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David O. Taylor

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DAVID O. TAYLOR*

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* Co-Director of the Tsai Center for Law, Science and Innovation and Associate Professor of Law, SMU Dedman School of Law; J.D., 2003, Harvard Law School; B.S., 1999, Texas A&M University. This Article was funded in part by the Fred E. Tucker Endowment for Faculty Excellence. Alex Bridge, Angela Oliver, and Kristen Zahnow provided helpful research assistance. Thanks to Bob Armitage, Dmitry Karshtedt, and Oskar Liivak for their insightful comments. Special thanks to Rachel, Caroline, Emily, and Joshua Taylor. The views expressed in this Article, as well as any errors, are my own.

Patent law—and in particular the law governing patent eligibility—is in a state of crisis. This crisis is one of profound confusion. Confusion exists because the current approach to determining patent eligibility confuses the relevant policies underlying numerous discrete patent law doctrines, and because the current approach lacks administrability. Ironically, the result of all this confusion is seemingly clear. The result seems to be that, when challenged, patent applications and issued patents in certain technology areas probably do not satisfy the requirement of eligibility—at least that is the perception. A resulting concern, therefore, is that the current environment substantially reduces incentives to invest in research and development. Given this confusion, lack of administrability, and risk of under-investment in research and development, the time has come for Congress to amend the patent statute. In this article, I lay the groundwork for an analysis of potential amendments to the patent statute by examining the root causes of the current confusion in this area of patent law. This groundwork is essential to resolving the present crisis.

INTRODUCTION

Patent law—and in particular the law governing patent eligibility—is in a state of crisis.[1] What started as a crisis of confidence in the patent system[2] has now transformed into a crisis of confusion in the patent system. The crisis of confidence resulted from the application of broad patentability standards that allowed for the issuance and enforcement of numerous patents seen by critics as undeserving of validity under the law.[3] The crisis of confusion, in

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1. *See* Ariosa Diagnostics, Inc. v. Sequenom, Inc., 809 F.3d 1282, 1285 (Fed. Cir. 2015) (Lourie, J., concurring in the denial of en banc rehearing) ("It is . . . said that a crisis of patent law and medical innovation may be upon us, and there seems to be some truth in that concern.").

2. *See generally, e.g.*, DAN L. BURK & MARK A. LEMLEY, THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT (2009).

3. *See* State St. Bank & Tr. Co. v. Signature Fin. Grp., Inc, 149 F.3d 1368, 1375 (Fed. Cir. 1998) (holding that patent eligibility was satisfied because a

turn, has resulted from one of many steps taken by Congress and the Supreme Court to address the crisis of confidence and these critics: in particular two of the Supreme Court's most recent decisions narrowing the scope of patent eligibility.[4]

No one can reasonably deny that the Supreme Court's decisions narrowing patent eligibility have had a significant impact on the patent system. Some have suggested that this impact is positive and that these decisions will improve the quality of patent applications and issued patents,[5] as well as reduce abusive patent litigation.[6] To the extent these positive results exist, however, they come with profound confusion.

Confusion exists, first, because the current approach to determining patent eligibility confuses the relevant policy concerns underlying numerous discrete patent law doctrines. Indeed, the Supreme Court's test for eligibility—while derived from its interpretation of 35 U.S.C. § 101 as including several implicit (some would say non-statutory) exceptions—is based on several policy concerns better addressed by other statutory patent law doctrines. In particular, the existing doctrines of non-obviousness, written description, and enablement already address concerns with the

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transformation of data by a machine produced "a useful, concrete and tangible result") (quoting *In re* Alappat, 33 F.3d 1526, 1540-41 (Fed. Cir. 1994) (en banc)), *abrogated by* Bilski v. Kappos, 561 U.S. 593 (2010); *Bilski*, 561 U.S. at 659-60 (2010) (Breyer, J., concurring in the judgment) (arguing that "the introduction of the 'useful, concrete, and tangible result' approach to patentability, associated with the Federal Circuit's *State Street* decision, preceded the granting of patents that 'ranged from the somewhat ridiculous to the truly absurd'") (quoting *In re Bilski*, 545 F.3d 943, 1004 (Fed. Cir. 2008) (en banc) (Mayer, J., dissenting)).

4. *See generally* Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347 (2014); Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289 (2012).

5. *See, e.g.*, Jacob S. Sherkow, *The Natural Complexity of Patent Eligibility*, 99 IOWA L. REV. 1137, 1190 (2014) ("These concerns with the quality of the specification's disclosure—not just its sufficiency—focus on whether the specification actually fulfills its teaching function in a manner worthy of the societal quid pro quo for the patent grant—whether the disclosure is meaningful to its particular art. Although the *Mayo* and *Myriad* Courts did not ground their decisions in those terms, their dicta concerning the patents' specifications highlight the difference between specifications that teach a meaningful new way of implementing the claimed invention and those that simply describe variants on 'well-understood, routine, conventional activity.'") (quoting *Mayo*, 132 S. Ct. at 1298).

6. *See, e.g.*, Daryl Lim, *Standard Essential Patents, Trolls, and the Smartphone Wars: Triangulating the End Game*, 119 PENN ST. L. REV. 1, 82 (2014) ("In *Alice Corp v. CLS Bank*, the Court further addressed the concern over abusive patent litigation by imposing heighted requirements to obtain a patent for software and business methods.").

breadth of patent claims.[7] Likewise, the utility, written description, and definiteness requirements, as well as the limit on functional claiming, already address concerns with abstractness and inadequate disclosure.[8] Moreover, concern regarding preemption of the basic building blocks of human ingenuity—the concern primarily emphasized in the most recent Supreme Court case on eligibility[9]—ignores the utility, enablement, and written description requirements, the limited terms of patents, and the existing experimental use exception.[10] Additionally, this concern could be addressed directly by a more robust experimental use exception to infringement liability.[11]

Confusion also exists because, beyond confusing relevant policies and doctrines, the current approach to determining patent eligibility lacks administrability. It is exceedingly difficult to understand whether a patent examiner or a court should find subject matter eligible for patenting given the overarching test for eligibility

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7. *See* 35 U.S.C. §§ 103(a) (non-obviousness), 112(a) (written description and enablement) (2012).

8. *See* 35 U.S.C. §§ 101 (utility), 112(a) (enablement and written description); 112(b) (definiteness), 112(f) (limitation on functional claiming) (2012).

9. *See Alice*, 134 S. Ct. at 2354 ("We have described the concern that drives this exclusionary principle as one of pre-emption.").

10. *See* 35 U.S.C. §§ 101 (utility), 112(a) (enablement and written description), 154(a)(2) (limited term), 271(e)(1) (experimental use exception) (2012); *e.g.*, Ted Hagelin, *The Experimental Use Exemption to Patent Infringement: Information on Ice, Competition on Hold*, 58 FLA. L. REV. 483, 560 (2006) (describing the existing, narrow statutory experimental use exception and advocating for a more robust statutory experimental use exception in part to "avoid inefficient barriers to follow-on and downstream research efforts").

11. *See* Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1086 (1989) (advocating for "a carefully formulated experimental use exemption from patent infringement liability"). In the recent Supreme Court eligibility cases, of course, the questions presented have not expressly identified these other patent law doctrines, and the Court has not analyzed most of these doctrines despite their clear relevance to the Court's policy concerns. At most, in *Mayo* the Court summarily dispensed with the idea that the other patentability requirements sufficiently address those concerns. *See* Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1304 (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."). Dmitry Karshtedt has similarly argued that the courts have created a de facto *extra-statutory* condition of patentability he calls the "completeness" requirement. *See generally* Dmitry Karshtedt, *The Completeness Requirement in Patent Law*, 56 B.C. L. Rev. 949 (2015).

articulated by the Supreme Court. That test requires two increasingly confusing analyses. First, the examiner or judge must determine whether a patent claim is directed to an ineligible concept: a law of nature, a physical phenomenon, or an abstract idea.[12] Second, the examiner or judge must then determine whether something in the claim transforms the nature of the claim into a patent-eligible application of the ineligible concept, an analysis identified as the search for an "inventive concept," one that "sufficiently ensure[s] that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself."[13] That two-part test is—to use a term coined by Justice Scalia with respect to his understanding of another patentability test—"gobbledygook."[14] Another way of describing it is—this time using a phrase coined by Justice Stewart when describing his understanding of hard-core pornography and thus obscenity—"I know it when I see it."[15] In short, the Supreme Court's test for eligibility provides no objective guidelines. There are no objective guidelines, in particular, to help a patent examiner or judge determine what constitutes an abstract idea or an inventive concept.[16]

Ironically, while the underlying policy concerns have been confused and the proper analysis of patent eligibility under the Supreme Court's recent precedent is confusing, the result of all this confusion is seemingly clear. The result seems to be that, when challenged, patent applications and issued patents, at least in certain technology areas,[17] probably do not satisfy the requirement of eligibility. Regardless of whatever analysis the "gobbledygook"

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12. *Alice*, 134 S. Ct. at 2355.

13. *Id.* (citing *Mayo*, 132 S. Ct. at 1294).

14. Transcript of Oral Argument at 41, KSR v. Teleflex, 550 U.S. 398 (2007) (No. 04-1350) (criticizing the Federal Circuit's teaching, suggestion, or motivation to combine test as "gobbledygook").

15. Jacobellis v. Ohio, 378 U.S. 184, 197 (1964) (Stewart, J., concurring). At least one district judge has leveled this criticism of the *Mayo* two-step test for eligibility in several opinions. *See, e.g.*, McRO, Inc. v. Sony Computer Entm't Am., LLC, 55 F. Supp. 3d 1214, 1220 (C.D. Cal. 2014) (noting that "the two-step test may be more like a one step test evocative of Justice Stewart's most famous phrase").

16. For a thorough treatment of the ambiguity of the prohibition on patenting an abstract idea, see generally Kevin Emerson Collins, *Bilski and the Ambiguity of "an Unpatentable Abstract Idea,"* 15 LEWIS & CLARK L. REV. 37 (2011).

17. These concerns particularly plague biotechnology and software technologies, but the impact of the Supreme Court's precedent has affected various other types of technologies. *See, e.g.*, Thales Visionix, Inc. v. United States, 122 Fed. Cl. 245 (2015) (invalidating claims to "motion-tracking technology for defense and aerospace applications" based on the Supreme Court's two-part test).

test actually requires, it gives unfettered access to the smorgasbord of supporting policies justifying different limits on patentability and is unconstrained and subjective by nature. At least, that is the perception. In reality we are not quite to the point where we could say, as Justice Jackson quipped in the context of U.S. patent law's discarded "invention" requirement—which, also ironically, the Supreme Court effectively resurrected in its search for an "inventive concept"—that "the only patent that is valid is one which [the Supreme] Court has not been able to get its hands on."[18] After all, the Supreme Court did find for the patent owner on the issue of eligibility, at least in part, in one of the four cases on point it heard in the past six years.[19] Application of the Supreme Court's eligibility test by the lower courts, however, has been more stark. In the first year after the Supreme Court's last decision on patent eligibility, for example, the U.S. Court of Appeals for the Federal Circuit invalidated every patent claim challenged as ineligible in twelve of thirteen opinions on point.[20] A resulting concern is that the current

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18. Jungerson v. Ostby & Barton Co., 335 U.S. 560, 572 (1949) (Jackson, J., dissenting). The analogy to *Jungerson* is particularly apt given the return of the concept of "invention" in the form of the search for an inventive concept. *Compare id.* (complaining that the Supreme Court seemingly invalidated every patent based on the "invention" requirement) *with Alice*, 134 S. Ct. at 2355 (explaining the requirement to search for an inventive concept).

19. In the one case where the Court found for the patent owner on the issue of eligibility, the Court actually split the baby by finding for the patent owner on one set of claims, and for the challenger on another set of claims. *Compare* Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 133 S. Ct. 2107 (2013) (finding eligibility of one of two sets of claims) *with Bilski*, 561 U.S. at 593 (finding ineligibility of all claims); *Mayo*, 132 S. Ct. at 1289 (same); *Alice*, 134 S. Ct. at 2347 (same).

