient specificity, the Court could be calling into question some of our own prior decisions.)

[194] *See* Brief for the United States as Amicus Curiae Supporting Neither Party at 26–33, Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. 66 (2012) (No. 10-1150).

[195] *See* Brief for the United States as Amicus Curiae Supporting Neither Party at 26–33, Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. 66 (2012) (No. 10-1150).

similarity between the prior art and the invention, either novelty or nonobviousness could have been used to decide *Mayo*. It is also worth noting that the Supreme Court's only reason for rejecting the government's position, besides their misguided belief that the other sections are not capable of performing this function, was because it was inconsistent with prior doctrine.[196] A legislative change would ameliorate this concern and also come out with the same result that the Supreme Court reached.

Myriad, a case about the patentability of isolated DNA and cDNA, can also be resolved based on novelty and obviousness grounds. First, the cDNA was deemed to be patentable, so a lower subject matter bar would not change that result and no further analysis needs to be done. However, the isolated DNA segments were not deemed patentable because the DNA segment was a product of nature and was not patent eligible merely because it was isolated.[197] Both of these arguments are similar to the arguments that would be made for novelty and obviousness. Either the isolated DNA segments have occurred before and therefore are anticipated and failed the novelty test, or the act of isolating the DNA is obvious because it is not distinct enough from the prior art. Thus, *Myriad* also could have been decided based on novelty or obviousness.

Last is *Alice* which was about a computer-implemented scheme for mitigating settlement risk. The patent was ruled ineligible on subject matter grounds because it did nothing more than "instruct the practitioner to implement the abstract idea of intermediated settlement on a generic computer."[198] At the Federal Circuit level, Judge Moore in her dissenting opinion specifically argued "[s]ection 102's novelty or § 103's nonobviousness requirements are the means to

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[196] *See Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 90 (2012).
[197] *See Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 580 (2013) ("we hold that a naturally occurring DNA segment is a product of nature and not patent eligible merely because it has been isolated").
[198] *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 225 (2014).

challenge a system claim that does no more than take a familiar, well known concept and put it on a computer."[199] Thus, these elements could also have been used to rule this patent invalid.

CONCLUSION

The current § 101 patent law jurisprudence is broken. The Federal Circuit, and district courts, cannot effectively apply it, the case law itself is inconsistent, and, most importantly, it is harming innovation. By harming innovation, § 101 is acting inapposite with the goals of patent law—to incentive innovation. Accordingly, change is needed. Because of the Supreme Court's reluctance to touch upon the topic, the innate difficulty of correcting the doctrine judicially, and the need for complex technical knowledge; Congress is best situated to right (and literally write) the doctrine.

Accordingly, this paper proposes a legislative change to patentable subject matter that turns the inquiry into solely whether or not the invention fits within one of the inclusion categories, with no weight to be given to the current carve outs. In doing so, more of the exclusionary "work" will be done by the other doctrines of patentability such as novelty and obviousness. This is preferred because of the smaller preemptive effect that a rejection under one of these doctrines has compared to the preemptive effect of a subject matter rejection. Thus, even if the rejection rates remain the same, less industries will think they are foreclosed from the patent system while the same "bad inventions" that patent policy would aim to exclude can still be rejected.

[199] *CLS Bank Int'l v. Alice Corp. Pty.*, 717 F.3d 1269, 1320 (Fed. Cir. 2013), *aff'd*, 573 U.S. 208 (2014) (Moore, J., dissenting in part).