20. The opinions reporting holdings of ineligibility include Versata Development Group, Inc. v. SAP America, Inc., 793 F.3d 1306 (Fed. Cir. 2015); Intellectual Ventures I LLC v. Capital One Bank *(USA)*, 792 F.3d 1363 (Fed. Cir. 2015); Internet Patents Corp. v. Active Network, Inc., 790 F.3d 1343 (Fed. Cir. 2015); Ariosa Diagnostics, Inc. v. Sequenom, Inc., 788 F.3d 1371 (Fed. Cir. 2015); OIP Techs., Inc. v. Amazon.com, Inc., 788 F.3d 1359 (Fed. Cir. 2015); Allvoice Developments US, LLC v. Microsoft Corp., 612 Fed. Appx. 1009 (2015); Content Extraction and Transmission LLC v. Wells Fargo Bank, N.A., 776 F.3d 1343 (Fed. Cir. 2014); Univ. of Utah Research Found. v Ambry Genetics Corp., 774 F.3d 755 (Fed. Cir. 2014); Ultramercial, Inc. v. Hulu, LLC, 772 F.3d 709 (Fed. Cir. 2014); buySAFE, Inc. v. Google, Inc., 765 F.3d 1350 (Fed. Cir. 2014); Planet Bingo, LLC v VKGS LLC, 576 Fed. Appx. 1005 (Fed. Cir. 2014); Digitech Image Techs., LLC v Electronics for Imaging, Inc., 758 F.3d 1344 (Fed. Cir. 2014). The lone exception is DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245 (Fed. Cir. 2014). Note that the list of cases does not include other cases during the same year when the Federal Circuit affirmed ineligibility holdings without issuing opinions. *See* Dietgoal

environment substantially reduces incentives to invest in research and development; if the prevailing perception is that, because of the eligibility requirement, patents will not be available to protect inventions, individuals and companies may not invest efficiently in research and development in affected technology areas.[21]

Given this confusion, lack of administrability, and risk of under-investment in research and development, the time has come for Congress to amend the patent statute. In this article, I lay the groundwork for an analysis of potential amendments to the patent statute by examining the root causes of the current confusion in this

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Innovations LLC v. Bravo Media LLC, 599 Fed. Appx. 956 (Fed. Cir. 2015); Gametek LLC v. Zynga Inc., 597 Fed. Appx. 644 (Fed. Cir. 2015); Fuzzysharp Technologies Inc. v. Intel Corporation, 595 Fed. Appx. 996 (Fed. Cir. 2015); Fed. Home Loan Mortg. Corp. v. Graff/Ross Holdings, LLP, 604 F. App'x 930 (Fed. Cir. 2015).

21. The contrary argument is that the ineligibility of so many patents actually encourages individuals and companies to invest more in research and development because these individuals and companies will bear less risk of liability for patent infringement. *Cf.* James Bessen & Michael J. Meurer, *The Direct Costs from NPE Disputes*, 99 CORNELL L. REV. 387, 416 (2014) (describing a "$29 billion tax on innovation" when "firms . . . cho[o]se to innovate and thereby expose[] themselves to the largely unavoidable risk of [non-practicing entity patent] lawsuit"). Taken to its extreme, this contrary argument calls into question the very existence of the patent system itself. Given Congress's decision to use the power granted to it by the Constitution to create a patent system, however, it is clear that Congress has decided that the patent system is necessary or at least appropriate to encourage investment in research and development. Thus, the burden seemingly falls on those who make the contrary argument—that the patent system retards research and development—to prove that the patent system should be abolished. And to make a convincing case, they need more than faith and hope. *Cf.* Mark A. Lemley, *Faith-Based Intellectual Property*, 62 UCLA L. REV. 1328, 1343-44 (2015) (recognizing arguments in favor of evidence-based weighing of competing policies in the field of intellectual property law, but putting the burden on advocates of the patent system to justify it given the mistaken view that patent rights today are "more and powerful" than they were "even a few decades ago," when the reality is the Supreme Court has taken significant steps to weaken patent rights in recent years); *see generally, e.g.*, Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347 (2014) (weakening patent rights by strengthening the eligibility requirement); Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289 (2012) (similar weakening of these rights); KSR v. Teleflex, 550 U.S. 398 (2007) (weakening patent rights by strengthening the obviousness requirement); eBay Inc. v. MercExchange, LLC, 547 U.S. 388 (2006) (weakening patent rights by weakening injunctive relief). Regardless, it seems highly unlikely that Congress will consider abolishing the patent system, and so the more important point—and the one on which I would expect agreement from both supporters and critics of the current patent system—is that Congress should fine tune the patent system to ensure that individuals and companies invest efficiently in research and development.

area of patent law. This groundwork is essential to resolving the present crisis. Without a deep understanding of the root causes, any attempt to amend the patent statute will be a rudderless endeavor unlikely to eliminate the existing confusion and, ultimately, resolve the present crisis.

Part I of this article analyzes the origins of the modern patent statute, including the language governing eligibility currently present in 35 U.S.C. § 101, identifying several lessons this history teaches relevant to the eligibility requirement. Part II confronts two of the most recent Supreme Court decisions on patent eligibility, decisions that highlight the confusion surrounding this area of the law and the failure of the Supreme Court to take into account the lessons taught by the history of the development of the modern patent statute. Part III explores various aspects of the confusion that reigns in patent law regarding eligible subject matter, including confusion over the various requirements of patentability and their supporting policies. Part IV considers the lack of administrability inherent in the current two-part test governing the eligibility requirement. Finally, Part V addresses the impact of the Supreme Court's approach to eligibility and, in particular, the concern with reduced incentive to invest in research and development.

I. CODIFYING PATENT ELIGIBILITY

A little history can go a long way toward understanding the present structure of the patent statute, and an accurate understanding of the present structure has profound implications for understanding the current confusion concerning the modern eligibility requirement.

A. The First Patent Statute

For our purposes, the relevant history began with the Patent Act of 1790, which created the first federal patent statute after ratification of the Constitution.[22] The Patent Act of 1790 included

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22. The Constitution granted Congress the power to pass legislation to create a patent system. U.S. CONST. art. I, § 8, cl. 8 (authorizing Congress to pass laws "To promote the Progress of . . . useful Arts, by securing for limited Times to . . . Inventors the exclusive Right to their . . . Discoveries"). As later explained in the legislative materials related to the Patent Act of 1952:

> This provision was unanimously adopted by the Constitutional Convention following suggestions for Federal jurisdiction over both patents and

two separate sections governing what I will call the patentability and specification requirements, respectively.[23]

The patentability requirements were concise and simple—even elegant; the relevant section permitted patents to issue for "any useful art, manufacture, engine, machine, or device, or any improvement therein not before known or used."[24] This language expressed three patentability requirements: (1) a utility requirement ("useful"); a subject matter requirement ("art, manufacture, engine, machine, or device, or any improvement therein"); and a novelty requirement ("not before known or used").[25]

The separate specification requirements were much less concise and simple, and no one in their right mind would call them elegant. The relevant section included long and halting language describing exactly what the specification must include, be, and do.[26] That language expressed two specification requirements: (1) a written description requirement;[27] and (2) an enablement requirement.[28]

> copyrights which had been made in the Convention by James Madison of Virginia and Charles Pinckney of South Carolina. Each proposed separate provisions relating to patents and to copyrights which were merged by the Drafting Committee of the Convention into the general statement we now have, which was adopted without any dissenting voice.

S. REP. NO. 82-1979 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2409. The Federalist Papers, for their part, include little discussion of this particular power. James Madison merely explained that the "utility of this power will scarcely be questioned" and that the "public good fully coincides . . . with the claims of individuals." THE FEDERALIST, No. 43 (James Madison).

23 Patent Act of 1790, ch. 7, §§ 1 & 2, 1 Stat. 109 (1790) (codified as amended at 35 U.S.C. §§ 100-105).

24. *Id.* at § 1.

25. *Id.*

26. *Id.* at § 2 (requiring "a specification in writing, containing a description, accompanied with drafts or models, and explanations and models (if the nature of the invention or discovery will admit of a model) of the thing or things, by him or them invented or discovered, and described as aforesaid, in the said patents; which specification shall be so particular, and said models so exact, as not only to distinguish the invention or discovery from other things before known and used, but also to enable a workman or other person skilled in the art or manufacture, whereof it is a branch, or wherewith it may be nearest connected, to make, construct, or use the same").

27. Patent Act of 1790, ch. 7, § 2, 1 Stat. 109 (1790) (requiring "a specification in writing, containing a description, accompanied with drafts or models, and explanations and models (if the nature of the invention or discovery will admit of a model) of the thing or things, by him or them invented or discovered, and described as aforesaid, in the said patents").

These patentability requirements (utility, subject matter, and novelty) and specification requirements (written description and enablement) have endured in today's patent law.[29] Their expression in the patent statute and their exact contours, however, have changed in the intervening years.

B. The Patent Statute Between 1793 and 1952

Importantly, between 1793 and 1952, the patent statute became increasingly complex, particularly with respect to the patentability requirements. This complexity, however, developed slowly.

The Patent Act of 1793 did not add much complexity.[30] It changed the subject matter requirement on the margins by removing and adding categories.[31] In particular, it added "composition of matter" and removed "engine" and "device."[32] It also added language expressing the novelty requirement in terms of the invention being "new."[33] Perhaps the most important change was relatively simple: the addition of language specifying that the relevant comparison for determining novelty was whether the invention was known or used "before the application."[34] Today we might call this an absolute novelty requirement. Finally, the Act actually simplified the language describing the specification requirements.[35] Subsequent amendments, however, added complexity.

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28. *Id.* (requiring that the "specification shall be so particular, and said models so exact, as not only to distinguish the invention or discovery from other things before known and used, but also to enable a workman or other person skilled in the art or manufacture, whereof it is a branch, or wherewith it may be nearest connected, to make, construct, or use the same").

29. *See* 35 U.S.C. §§ 101, 102, 112(a) (2012).

30. *See* Patent Act of 1793, ch. 11, § 1, 1 Stat. 318 (1793).

31. *Id.*

32. *See id.* (requiring "any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement on any art, machine, manufacture or composition of matter, not known or used before the application").

33. *Id.*

34. *Id.*

35. Patent Act of 1793, ch. 11, § 3, 1 Stat. 318 (1793) (requiring "a written description of his invention, and of the manner of using, or process of compounding the same, in such full, clear and exact terms, as to distinguish the same from all other things before known, and to enable any person skilled in the art or science, of which it is a branch, or with which it is most nearly connected, to make, compound, and use the same").

The Patent Act of 1836 made two significant changes to the patentability requirements.[36] First, it modified the novelty requirement, effectively codifying the first-to-invent paradigm. In particular, rather than determine whether the invention was known or used "before the application," the novelty analysis required determining whether the invention was known or used "before [the applicant's or applicants'] discovery or invention thereof."[37] Thus, if an inventor could show he invented the invention before another person used the invention in public, he would be entitled to a patent under the new formulation of the law. In modern terms, we have called this "swearing behind" potential prior art.[38] Second, the Act limited the ability to swear behind potential prior art by introducing the concept of what we now call a statutory bar. This statutory bar prohibited patentability, even if the inventor invented the invention before the public use or sale of the invention, if the inventor caused the invention to be in public use or on sale prior to the filing of the patent application. In the words of the statute, no patent would issue if the invention was, "at the time of [the applicant's] application for a patent, in public use or on sale, with his consent or allowance."[39] The specification requirements, by contrast, did not change significantly.[40]

Just three years after the Patent Act of 1836, Congress modified the patentability requirements again, adding even more complexity.[41] The first change it made was to insert into the statute what today we call a "prior user right," which, among other things, gave a party a right to use an invention without paying a patent

36. Patent Act of 1836, ch. 357, § 6, 5 Stat. 117 (1836).

37. *Id.* In this sense, Congress codified a holding of the Supreme Court in an opinion by Justice Story. *See* Pennock v. Dialogue, 27 U.S. 1, 18 (1829) ("What then is the true meaning of the words '*not known or used before the application*?' They cannot mean that the thing invented was not known or used before the application by the inventor himself, for that would be to prohibit him from the only means of obtaining a patent.").

38. *See* U.S. PATENT AND TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 715 (9th ed., rev. 7, 2015), *available at* https://www.uspto.gov/web/offices/pac/mpep/s715.html (entitled "Swearing Behind a Reference").

39. *See* Patent Act of 1836, ch. 357, § 6, 5 Stat. 117 (1836).

40. *Id.* (requiring "a written description of his invention or discovery, and of the manner and process of making, constructing, using, and compounding the same, in such full, clear, and exact terms, avoiding unnecessary prolixity, as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same").

41. Patent Act of 1839, ch. 88, § 7, 5 Stat. 353 (1839).

owner if the party purchased the invention prior to the filing of the relevant patent application.[42] The next change altered the existing statutory bar in two ways by introducing what we would call today a "grace period." For patentability purposes, this grace period allowed an invention to be in public use or on sale prior to the filing of a patent application, so long as the inventors filed an application within two years of the public use or on sale event.[43] Stated conversely, if the inventors did not file an application within two years of the public use or on sale event, they would not be entitled to a patent.[44] This change to the law, first, expanded the statutory bar to public uses and sales of the invention not controlled by the inventor. This change however, also narrowed the instances in which the statutory bar would apply by effectively excusing the prior public use or sale if the inventor filed a patent application within two years of it. This grace period introduced in 1839 continues to exist in the patent statute today, although it now excuses public uses or sales only one year, rather than two years, prior to the application date.[45] Notably, the Patent Act of 1839 also introduced the concept of abandonment, which would cause a prior public use or sale to spring back to life, so to speak, and invalidate a patent.[46]

The complexity of the patent statute increased even more with the Patent Act of 1870. The Act made three changes to the patentability requirements. First, the Act combined the statutory language expressing both the novelty requirement and the statutory bars from the Patent Act of 1836 with the grace period of the Patent Act of 1839, resulting in one expression of all three of these concepts.[47] Second, the Act changed the novelty requirement by

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42. *Id.* ("That every person or corporation who has, or shall have, purchased or constructed any newly invented machine, manufacture, or composition of matter, prior to the application by the inventor or discoverer for a patent, shall be held to possess the right to use, and vend to others to be used, the specific machine, manufacture, or composition of matter so made or purchased, without liability therefor to the inventor, or any other person interested in such invention.").

43. *Id.* ("[N]o patent shall be held to be invalid by reason of such purchase, sale, or use prior to the application for a patent as aforesaid, except on proof of abandonment of such invention to the public; or that such purchase, sale, or prior use has been for more than two years prior to such application for a patent.")

44. *Id.*

45. *See* 35 U.S.C. § 102 (2012).

46. *See* , ch. 88, § 7, 5 Stat. 353 (1839) ("[N]o patent shall be held to be invalid by reason of such purchase, sale, or use prior to the application for a patent as aforesaid, except on proof of abandonment of such invention to the public.").

47. Patent Act of 1870, ch. 230, § 24, 16 Stat. 198 (1870) (allowing patents to "any new and useful art, machine, manufacture, or composition of matter, or any

adding a geographic restriction to the prohibition on obtaining a patent if the invention was "known or used before his or their discovery or invention thereof;" such that this prohibition applied only if it was known or used "in this country."[48] Third, the Act changed the novelty requirement by adding a prohibition on obtaining a patent if the invention was "patented, or described in any printed publication in this or any foreign country, before his invention or discovery thereof."[49] The Patent Act of 1870 also changed the specification requirements in two important respects. First, it added the best mode requirement.[50] Second, it added a claiming requirement, which included what is now known as the definiteness requirement.[51]

The next major patent legislation, the Patent Act of 1897, did not make significant changes to the patentability requirements.[52]The complexity of its single provision governing the patentability requirements, however, was extreme:

> Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, not known or used by others in this country, before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, or more than two years prior to his application, and not in public use or on sale in this country for more than two years prior to his application, unless the same is proved to have been abandoned, may,

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new and useful improvement thereof, not known or used by others in this country, and not patented, or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned").

48. *Id.*

49. *Id.*

50. *Id.* § 26 (requiring "a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle so as to distinguish it from other inventions").

51. *Id.* ("[H]e shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery.").

52. Patent Act of 1897, ch. 391, § 1, 29 Stat. 692 (1897).

> upon payment of the fees required by law, and other due proceeding had, obtain a patent therefor.[53]

All of the patentability requirements and their qualifications were expressed in this one sentence. This sentence described subject matter, utility, novelty, the statutory bar, geographic restrictions, the grace period, and abandonment. It is no wonder, then, that later drafters would separate the patentability requirements into more than one section of the patent statute.[54]

C. The Modern Patent Statute

The modern patent statute—at least its organization into its present sections—began with the Patent Act of 1952. The Act itself was part of a "comprehensive program of revising and enacting into law all of the titles of the United States Code."[55] As part of that comprehensive program, the drafters did at least three important things with respect to the patentability requirements[56] in particular. First, they separated the utility and subject matter requirements from the novelty requirement and statutory bars: they placed the former in 35 U.S.C. § 101 and the latter in 35 U.S.C. § 102.[57] This

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53. *Id.*

54. In 1903, for example, Congress provided that

> [n]o person otherwise entitled thereto shall be debarred from receiving a patent for his invention or discovery, nor shall any patent be declared invalid by reason of its having been first patented or caused to be patented by the inventor or his legal representatives or assigns in a foreign country, unless the application for said foreign patent was filed more than twelve months . . . prior to the filing of the application in this country, in which case no patent shall be granted in this country.

Patent Act of 1903, ch. 1019, § 1, 32 Stat. 1225 (1903). This created an additional statutory bar related to the filing of patent applications in foreign countries. An inventor would be barred from obtaining a U.S. patent if she did not file her application in the United States within one year of filing a foreign patent application. Congress placed this statutory bar in a separate statutory section as compared to all of the other patentability requirements. *Id.*

55. S. REP. NO. 82-1979, at 1 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2395. The House Report duplicates the relevant text from the Senate Report. Thus, I will cite only to the Senate Report.

56. The "patentability requirements" include the utility, subject matter, novelty, statutory bars, and non-obviousness requirements.

57. Patent Act of 1952, Pub. L. No. 82-593, 66 Stat. 792, 797-98 (codified as amended at 35 U.S.C. §§ 102-103) ("A person shall be entitled to a patent unless—(a)

simplified the complex language from the Patent Act of 1897, resulting in a pared-down statutory section—35 U.S.C. § 101—that expressed only two patentability requirements: (1) the utility requirement; and (2) the subject matter requirement.[58] Together, I refer to these two requirements as the "eligibility requirement." Second, they amended the subject matter requirement by replacing the category of "art" with "process."[59] Third, they "codified" the common law doctrine of "invention," actually replacing it with a statutory requirement of non-obviousness in 35 U.S.C. § 103.[60]

With respect to the specification requirements,[61] the Patent Act of 1952 placed all of them in one new statutory section. The Act described the written description, enablement, and best mode requirements in a first paragraph of § 112, and the claiming and

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the invention was known or used by others in this country, or patented or described in this or a foreign country, before the invention thereof by the applicant for patent, or (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or (c) he has abandoned the invention, or (d) the invention was first patented or caused to be patented by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application filed more than twelve months before the filing of the application in the United States, or (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or (f) he did not himself invent the subject matter sought to be patented, or (g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.").

58. *Id.* (codified as amended at § 101) ("Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.").

59. *Id.* They also explained what "process" meant in § 100: "The term 'process' means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material." *Id.* (codified as amended at § 100).

60. *Id.* (codified as amended at § 103 ("A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.").

61. The "specification requirements" include the enablement, written description, best mode, claiming, definiteness, and functional claiming requirements.

definiteness requirement in a second paragraph of § 112.[62] It also created a new provision in a third paragraph related to functional claiming.[63]

While the Senate and House Reports accompanying the Patent Act of 1952 say little with respect to the specification requirements, they include important descriptions of the patentability requirements in the new statute and their relationship with one another. In the following excerpt, for example, the drafters identify the role of § 101, as well as its relationship to the other sections of the statute:

> Referring first to section 101, this section specifies the type of material which can be the subject matter of a patent. . . .
>
> Section 101 sets forth the subject matter that can be patented, "subject to the conditions and requirements of this title." The conditions under which a patent may be obtained follow, and section 102 covers the conditions relating to novelty.
>
> A person may have "invented" a machine or a manufacture, which may include anything under the sun that is made by man, but it is not necessarily patentable under section 101 unless the conditions of the title are fulfilled.[64]

In this way, the Senate and House Reports explain that § 101 specifies or sets forth the "type of material which can be the subject matter of a patent," or, in other words, the "subject matter that can be patented."[65] Here, the Reports also clarify that § 101 merely identifies the subject matter that "can be patented," but for a patent to issue the application must satisfy the other conditions and requirements of Title 35 which "follow," such as § 102.[66] Thus, for example, a machine or manufacture "is not necessarily patentable under section 101 unless the conditions of the title are fulfilled."[67] That is, for a patent to be issued, the inventor must comply not only

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62. *Id.* (codified as amended at § 112).

63. *Id.*

64. S. REP. NO. 82-1979, at 5 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2398–99.

65. *Id.*

66. *Id.*

67. *Id.*

with the patentability requirements of § 101, but also with the patentability requirements of §§ 102 and 103.

Besides identifying the role of § 101 and its relationship to the other sections of the statute, the Senate and House report also address the decision to replace the category of "art" with "process" in § 101.[68] With respect to this change in statutory language, the drafters explained that "the word 'art' as used in this place means 'process or method.'"[69] The legislative history also describes the additional sections expressing the other patentability requirements:

> Section 102, in general, may be said to describe the statutory novelty required for patentability, and includes, in effect, an amplification and definition of "new" in section 101.
>
> Section 103, for the first time in our statute, provides a condition which exists in the law and has existed for more than 100 years, but only by reason of decisions of the courts. An invention which has been made, and which is new in the sense that the same thing has not been made before, may still not be patentable if the difference between the new thing and what was known before is not considered sufficiently great to warrant a patent.[70]

These other patentability requirements exist in §§ 102 and 103. Importantly, the drafters explained that while § 101 would still include the word "new," § 102 provides "in effect, an amplification and definition of 'new' in section 101."[71] Thus, § 102, in general, may be said to describe the statutory novelty required for patentability.[72] Section 102 also described statutory bars.[73] Finally, § 103 described the last patentability requirement showing that even a novel

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68. *Id.*

69. *Id.* ("[T]he word 'art' which appears in the present statute has been changed to the word 'process.' 'Art' in this place in the present statute has a different meaning than the words 'useful art' in the Constitution, and a different meaning than the use of the word 'art' in other places in the statutes, and it is interpreted by the courts to be practically synonymous with process or method. The word 'process' has been used to avoid the necessity of explanation that the word 'art' as used in this place means 'process or method,' and that it does not mean the same thing as the word 'art' in other places.").

70. *Id.* at 6 (*as reprinted in* 1952 U.S.C.C.A.N. 2394 at 2399).

71. *Id.*

72. *Id.*

73. *See* Patent Act of 1952, Pub. L. No. 82-593, 66 Stat. 792, 797-98 (codified as amended at 35 U.S.C. § 102).

invention "may still not be patentable if the difference between the new thing and what was known before is not considered sufficiently great to warrant a patent."[74]

Since 1952, the most important patent legislation has been the Leahy-Smith America Invents Act ("America Invents Act") of 2011.[75] While the America Invents Act substantially changed aspects of the patent statute—including the novelty requirement of § 102 by replacing the first-to-invent paradigm with a first-inventor-to-file paradigm[76]—it did not change the organization of the patent statute generally, or § 101, in particular.[77] Thus, the patentability requirements remain expressed in §§ 101 (utility and subject matter), 102 (novelty and statutory bars), and 103 (non-obviousness).[78] Likewise, the specification requirements remain expressed in § 112(a) (written description, enablement, and best mode), 112(b) (claiming, definiteness), and 112(f) (functional claiming).[79]

D. Lessons About Eligibility Law

To a Federal Circuit judge or a patent law professor or practitioner, this brief summary of the history of the patent statute may be known. But there are several important lessons this history teaches.

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74. S. REP. NO. 82-1979, at 6 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2399.

75. Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011).

76. Among the patentability requirements, the most substantial change made by the America Invents Act was the modification of § 102 to return U.S. patent law to a type of first-to-file rather than a first-to-invent paradigm while preserving the one-year grace period for certain events. *See generally* Joe Matal, *A Guide to the Legislative History of the America Invents Act: Part I of II*, 21 FED. CIR. B. J. 435, 449 (2012) (describing the revised version of § 102). In reality, however, given the statutory language, the America Invents Act introduced what I like to call a "first-inventor-to-file-or-publicly-disclose-without-abandoning" paradigm. *See* 35 U.S.C. § 102(b)(1)(B), 102(b)(2)(B) (providing protection for the first to publicly disclose); § 102(a)(2) (requiring at least publication of a filed patent application, and therefore no abandonment until at least publication, for that application to qualify as prior art).

77. The America Invents Act did add a note to § 101, stating that, "[n]otwithstanding any other provision of law, no patent may issue on a claim directed to or encompassing a human organism." America Invents Act § 34, 125 Stat. at 340.

78. *See* 35 U.S.C. §§ 101, 102, 103 (2012).

79. *Id.* § 112.

First, this history teaches that § 101 does not state all of the patentability requirements. The present patent statute includes other sections identifying patentability requirements—§§ 102 and 103 in particular. While all of the patentability requirements at one time existed in one section,[80] the original, elegant language became bloated.[81] Thus, the Patent Act of 1952 separated the patentability requirements into multiple sections of the patent statute.[82] This is important because it means that § 101 alone does not need to do all of the work necessary to eliminate patentability for unworthy claims. Therefore, there is no need to twist the language of § 101 for policy reasons to ensure that unmeritorious inventions are not patentable, at least without considering all of the patentability requirements, including those outside of § 101. If § 101 does not render an invention unpatentable, the patentability requirements of §§ 102 and 103 still remain. Likewise, there is no valid basis for an analysis of the constitutionality of a particular interpretation or version of § 101 divorced from the remainder of the patent statute. The various sections of the patent statute work together to ensure that only worthy inventors obtain patents.[83]

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80. Patent Act of 1790, ch. 7, § 1, 1 Stat. 109 (1790) (permitting patents to issue for "any useful art, manufacture, engine, machine, or device, or any improvement therein not before known or used").

81. The Patent Act of 1897 included a single provision governing the patentability requirements:

> Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, not known or used by others in this country, before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, or more than two years prior to his application, and not in public use or on sale in this country for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceeding had, obtain a patent therefor.

Patent Act of 1897, ch. 391, § 1, 29 Stat. 692 (1897). In this one sentence resided all of the patentability requirements and their qualifications: subject matter, utility, novelty, the statutory bar, geographic restrictions, the grace period, and abandonment. It is no wonder, then, that later drafters would separate the patentability requirements into more than one section of the patent statute. *See* Patent Act of 1903, ch. 1019, § 1, 32 Stat. 1225 (1903).

82. *See* Patent Act of 1952, Pub. L. No. 82-593, 66 Stat. 792, 797-98 (codified as amended at 35 U.S.C. §§ 101-03).

83. Thus, the Supreme Court is wrong to the extent it believes that the patentability requirements expressed in § 101—what collectively I call the eligibility

Second, this history teaches that "new" in § 101 is redundant. Section 102 defines the requirement of newness in terms of comparing the claimed invention with prior art. The legislative history to the Patent Act of 1952 makes this clear. It explains that "[s]ection 102, in general, may be said to describe the statutory novelty required for patentability, and includes, in effect, an amplification and definition of 'new' in section 101."[84] This is important because it highlights that "newness" or novelty of a claim, when comparing that claim to prior art at least, is not a relevant concern of any independent patentability requirement remaining in § 101.[85]

Third, this history teaches that the "invention" requirement is not part of § 101. The Patent Act of 1952 replaced the common law "invention" requirement with the statutory non-obviousness requirement of § 103.[86] And if the history of the statutory amendments did not make this clear, one of the drafters of the Patent Act of 1952 did make this clear in his writings on point, as I will show.[87] Regardless, this replacement is important because it shows that it is not a relevant concern of any independent patentability requirement in § 101 to consider how similar the claimed invention is to the prior art. It is the role of § 103 to ensure

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requirement—are the only bars to patentability. It is therefore wrong to the extent it, as a result of this misunderstanding, develops common law tests that are based on policies untied to the statutory text of § 101, that are superfluous, or that, worse, conflict with the remaining patentability requirements of §§ 102 and 103. *See, e.g.*, *infra* Part III.B.2.

84. S. REP. NO. 82-1979, at 6 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2399. Beyond novelty, § 102 also sets forth the law governing what traditionally were known as statutory bars. *See* Daniel Taskalos, *Metallizing Engineering's Forfeiture Doctrine After the America Invents Act*, 16 STAN. TECH. L. REV. 657, 661 (2013) ("Although the AIA completely redrafts the language of the novelty provision, it maintains the same categories of available prior art references contained in the statutory bars subsection of the novelty provision.").

85. The Supreme Court shows its failure to understand this point—that "newness" or novelty of a claim, when comparing that claim to prior art at least, is not a relevant concern of any independent patentability requirement remaining in § 101—when it discounts existing or conventional acts in the context of its eligibility analysis. *See* Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347, 2357-58, 2359 (2014); Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1294, 1298 (2012). I discuss this point in more detail *infra* text accompanying note 113.

86. *See* Patent Act of 1952, Pub. L. No. 82-593, 66 Stat. 792, 798 (codified as amended at 35 U.S.C. §103).

87. S. REP. NO. 82-1979, at 6 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2399.

that "the difference between the new thing and what was known before" is "sufficiently great to warrant a patent."[88]

Judge Giles Rich's writings make this last point clear. Judge Rich was an authority on this point because, prior to becoming a judge, he and P.J. Federico, the Patent Office's Examiner-in-Chief, drafted the new patent statute enacted in 1952.[89] Importantly, Judge Rich repeatedly explained how § 103 replaced the common-law "invention" requirement, for example, explaining that it was the very intention of the drafters of the Patent Act of 1952 to eliminate the "invention" requirement:

> Nowhere in the entire act is there any reference to a requirement of "invention" and the drafters did this deliberately in an effort to free the law and lawyers from bondage to that old and meaningless term. The word "invention" is used in the statute only to refer to the thing invented. That is why the requirement of "invention" should be referred to, if at all, only with respect due to that which is dead.[90]

In other words, not only is there no "invention" requirement in § 101, there is no longer any invention requirement anywhere in the common law or in the patent statute. Congress replaced the "invention" requirement with the statutory non-obviousness requirement, as Judge Rich explained:

> Upon examination in the Patent Office or upon adjudication in court, under the statute, when novelty, utility, and [non]obviousness as defined in section 103 are found to exist, and provided there is no one-year statutory bar, then there is *patentability* and *that is the end of the matter*. An examination for the presence or absence of "invention," or adherence to precedents on that muddy issue, is not called for and is not proper. It is a work of supererogation. It

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88. *Id.*

89. Sean B. Seymore, *The Presumption of Patentability*, 97 MINN. L. REV. 990, 1008 (2013) ("The 1952 Patent Act was co-drafted by then-Examiner-in-Chief and Patent Office Board of Appeals member Pasquale J. (Pat) Federico and then-patent attorney and future C.C.P.A. and Federal Circuit Judge Giles Sutherland Rich.").

90. Giles S. Rich, *Principles of Patentability*, 28 GEO. WASH. L. REV. 393, 405 (1960), *reprinted in* 14 FED. CIR. B.J. 135, 145 (2004).

> illustrates, furthermore, a failure to grasp the meaning of the statutory provisions.[91]

Given this explanation, it is clear that any insistence on the search for an "invention" after 1952 reflects a failure to understand the meaning of the new patent statute. The reality is that § 101 does not express any "invention" requirement.[92]

Fourth, the legislative history clearly explains that § 101 specifies or sets forth the "type of material which can be the subject matter of a patent," or in other words the "subject matter that can be patented."[93] The legislative history says nothing concerning claim breadth with respect to § 101.[94]

In stark contrast with all of these lessons stands the Supreme Court's recent decisions on the issue of patent eligibility, decisions that reflect, and have caused, considerable confusion. We now turn to those decisions and the confusion they have created.

II. UNRAVELING PATENT ELIGIBILITY

Two of the most recent Supreme Court decisions on patent eligibility highlight the confusion surrounding this area of the law, as well as the failure of the Supreme Court to take into account the lessons taught by the history of the development of the modern patent statute. As I will show, these decisions in particular reflect confusion regarding the organization of the patent statute and the policies underlying various patent law doctrines, including, not just the eligibility requirement, but all of the patentability and specification requirements.

A. Mayo Collaborative Servs. v. Prometheus Labs.

The earlier of the two cases is *Mayo Collaborative Services v.*

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91. Giles S. Rich, *The Vague Concept of "Invention" as Replaced by Sec. 103 of the 1952 Patent Act*, 46 J. PAT. OFF. SOC'Y 855, 866 (1964).

92. Unfortunately, the Supreme Court shows its failure to understand this basic point when it invokes a search for an inventive concept in the context of its analysis of eligibility. *See Alice*, 134 S. Ct. at 2355; *Mayo*, 132 S. Ct. at 1294. I discuss this problem in more detail. *See infra* text accompanying notes 365 and 397-407.

93. S. REP. NO. 82-1979, at 6 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2399.

94. *Id.* In short, the Supreme Court and commentators are wrong to suggest that the primary concern of § 101 is reigning in claims that are too broad. I discuss this problem in more detail. *See infra* Part III.B.

Prometheus Laboratories, Inc.[95] In an opinion by Justice Breyer, the Court focused on a common law "implicit exception" to patent eligibility for laws of nature, natural phenomena, and abstract ideas.[96] The Court explained that the concern underlying this exception is impeding innovation by creating exclusive rights in the basic tools of scientific and technological work.[97] And while the *application* of a law of nature may be eligible, the Court explained that "one must do more than simply state the law of nature while adding the words 'apply it.'"[98]

The *Mayo* Court concluded that the claimed processes at issue in the case did not transform unpatentable natural laws into patent-eligible applications of those laws.[99] The important part of the decision is the Court's explanation of why. One might think, based on the Court's discussion to this point, that the Court would explain that the claim simply did not describe how to apply the relevant natural law. But the claim at issue did so.[100] Thus, to reach its conclusion that the claim was invalid, instead the Court explained that what was missing was an inventive concept sufficient to ensure that the claim amounts to "significantly more" than a claim upon a natural law itself.[101]

The Court additionally explained that the claim at issue in the case set forth a law of nature, namely the relationships between metabolites in human blood and the effectiveness or harmfulness of a drug.[102] The *Mayo* Court then walked through each of the elements of the claim and pointed out that each was either the law of nature itself or old steps.[103] It also concluded that the combination of these elements added nothing to each individual step.[104] In other words, apart from the natural law itself, all the claimed process involved

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95. 132 S. Ct. 1289 (2012).

96. *Id.* at 1293.

97. *Id.*

98. *Id.* at 1294.

99. *Id.*

100. *Id.* at 1295 (quoting claim 1 of the patent-in-suit, which described how to administer a drug to a subject, determine a level of the relevant metabolites in the blood of the subject, and based on the level to determine the need to increase or decrease administration of the drug).

101. *Id.* at 1297–99.

102. *Id.* at 1294, 1296.

103. *Id.* at 1297–98. According to the Court, the wherein clauses described the law of nature itself and the administering and determining elements merely described old steps. *Id.*

104. *Id.* at 1298.

was "well-understood, routine, conventional activity previously engaged in by researchers in the field, which according to the Court was insufficient to show eligibility."[105] Furthermore, according to the Court, granting a patent on this claim would risk tying up the use of the underlying natural law, inhibiting its use in making further discoveries.[106]

The Supreme Court faulted the Federal Circuit for using what was known as the "machine or transformation" test to determine patent eligibility.[107] The Court further faulted the Federal Circuit's finding that the claims at issue met the transformation part of that test.[108] The Court then rejected several other arguments. One important argument rejected by the Court was the government's view that § 101 should be easy to meet and that other statutory provisions—§§ 102, 103, and 112—should do the necessary screening of claims.[109] The Court rejected this position out of hand, saying that its prior cases were not consistent with the government's view.[110]

To say that the Supreme Court's understanding of patent eligibility in *Mayo* was shocking to patent law professors and practitioners would be a gross understatement. To start, it directly contradicts the four lessons described above that are taught by the legislative history of § 101. First, the Supreme Court expressly rejected the idea that § 101 should not duplicate the patentability requirements in the other statutory provisions.[111] The Court indicated its view that the patentability requirements in § 101 should alone bar patentability, and as a result, it developed a common law test based on policies untied to the statutory text of § 101 and conflicting or superfluous compared to the remaining statutory text of §§ 102 and 103.[112] Second, by discounting existing

105. *Id.* at 1294.
106. *Id.* at 1301.
107. *Id.* at 1296, 1302–03.
108. *Id.* at 1303.
109. *Id.* at 1303–04.
110. *Id.* at 1303.
111. *Id.* at 1304 ("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.").
112. *Id.* at 1304–05.

or conventional acts in the context of its analysis of eligibility,[113] the Court showed its failure to understand that novelty with respect to prior art is not a relevant concern of § 101. Third, the Court, when it invoked a search for an inventive concept,[114] showed its failure to understand that Congress eliminated any search for inventiveness in favor of a requirement of non-obviousness articulated in § 103. Fourth, by stating that the claim was "overly broad,"[115] the Court highlighted its failure to understand that § 101 is not concerned with the breadth of claims.

Moreover, the decision shocked knowledgeable observers because it directly contradicted Supreme Court precedent directly on point. In *Mayo*, the Court condoned analyzing the novelty of individual steps of the claimed process—indeed, the Court separately analyzed each step of the claimed process and discounted steps that were "well known in the art."[116] The Court, for example, discounted one particular step in the claimed process because it simply "tells doctors to engage in well-understood, routine, conventional activity previously engaged in by scientists who work in the field."[117] But the Court in *Diamond v. Diehr* had previously said not to do this exact thing: "The 'novelty' of any element or steps in a process, or even of the process itself, is of no relevance in determining whether the subject matter of a claim falls within the § 101 categories of possibly patentable subject matter."[118]

Beyond this clear contradiction of its own precedent, the Supreme Court has also relied upon a misinterpretation of English

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113. *Id.* at 1298 ("[T]his step tells doctors to engage in well-understood, routine, conventional activity previously engaged in by scientists who work in the field. Purely 'conventional or obvious' '[pre]-solution activity' is normally not sufficient to transform an unpatentable law of nature into a patent-eligible application of such a law.") (second alteration in original) (quoting Parker v. Flook, 437 U.S. 584, 590 (1978)).

114. *Id.* at 1294 (stating that its previous cases "insist that a process that focuses upon the use of a natural law also contain other elements or a combination of elements, sometimes referred to as an 'inventive concept,' sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself") (citing *Flook*, 437 U.S. at 594).

115. *Id.* at 1301.

116. *Id.* at 1297–98.

117. *Id.*

118. Diamond v. Diehr, 450 U.S. 175, 188–89 (1981). Older Supreme Court precedent similarly does not support considering the novelty of a claimed invention to determine eligibility. *Flook*, 437 U.S. at 591–92 ("[T]he novelty of the mathematical algorithm is not a determining factor at all.").

precedent, *Neilson v. Harford*,[119] as shown recently by Jeffrey Lefstin.[120] The Court in *Mayo* explained that the invention in *Neilson* was eligible for patenting because "the claimed process did more than simply instruct users to use the principle that hot air promotes ignition better than cold air, since it explained how the principle could be implemented *in an inventive way*."[121] Furthermore, the *Mayo* Court explained that "the claimed process [in *Neilson*] included not only a law of nature but also several *unconventional* steps."[122] As Lefstin has shown, however, this is incorrect; it is exactly the opposite of the actual test applied in *Neilson*.[123] The invention in *Neilson* was eligible for patenting, not because it disclosed anything "inventive" or "unconventional," but instead, because it disclosed a mere *practical* application of a natural law or phenomena.[124]

On top of these contradictions with the legislative history and case law regarding the eligibility requirement, the test the Supreme Court articulated provides no guidance. Instead it incorporates a purely subjective standard, the correct application of which cannot be predicted with any certainty. Indeed, the *Mayo* Court's own articulation of the test it put in place highlighted the lack of certainty it was creating: "[T]o transform an unpatentable law of

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119. THOMAS WEBSTER, REPORTS AND NOTES OF CASES ON LETTERS PATENT FOR INVENTION, 371 (1844) (reporting the June 26, 1841 opinion of the English court in support of its judgment in *Neilson v. Harford*).

120. *See generally* Jeffrey A. Lefstin, *Inventive Application: A History*, 67 FLA. L. REV. 565 (2015).

121. *Mayo*, 132 S. Ct. at 1300 (emphasis added).

122. *Id.* (emphasis added).

123. Lefstin, *supra* note 120, at 565.

124. *See id.* at 570. As explained by Lefstin:

> In both England and the United States, *Neilson* established the line between principles in the abstract, which were not patent eligible, and practical applications of principles, which were. That understanding was carried forward through the early twentieth century in the United States, where it became black-letter law that nearly every practical application of a fundamental principle might properly be the subject of a patent. It was not until 1948, when the Supreme Court decided *Funk Brothers Seed Co. v. Kalo Inoculant Co.*, that a test of inventive application entered the mainstream of American patent law.

Id. According to Lefstin, in *Neilson* the court reached its conclusion "not because [the inventor's] application was inventive, but because his application was *entirely conventional*." *Id.* at 586.

nature into a patent-eligible *application* of such a law, one must do more than simply state the law of nature while adding the words 'apply it.'"[125] Likewise, the Court stated that "a process that focuses upon the use of a natural law [must] also contain other elements or a combination of elements, sometimes referred to as an 'inventive concept,' sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself."[126]

What does all of this mean? Something "more" than simply stating "apply the natural law" is required, and that missing something is an inventive concept.[127] But what is an inventive concept? The Court never explains, other than to say what it is not: it is not limiting the use of a natural law to a particular technological environment;[128] it is not adding insignificant postsolution activity;[129] and it is not "well-understood, routine, conventional activity previously engaged in by researchers in the field."[130] Thus, no affirmative explanation is given. In terms of highlighting the confusion it created, it is telling that when the Court characterized one of its precedents as involving an inventive concept, the Court did not even explain why that precedent included an inventive concept, other than to repeat the use of the word "inventive."[131]

Given all of these problems with *Mayo*, it is not surprising to see the author of a prominent patent law blog state that *Mayo* is one of the worst opinions the Supreme Court has ever issued in patent law.[132] Other prominent practitioners have had similarly negative reactions to *Mayo*.[133]

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125. *Mayo*, 132 S. Ct. at 1294 (citing Gottschalk v. Benson, 409 U.S. 63 (1972)).

126. *Id.*

127. *Id.*

128. *Id.* at 1297.

129. *Id.* at 1298.

130. *Id.*

131. *Id.* at 1299 ("These other steps apparently added to the formula something that in terms of patent law's objectives had significance—they transformed the process into an inventive application of the formula.").

132. Gene Quinn, *Killing Industry: The Supreme Court Blows Mayo v. Prometheus*, IP WATCHDOG (Mar. 20, 2012), http://www.ipwatchdog.com/2012/03/20/supreme-court-mayo-v-prometheus/id=22920.

133. *See, e.g.*, Donald R. Dunner, *2014 Friedman Appellate Advocacy Lecture*, 24 FED. CIR. B.J. 381, 384–85 (2015) ("On the § 101 front, the Supreme Court has replaced the machine-or-transformation test with a number of unhelpful guidelines. . . . [W]holly aside from the fact that focusing on an additional 'inventive concept' is a backward step from the goal of predictability, it unfortunately conflates the mission of § 101 with the other, patentability-oriented statutory provisions.").

B. Alice Corp. v. CLS Bank Int'l

The latter of the two Supreme Court cases highlighting confusion surrounding patent eligibility is *Alice Corp. v. CLS Bank International*.[134] In an opinion by Justice Thomas, the Supreme Court effectively doubled-down on the test introduced in *Mayo*, explaining that the same test protected not just laws of nature, but also abstract ideas from being patented.[135] The Court explained that it sought to balance the policy of preventing preemption of the basic tools of scientific and technological work with the idea that, at some level, all inventions embody or use laws of nature and abstract ideas.[136] Ultimately, the *Alice* Court stated that an invention is not ruled ineligible merely because it involves an abstract concept; "*applications* of such concepts 'to a new and useful end,'" the Court said, "remain eligible for patent protection."[137] Rather than focus on whether the claim actually identifies an application of an abstract idea, however, the Court focused on the analysis used in *Mayo*. What is important, according to the *Alice* Court, is to distinguish between basic "building blocks" and inventions that integrate them into "something more."[138]

The framework the Court identified is a generalized version of the one introduced in *Mayo*, divided into two steps. First, determine whether the claims are directed to one of the patent-ineligible concepts, and, second, if so, ask what else is in the claims, to see whether the additional elements transform the nature of the claims into patent-eligible applications.[139] The Court highlighted—again drawing from *Mayo*—that that this second part of the test is the search for an inventive concept—an element of a claim that ensures that the claim in practice amounts to "significantly more" than a claim on the concept itself.[140]

Applying this two-part test to the particular invention at issue in *Alice*, the Court first concluded that the claims were directed to an "abstract idea of intermediated settlement."[141] Apparently this was

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134. *See* Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347 (2014).

135. *Id.* at 2354–55.

136. *Id.* at 2354.

137. *Id.* (citing Gottschalk v. Benson, 409 U.S. 63, 67 (1972)).

138. *Id.* (citing Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1303 (2012)).

139. *Id.* at 2355.

140. *Id.* (citing *Mayo*, 132 S.Ct. at 1294).

141. *Id.*

so because the claims were addressed to a fundamental economic practice long prevalent in commerce, and because that longstanding practice, intermediated settlement, is a "building block of the modern economy."[142] The Court, however, did not limit its conception of an abstract idea to "preexisting, fundamental truths."[143] Second, the Court concluded that the claims did not add enough to transform the abstract idea into a patent eligible invention.[144] The claims apparently included no inventive concept.[145] In particular, the mere addition of a generic computer was insufficient.[146] In this regard, the Court analyzed past precedent, concluding that *solving a technological problem* qualifies an invention as eligible for patenting.[147] The improvement of an existing technological process qualifies as a patent eligible invention, said the Court, and not just because of the use of a computer.[148] The Court explained that "[t]he mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention."[149] Apparently, well understood routine use of a computer was not enough to transform the abstract idea into a patent eligible invention, and instead, what the Court sought was an "inventive use" of a computer.[150] The Court noted that the invention at issue in the case did not improve any other technology or improve the functioning of the computer itself.[151]

Alice only furthered the confusion surrounding patent eligibility by adopting the reasoning and test set forth in *Mayo*, and applying it beyond the common law exception for natural laws to the common law exception for abstract ideas. Thus, *Alice* both perpetuated and extended the contradiction of the lessons taught by the legislative history of § 101, the inconsistency with prior Supreme Court and English precedent, and ultimately, the purely subjective approach to eligibility that provides no guidance to those making decisions whether to invest in research and development.

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142. *Id.* at 2356.
143. *Id.* at 2356–57 (internal citations omitted).
144. *Id.* at 2357.
145. *Id.*
146. *Id.*
147. *Id.* at 2358 (discussing Diamond v. Diehr, 450 U.S. 175, 177–78 (1981)).
148. *Id.*
149. *Id.*
150. *See id.*
151. *Id.* at 2359–60.

III. UNDERLYING CONFUSION

In *Mayo* and *Alice*, the Supreme Court has (1) confused the relevant policies underlying patent eligibility as compared to other patent law doctrines; and (2) created a confusing test governing patent eligibility. I address these two areas of confusion in turn. However, I first address a preliminary foundational problem: confusion over what are the very requirements of patentability—highlighted, interestingly enough, by a common phrase used to describe the doctrine of eligibility, "patentable subject matter."[152]

A. The Requirements of Patentability

It is important at the beginning to clearly label the doctrine under consideration. This doctrine has been known as the requirement of "patentable subject matter,"[153] but that terminology is, at a minimum, confusing and, at worst, inaccurate.[154] Use of the phrase "patentable subject matter" may lead some to believe that if this doctrine is satisfied—if there is patentable subject matter—then the applicant is entitled to a patent. That is wrong.

"Patentable subject matter" refers to a patentability requirement that, not surprisingly, relates to subject matter. Importantly, however, when an applicant meets the requirement of "patentable subject matter," there are other patentability requirements that also

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152. I use the phrase "patentability requirements" to encompass the eligibility requirement as well as the requirements of 35 U.S.C. §§ 102 and 103. The patent statute labels the requirements of §§ 102 and 103 in particular as "conditions for patentability." 35 U.S.C. §§ 102 ("Conditions for patentability; novelty") & 103 ("Conditions for patentability; non-obvious subject matter") (2012).

153. *See, e.g.*, Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1293 (2012) ("Section 101 of the Patent Act defines patentable subject matter."); OIP Techs., Inc. v. Amazon.com, Inc., 788 F.3d 1359, 1360 (Fed. Cir. 2015) ("The district court granted judgment on the pleadings, concluding that the patent does not claim patentable subject matter under 35 U.S.C. § 101."); Rochelle Cooper Dreyfuss, *Giving the Federal Circuit A Run for Its Money: Challenging Patents in the PTAB*, 91 NOTRE DAME L. REV. 235, 256 (2015) (stating that "the [Supreme] Court rejected the Federal Circuit's view that any invention that produces a useful, concrete, and tangible result is drawn to patentable subject matter").

154. It does not help matters that the official title of 35 U.S.C. § 101 is "Inventions patentable." 35 U.S.C. § 101 (2012). The legislative history explains that "[t]he corresponding section of [the] existing statute [was] split into two sections, section 101 relating to the subject matter for which patents may be obtained, and section 102 defining statutory novelty and stating other conditions for patentability." S. REP. NO. 82-1979 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2409.

must be met before the applicant is entitled to a patent. "Patentable subject matter" should therefore not be confused with patentability. To be patentable, a claim must meet every requirement of patentability, not just the requirement related to subject matter. Thus, were we to stick with the rather confusing phrase of "patentable subject matter," we would need to describe novelty as "patentable novelty" and non-obviousness as "patentable non-obviousness." There, however, is no difference between "novelty" and "patentable novelty," or between "non-obviousness" and "patentable non-obviousness."

A less confusing and more accurate label is the "subject matter requirement" or "eligible subject matter."[155] Saying that subject matter is "eligible" for patenting more clearly and accurately highlights the existence of additional patentability requirements. In other words, for eligible subject matter to issue in a patent, that eligible subject matter must meet the additional patentability requirements. Those additional patentability requirements include utility,[156] novelty and statutory bars,[157] and non-obviousness.[158] In the patent statute, the additional patentability requirements of novelty, statutory bars, and non-obviousness are called "conditions for patentability."[159]

This distinction between "patentable subject matter" (wrongly understood) and "eligible subject matter" is important. If one inaccurately thinks that the "patentable subject matter" requirement is all that stands between a patent application and an issued patent, then there is good reason to interpret the requirement creatively to add to the doctrine. But if one correctly understands that the requirement is concerned only with "eligibility" and that there is an assortment of other statutory grounds or "policy levers"[160] available to prevent patents from issuing to unworthy applicants,

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155. Note that I do not say "eligibility." In my view, both the subject matter requirement and the utility requirement should be considered together to form the eligibility requirement.

156. 35 U.S.C. § 101 (2012).

157. 35 U.S.C. § 102 (2012).

158. 35 U.S.C. § 103 (2012).

159. 35 U.S.C. §§ 102 ("Conditions for patentability; novelty") & 103 ("Conditions for patentability; non-obvious subject matter") (2012).

160. *See generally* Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1671–75 (2003).

then there is no basis to interpret the requirement creatively to add non-statutory constraints.[161]

This underlying distinction between "patentable subject matter" (wrongly understood) and "eligible subject matter" is consistent with one explanation of why the Supreme Court has so badly misinterpreted § 101. The Supreme Court has treated the doctrine as if it were the only barrier to a patent applicant obtaining a patent. This confusion, however, may have less to do with nomenclature than the history of § 101. As described above, Congress created § 101 in 1952 when it recodified the patent statute.[162] The creation of Title 35 was the result of an effort to create one new statute, with better articulation and organization of the governing law.[163] With respect to § 101, in particular, the drafters of the new statute explained that "[t]he corresponding section of [the] existing statute [was] split into two sections, section 101 relating to the subject matter for which patents may be obtained, and section 102 defining statutory novelty and stating other conditions for patentability."[164] Likewise, the drafters created another separate section, § 103, to govern the non-obviousness condition for patentability.[165] The Supreme Court, however, has been interpreting § 101 creatively, as if it were the only barrier to patentability, and in the process conflating eligibility in § 101 with the concepts of novelty and non-obviousness from §§ 102 and 103.

B. Claim Breadth

Beyond confusion regarding the patentability requirements, confusion exists because the current approach to patent eligibility confuses the relevant policy concerns underlying numerous discrete patent law doctrines. Consider the first major concern reflected in the Supreme Court's recent decisions on patent eligibility: the breadth of patent claims.[166] Other statutory patent doctrines already

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161. The Supreme Court may view its decisions on § 101 as the only basis to eliminate bad patents. Indeed, Judge Mayer of the Federal Circuit has expressed this view. MySpace, Inc. v. GraphOn Corp., 672 F.3d 1250, 1268 (Fed. Cir. 2012) (Mayer, J., dissenting).

162. S. REP. NO. 82-1979, at 1 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2395.

163. *Id.*

164. *Id.* at 2409.

165. *Id.* at 2399.

166. *See* Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347, 2354–55 (2014); Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1294 (2012).

address this concern, and they do so with more precision, guidance, and authority than the Supreme Court's law of patent eligibility.

1. The Supreme Court's Underlying Concerns

In its eligibility cases, the Supreme Court has articulated several concerns related to the scope of patent claims. The Court, for example, has indicated a generalized concern with the breadth of claims. In *Bilski v. Kappos*, the Supreme Court characterized the claims at issue as "broad examples of how hedging can be used in commodities and energy markets."[167] In *Mayo v. Prometheus*, the Court went further, complaining that the claims at issue were "overly broad."[168]

The Court has more clearly identified its concern with the breadth of claims. For example, it has focused on whether the claims cover old activities. In *Bilski*, the Court faulted the claims at issue for covering hedging because "'[h]edging is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class.'"[169] Likewise, in *Mayo*, the Court faulted claimed processes because "the steps in the claimed processes (apart from the natural laws themselves) involve well-understood, routine, conventional activity previously engaged in by researchers in the field."[170] And in *Alice*, the Court pointed out that the claims covered "computer functions [that] are 'well-understood, routine, conventional activit[ies]' previously known to the industry."[171]

At other times, the Supreme Court has stated that its concern with broad claims is that they preempt the basic building blocks of human ingenuity. In *Bilski*, for example, the Court explained that "[a]llowing petitioners to patent risk hedging would pre-empt use of this approach in all fields."[172] Similiarly, in *Mayo*, the Court characterized its cases as "warn[ing] us against upholding patents that claim processes that too broadly preempt the use of a natural

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167. Bilski v. Kappos, 561 U.S. 593, 612 (2010) (indicating concern that "Petitioners' remaining claims are broad examples of how hedging can be used in commodities and energy markets").

168. *Mayo*, 132 S. Ct. at 1301.

169. *Bilski*, 561 U.S. at 611 (faulting claims for "explain[ing] the basic concept of hedging, or protecting against risk") (quoting Bilski v. Kappos, 545 F.3d 943, 1013 (Fed. Cir. 2008) (en banc) (Rader, J., dissenting)).

170. *Mayo*, 132 S. Ct. at 1294.

171. *Alice*, 134 S. Ct. at 2359 (quoting *Mayo*, 132 S. Ct. at 1294).

172. *Bilski*, 561 U.S. at 611–12.

law."[173] It recognized a "danger that the grant of patents that tie up . . . use [of the basic tools of scientific and technological work] will inhibit future innovation premised upon them."[174] And it concluded that the "presence here of the basic underlying concern that these patents tie up too much future use of laws of nature" justified its "conclusion that the processes described in the patents are not patent eligible."[175] In *Association for Molecular Pathology v. Myriad Genetics*, the Court likewise referenced the "considerable danger that the grant of patents would 'tie up' the use of [the basic tools of scientific and technological work] and thereby 'inhibit future innovation premised upon them.'"[176] In *Alice*, however, the Court went even further. It similarly described a risk of preemption of "the building blocks of human ingenuity."[177] But it also cited preemption as "the concern that drives th[e] exclusionary principle [of § 101],"[178] and then proclaimed that "the pre-emption concern . . . undergirds our § 101 jurisprudence."[179] Thus, the most recent case, *Alice*, seemingly made preemption the central concern of a § 101 analysis.

The problem with using any of these concerns with claim breadth as the basis for a robust § 101 analysis is that the existing statutory doctrines of novelty, non-obviousness, written description, and enablement already better address these concerns. Before considering how they do so, however, it is important first describe the concern with claim breadth as accurately as possible.

Any concern with the breadth of claims necessarily requires careful consideration of the particular underlying problem. In other words, it does not make sense to say alone, "These claims are too broad." The appropriate response is, "Compared to what?" Without

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173. *Mayo*, 132 S. Ct. at 1294.

174. *Id.* at 1301.

175. *Id.* at 1302 ("The presence here of the basic underlying concern that these patents tie up too much future use of laws of nature simply reinforces our conclusion that the processes described in the patents are not patent eligible, while eliminating any temptation to depart from case law precedent.").

176. Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 133 S. Ct. 2107, 2116 (2013) (describing "considerable danger that the grant of patents would 'tie up' the use of [the basic tools of scientific and technological work] and thereby inhibit future innovation premised upon them") (internal quotation marks omitted) (quoting *Mayo*, 132 S. Ct. at 1301).

177. Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347, 2354–55 (2014) (describing the risk of pre-emption of the building blocks of human ingenuity).

178. *Id.* ("We have described the concern that drives this exclusionary principle as one of pre-emption.").

179. *Id.* at 2358.

answering the question of what to compare the claims to, the Supreme Court's free-floating concern provides no objective way to determine when claims are, in fact, too broad. Moreover, it is insufficient for the Court simply to say that claims "too broadly preempt the use of a natural law"[180] if the Court does not supply any objective way to determine how much preemption of the use of a natural law is too much preemption.[181] Of course, patents preempt the use of technology, as patents by definition grant the right to exclude.[182] The relevant question though is how to determine whether to grant or sustain that right, and the answer surely cannot be based on an unconstrained, subjective view of a patent examiner, jury, or judge.

There are two things, however, that other sections of the existing patent statute already require examiners and courts to compare with the scope of claims: (1) the prior art; and (2) the specification of a patent application or patent.[183] The existing novelty and non-obviousness requirements deal with the former comparison,[184] while the existing written description and enablement requirements deal with the latter comparison.[185] Importantly, these statutory requirements already address concerns with the breadth of patent claims.[186] Moreover, as I will show, these requirements exactly address the two specific concerns with claim breadth identified in the Supreme Court's opinions: concern with claims covering old activities and concern with claims preempting the use of the building blocks of human ingenuity. There is simply no need for the Supreme Court to develop judicially-created exceptions to patent eligibility to deal with claim breadth, as these statutory doctrines already deal with the issue.

2. Existing Statutory Requirements Address the Concerns with Claim Breadth

The novelty requirement ensures that claims do not cover subject matter that another person has already invented or disclosed to the

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180. *Mayo*, 132 S. Ct. at 1294 (stating that earlier cases "warn us against upholding patents that claim processes that too broadly preempt the use of a natural law").

181. *See generally id.* at 1289.

182. *See* 35 U.S.C. § 154(a) (2012).

183. *See* 35 U.S.C. §§ 102, 112(a) (2012).

184. 35 U.S.C. §§ 102 (2012), 103 (2012).

185. 35 U.S.C. § 112(a) (2012).

186. *See generally id.*

public.[187] The relevant statutory section, § 102, includes detailed explanations of what activity qualifies as prior art to a claimed invention.[188] The eligibility doctrine includes no such details.[189] The case law governing novelty, moreover, strictly requires each and every element of a claim to be present, expressly or inherently, in a single prior art reference.[190] By contrast, the eligibility doctrine, as presently applied allows courts to engage in a much less rigorous analysis that includes summarizing the claim in the broadest possible manner before analyzing whether it, or just a part of the claim, is "conventional."[191]

The non-obviousness requirement, in turn, ensures that claims do not come too close to covering subject matter that another person already has invented or disclosed to the public.[192] The Supreme Court has interpreted the non-obviousness requirement, codified in § 103, to require a relatively well-defined four-part test that requires determination of: (1) "The scope and content of the prior art" (relying upon the well-defined categories of prior art identified in § 102); (2) the "differences between the prior art and the claims at issue"; (3) the "level of ordinary skill" in the relevant field of technology; and, (4) based on the first three determinations, the "obviousness or non-obviousness" of the claimed invention as a whole, from the perspective of one of ordinary skill in the relevant field of technology, including consideration of evidence such as commercial success, long-felt but unsolved needs, and failure of others that point in the direction of non-obviousness.[193]

One might argue that the final determination of non-obviousness, the fourth step, includes subjectivity that is analogous to the subjectivity of the search for an inventive concept that is part

187. Prior to the AIA, the novelty requirement of § 102(g) generally awarded a patent to the first to invent. *See* Fox Grp., Inc. v. Cree, Inc., 700 F.3d 1300, 1306 (Fed. Cir. 2012). After the AIA, the novelty requirement of § 102 generally awards a patent to the first inventor to disclose the invention. *See generally* 35 U.S.C. § 102 (2012).

188. *See* 35 U.S.C. § 102 (2012).

189. *See, e.g.*, Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347, 2357–59 (2014); Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1297–98, 1299–30 (2012).

190. *See, e.g.*, *In re* Schreiber, 128 F.3d 1473, 1477 (Fed. Cir. 1997) ("To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently.").

191. *See, e.g.*, *Alice*, 134 S. Ct. at 2357-59]; Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1297–98, 1299–30 (2012).

192. *See generally* 35 U.S.C. § 103 (2012).

193. Graham v. John Deere Co., 383 U.S. 1, 17–18 (1966).

of the current patent eligibility test. While a prohibition on being "too close" to the prior art is not a clear demarcation, one way of understanding the need for the fuzzy line of the non-obviousness analysis is that it advances the goal of the patent system by focusing on whether the subject matter of the claims would have been invented or disclosed anyway, without the inducement of investment in research and development that patents provide. And given that the analysis requires consideration of the hypothetical world of what would have been, it necessarily involves some guesswork and estimation. Indeed, the non-obviousness test asks the hypothetical question whether one of ordinary skill in the relevant field of technology would have found the claimed invention non-obvious at the time of the invention.[194]

With all that said, however, the non-obviousness requirement—particularly when compared to the search for an inventive concept, as required by the Supreme Court in the context of eligibility—does include well-defined objective guidelines for patent examiners and courts to use in making the relevant determination. The objective guidelines include the first three steps in the test: identifying the scope and content of the prior art, the differences between the prior art and the claims, and the level of ordinary skill in the relevant technology.[195] Each of these steps involves a search for an objectively verifiable fact or set of facts. In addition, the objective guidelines include the secondary considerations of non-obviousness; it is objectively verifiable whether there was commercial success, long-felt but unsolved needs, and failure of others.[196] In short, there are sufficient objective guidelines used in the non-obviousness analysis so that it is not wholly subjective and instead is administrable—guidelines that the patent eligibility analysis sorely lacks, particularly when asking whether there is an inventive concept.[197]

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194. A fuzzy line encourages inventors to steer clear of prior patent rights, a concept the Supreme Court has emphasized with respect to the doctrine of equivalents for purposes of infringement analyses. *See* Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 730–32 (2002). Another way of understanding the need for such a fuzzy line in the context of the non-obviousness requirement is that the goal is to determine whether the subject matter of the claims has already been invented, and we do not trust that all that has been invented is disclosed in what qualifies as prior art. Thus, we require the subject matter of a claim to differ more than insignificantly from what is actually disclosed in the prior art.

195. *Graham*, 383 U.S. at 17–18.

196. *Graham*, 383 U.S. at 17–18.

197. *Id.*

There is, however, one limitation on use of the novelty and non-obviousness requirements to meet the concerns with broad claims that this discussion highlights. Both doctrines focus on what patent lawyers describe as the "prior art," the "art" that came "prior" to the invention or the disclosure of the invention. Notably, given that we are not talking about sculptures or paintings, use of the word "art" in this context seems like use of a foreign language today. It is a relic of bygone days. But the history of use of the term "art," in the context of the term "prior art," highlights that it refers to something that is made by mankind.[198] Likewise, a definition of "art" from Samuel Johnson's dictionary in 1792, near the time the word entered the patent statute,[199] indicates that the word meant "[t]he power of doing something not taught by nature and instinct."[200] Based on this evidence, "art," at least in the sense of "prior art," seems to have referred to something that is a creation by a human rather than a naturally-occurring thing or phenomenon. As a result, the comparison of the claims to "prior art" does not include any comparison of the claims to naturally-occurring things and phenomena, unless those naturally-occurring things and phenomena are disclosed, expressly or inherently, in something that does qualify as prior art—in other words, something created by mankind, such as a scientific journal article.[201]

Thus, one concern with the scope of claims that is not clearly captured by the novelty and non-obviousness doctrines is the idea that claims should not merely cover naturally-occurring things or natural phenomena, and, in particular, those that are not disclosed in something that qualifies as prior art.[202] Indeed, that was the

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198. Sean M. O'Connor, *The Overlooked French Influence on the Intellectual Property Clause*, 82 U. CHI. L. REV. 733, 780, 784 (2015) ("Throughout the Middle Ages, 'art' retained the broad meaning of any human activity. . . . [B]y the beginning of the seventeenth century . . . . '[a]rt' meant the manipulation of changeable aspects of the world.").

199. *See generally* Patent Act of 1790, ch. 7, § 1, 1 Stat. 109 (1790) (codified as amended at 35 U.S.C. §§ 100–105). Congress introduced the term "art" as an expression of patent eligible subject matter, not to refer to prior art. Here I concern myself with the meaning of the term "art" in the phrase "prior art," which is a phrase now used to describe what may invalidate a patent claim under 35 U.S.C. § 102.

200. SAMUEL JOHNSON, A DICTIONARY OF THE ENGLISH LANGUAGE 162 (10th ed. 1792).

201. *See, e.g.*, Schering Corp. v. Geneva Pharm., 339 F.3d 1373, 1377–78 (Fed. Cir. 2003) (discussing inherent anticipation in the context of a prior art article).

202. Claims should not merely cover naturally-occurring things or natural phenomena, regardless of whether they are disclosed in something that qualifies as prior art. The inherent anticipation doctrine, however, already invalidates claims

reasoning used in *Mayo* when the Supreme Court rejected the government's argument that, rather than § 101, "other statutory provisions [including §§ 102, 103, and 112] can perform th[e required] screening function."[203] The Court pointed out that "§§ 102 and 103 say nothing about treating laws of nature as if they were part of the prior art when applying those sections."[204] This recognition that there is a limitation on the usefulness of the novelty and non-obviousness requirements to address the concern with claims that merely cover natural laws or natural phenomena, however, should lead to a consideration of the usefulness of other statutory doctrines, in particular the written description and enablement requirements, before creating or sustaining an extra-statutory test to deal with those concerns.

As it turns out, the written description and enablement requirements probably close any loophole left by the doctrines of novelty and non-obviousness with respect to the concern over the breadth of claims. In particular, these doctrines address the remaining specific concern with claims preempting the use of the building blocks of human ingenuity, including natural laws and phenomena.

The written description requirement mandates that the specification of a patent clearly allow someone of ordinary skill in the art to recognize that the inventor invented what is claimed.[205] In other words, the specification must convey to one of ordinary skill that the inventor "had possession of the claimed subject matter as of the filing date," where possession refers to "possession as shown in the disclosure."[206] With respect to "genus" or "generic" claims in particular, compliance with the written description requirement may be made in two ways: possession may be shown through the

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covering naturally-occurring things or natural phenomena disclosed expressly or inherently in prior art. *Id.*

203. Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1303 (2012).

204. *Id.* at 1304. Interestingly, however, the Supreme Court at one point took the position that at least algorithms were treated as if part of the prior art. *See* Parker v. Flook, 437 U.S. 584, 591–92 (1978) ("Whether the algorithm was in fact known or unknown at the time of the claimed invention, as one of the basic tools of scientific and technological work, ... it is treated as though it were a familiar part of the prior art.") (internal quotations omitted).

205. Ariad Pharm., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1340 (Fed. Cir. 2010) (en banc) (reaffirming that the first paragraph of § 112 contains a written description requirement separate from the enablement requirement).

206. *Id.* at 1351.

disclosure of example species of the claimed genus, or through the disclosure of structural features common to members of the genus.[207] Moreover, the law includes a set of objective guidelines for making a determination of whether a claim to a genus meets the written description requirement.[208] These guidelines include identifying the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, and the predictability of the aspect at issue.[209] Thus, the law governing the written description requirement provides for objective inquiries that help make the determination of compliance reasonably ascertainable. And the written description requirement is particularly applicable to claims that allegedly preempt use of natural laws and phenomena, because such claims would cover every or nearly every use of the natural laws, rather than particular applications of them. These claims would be genus or generic claims subject to analysis using the doctrine's objective guidelines. By contrast, the law of patent eligibility does not include any objective guideline to determine whether claims "too broadly preempt the use of a natural law."[210]

In turn, the enablement requirement mandates that the specification describe the "manner and process of making and using [the claimed invention], in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same."[211] As applied by the Federal Circuit, the enablement requirement ensures that the specification includes sufficient disclosure to enable one of ordinary skill in the art to practice the claimed invention "without undue experimentation."[212] If there is evidence that some experimentation is needed to practice the

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207. *Id.* at 1352.

208. *Id.* at 1351 ("For generic claims, we have set forth a number of factors for evaluating the adequacy of the disclosure, including 'the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, [and] the predictability of the aspect at issue.'") (quoting Capon v. Eshhar, 418 F.3d 1349, 1359 (Fed. Cir. 2005)).

209. *Id.*

210. Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1294 (2012). (stating that Supreme Court cases "warn us against upholding patents that claim processes that too broadly preempt the use of a natural law").

211. 35 U.S.C. § 112(a) (2012).

212. Alcon Research Ltd. v. Barr Labs., Inc., 745 F.3d 1180, 1188 (Fed. Cir. 2014) (quoting Johns Hopkins Univ. v. CellPro, Inc., 152 F.3d 1342, 1360 (Fed. Cir. 1998)).

claimed invention, the court refers to a set of objective guidelines or "factual considerations" to determine "whether the amount of that experimentation is either 'undue' or sufficiently routine such that an ordinarily skilled artisan would reasonably be expected to carry it out."[213] These factual considerations include

> (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.[214]

Yet again, the objective nature of these factual considerations contrast with the unfettered nature of the eligibility requirement's search for an inventive concept.[215] Moreover, like the written description requirement, the enablement requirement is particularly applicable to claims that allegedly preempt use of natural laws, because such claims would cover every, or nearly every, use of the natural laws rather than particular applications of them, and these claims would be subject to the enablement requirement's objective guidelines, ensuring that one of ordinary skill would be able to make every use of the natural law or phenomenon without undue experimentation.

3. The Supreme Court Wrongly Rejected Use of Existing Statutory Requirements to Address Claim Breadth

Notably, the Supreme Court in *Mayo* rejected the argument, considered here, that sections of the patent statute other than § 101 fully address concerns with claim breadth.[216] In this regard the Court failed to provide any persuasive justification for why the other sections are insufficient.[217] The Court cited its precedent as "rest[ing] their holdings upon section 101, not later sections," and the fact that application of § 112 would make the "law of nature

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213. *Id.* (quoting *In re* Wands, 858 F.2d 731, 737 (Fed. Cir. 1988)).

214. *In re Wands*, 858 F.2d at 737 (citing *In re* Forman, 230 U.S.P.Q. 546, 547 (B.P.A.I. 1986)).

215. *See, e.g.*, Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347, 2357-59 (2014).

216. Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1303–04 (2012).

217. *See generally id.*

exception to § 101 patentability a dead letter."[218] Stare decisis, however, does not depend on the correctness of precedent as a matter of policy or statutory interpretation.[219] The Court also cited and quoted from the legislative history of the Patent Act of 1952, misleadingly highlighting language explaining that a machine or manufacture "is not necessarily patentable under section 101."[220] The meaning of that phrase is not consistent with the Court's view, particularly given the context: the phrase following it explains that a machine or manufacture is not patentable "unless the conditions of the title are fulfilled,"[221] where those conditions are clearly specified in the patent statute as §§ 102 and 103.[222]

In the end, the Court did highlight two policy concerns.[223] Neither, however, justifies an expansive and subjective application of § 101. It explained that "shift[ing] the patent-eligibility inquiry entirely to [other] sections risks creating significantly greater legal uncertainty, while assuming that those sections can do work that they are not equipped to do."[224] The first concern, uncertainty, is particularly ironic; it is hard to believe there could be any more uncertainty than that created by the current test for eligibility. Moreover, as I have explained, the other statutory sections invoke established analyses with objective guidelines firmly grounded in the relevant policy concerns. Thus, the only real policy question is whether the other statutory sections are equipped to do the work the Supreme Court believes § 101 is required to do.

With respect to the novelty and non-obviousness requirements, the *Mayo* Court points out that "§§ 102 and 103 say nothing about treating laws of nature as if they were part of the prior art when applying those sections."[225] While that is true, it has to be mentioned how hypocritical it is for the Court to say this. The Court has had no

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218. *Id.*

219. Kimble v. Marvel Entm't, 135 S. Ct. 2401, 2409 (2015).

220. *Mayo*, 132 S. Ct. at 1304.

221. S. REP. NO. 82-1979, at 6 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2399.

222. Patent Act of 1952, Pub. L. No. 82-593, 66 Stat. 792, 797-98 (codified as amended at 35 U.S.C. §§ 102-103) (referring to §§ 102 and 103 as each a "condition of patentability").

223. *See Mayo*, 132 S. Ct. at 1304.

224. *Id.*

225. *Id.* Moreover, even if natural laws were considered to be prior art, the Court suggests that the result would be that all inventions would be unpatentable because the implementation of principles of nature would be obvious. *Id.* This result seems far-fetched.

problem finding implied exceptions to patentability under § 101, where § 101 itself says nothing about, for example, laws of nature. Regardless, any deficiency with §§ 102 and 103 highlights the need to analyze the usefulness of other statutory doctrines, including those related to § 112.

In that regard, the Court goes on to argue that § 112 does not fill the gap left by §§ 102 and 103.[226] The Court states in a conclusive fashion that § 112 "does not focus on the possibility that a law of nature (or its equivalent) that meets these conditions will nonetheless create the kind of risk that underlies the law of nature exception, namely the risk that a patent on the law would significantly impede future innovation."[227] The Court did not explain this conclusion, but instead merely cited two law review articles reaching similar conclusions.[228]

In the first article cited by the *Mayo* Court, a group of law professors (Mark Lemley, Michael Risch, Ted Sichelman, and Polk Wagner) take the position that the doctrine of patent eligibility should fill a void supposedly left by § 112.[229] Those law professors make several arguments in support of this position. First, they argue that that the relevant question "is not whether one could make the embodiments claimed, but rather whether the inventor has contributed enough to merit a claim so broad that others will be locked out."[230] On this basis, they argue that preemption is a relevant concern "even if the patentee has enabled others to use all currently known embodiments, thus satisfying [the enablement requirement of] § 112."[231]

"[W]hether the inventor has *contributed enough*"[232] to merit a broad claim, however, is not the right question. The eligibility analysis should not focus, as they claim, on "whether the scope of the patentee's claims is *commensurate* with the invention's practical,

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226. *Id.*

227. *Id.*

228. *Id.* (citing Rebecca S. Eisenberg, *Wisdom of the Ages or Dead-Hand Control? Patentable Subject Matter for Diagnostic Methods after* In re Bilski, 3 CASE W. RES. J.L. TECH. & INTERNET 1, 61 (2012); Mark A. Lemley, Michael Risch, Ted Sichelman & R. Polk Wagner, *Life After* Bilski, 63 STAN. L. REV. 1315, 1329-32 (2011)). Justice Stevens made a similar mistake in his concurring opinion in *Bilski*. *See* Bilski v. Kappos, 561 U.S. 593, 621 (2010) (Stevens, J., concurring).

229. Lemley, Risch, Sichelman & Wagner, *supra* note 228, at 1329–32.

230. *Id.* at 1330.

231. *Id.*

232. *Id.* (emphasis added).

real-world *contribution*."[233] It is likewise no answer to say, as they do, that decision-makers should focus on the "the *importance* of the patentee's *contribution*."[234] Nor can the decision-maker "balance[e] the incentives needed for the patentee against the risk of stifling future innovation" by identifying "how *important* the patentee's invention is, as well as how important the future innovation might be."[235] This approach would be particularly problematic. There is no objective way to determine whether the invention's practical, real-world contribution (which I understand to refer to the value of the novel aspect of the claimed invention)[236] is "enough" or important "enough," particularly as compared to the importance of *unknown* future innovation, and, critically, during the application process, long before the claimed invention itself has reached maturity of use. While the law professors identify five factors "critical to a proper scope-based determination for patentable subject matter eligibility,"[237] the factors provide no real objective, determinable constraints on the analysis. For example, who can tell, particularly during the application process before an invention is used, whether the invention is "potentially generative of many kinds of new inventions"?[238] And with respect to whether the relevant industry "relies heavily on cumulative invention" and whether the field is "fast-moving,"[239] the question is, "compared to what?" Moreover, existing doctrines better address concerns highlighted by other factors. The question whether the patentee has "disclosed a small number of embodiments but claimed a broad inventive principle,"[240] for example, is a question answered by a proper application of § 112. Likewise, it is a matter for § 103 to ask whether "the patentee [has]

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233. *Id.* at 1315 (emphases added).

234. *Id.* at 1340 (emphasis added).

235. *Id.* (emphasis added).

236. In context it is clear that the law professors use "contribution" to refer to the novel aspect of the claimed invention. Had their test asked whether the scope of the patentee's claims is commensurate with the *inventor's disclosure* (rather than the invention's contribution), their test would both ask a question with a determinable answer and reflect the actual requirements of § 112(a). *See, e.g.*, Application of Fisher, 427 F.2d 833, 839 (C.C.P.A. 1970) ("That paragraph requires that the scope of the claims must bear a reasonable correlation to the scope of enablement provided by the specification to persons of ordinary skill in the art.").

237. Lemley, Risch, Sichelman & Wagner, *supra* note 228, at 1341.

238. *Id.*

239. *Id.*

240. *Id.*

made an important contribution *relative to the prior art*,"[241] so long as the purely subjective question of "importance" is replaced with the more objective question of whether one of ordinary skill in the art would conclude that the claimed invention was non-obvious given the relevant objective data. In short, other than the factors directly tied to other sections of the patent statute, the five factors invite guesswork.

Importance, moreover, is irrelevant for purposes of eligibility and likely irrelevant for patentability more generally. An assessment of the importance of the patentee's contribution can be understood to be an assessment of the value of that contribution. But the value of the contribution is not a proper component of the patentability analysis outside of, perhaps, the secondary consideration of non-obviousness that looks toward commercial success.[242] The value of the contribution is primarily a matter of determining damages, such as calculating reasonable royalties.[243] In short, an important invention, when the patent covering it is infringed, will generate significant lost profits and reasonable royalties. An unimportant invention will not.

It is important to recognize that the idea that patentability should be determined based on an assessment of the importance of the invention is not new; it has been rejected before for good reason. As Judge Rich once explained, it is an "unsound notion that to be patentable an invention must be better than the prior art."[244] One reason is that "it would require the Patent Office and the courts reviewing its final rejections to make a value judgment of a kind they are not equipped to make and should not be asked to make."[245] Examiners "could be wrong and the inventor should have his chance" to introduce an invention into the marketplace, which "will pass judgment."[246]

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241. *Id.* (emphasis added).

242. Graham v. John Deere Co., 383 U.S. 1, 17–18 (1966) (describing secondary considerations of non-obviousness).

243. *See generally* Amy L. Landers, *Patent Claim Apportionment, Patentee Injury, and Sequential Invention*, 19 GEO. MASON L. REV. 471 (2012). When calculated correctly, damages should reflect the value of the patented technology rather than the value of the patent rights, such as the power to impose negotiation and litigation costs. *See* David O. Taylor, *Using Reasonable Royalties to Value Patented Technology*, 49 GA. L. REV. 79, 118–41 (2014).

244. Rich, *supra* note 90, at 393.

245. *Id.* at 401.

246. *Id.*

Beyond the argument that § 101 should somehow require weighing the importance or value of an invention based on the scope of its claim, the group of law professors also point out that the written description and enablement requirements concern the adequacy of the specification only at the time of filing.[247] They argue that § 101 is necessary to address concerns related to follow-on inventions created after the time of filing.[248] According to the law professors,

> under § 112, as long as an inventor sufficiently discloses those embodiments of the invention that could have been built at the time of filing, the inventor will generally be afforded exclusionary rights over later inventions that use after-arising technology—technology that did not exist at the time of filing.[249]

Thus, they argue that concerns with after-arising technology justify a robust role for the eligibility requirement because the written description and enablement requirements of § 112 do not sufficiently address those concerns. This argument is misleading, however, in three respects.

First, the argument glosses over significant aspects of the enablement and written description requirements of § 112. That is, § 112 does place important constraints upon the extent to which claims may cover after-arising technologies. For example, the enablement requirement asks whether the specification enables a person of ordinary skill in the relevant technology to make and use the claimed invention *without undue experimentation*.[250] If, given the disclosure of a patent specification, undue experimentation is required to build an embodiment of a machine covered by a claim, the claim is invalid due to a violation of the enablement requirement.[251] Thus, claims may cover after-arising technologies only if undue experimentation is not needed to build or use those technologies. Furthermore, both the enablement and written

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247. *See* Lemley, Risch, Sichelman & Wagner, *supra* note 228, at 1330.

248. *Id.*

249. *Id.* at 1330–31.

250. *See, e.g.*, Atlas Powder Co. v. E.I. du Pont De Nemours & Co., 750 F.2d 1569, 1576 (Fed. Cir. 1984) ("That some experimentation is necessary does not preclude enablement; the amount of experimentation, however, must not be unduly extensive.").

251. *Id.* at 1566–67.

description requirements also compel the disclosure of a sufficient number of representative species of an invention to support a broad claim to a genus of the invention.[252]

These aspects of the enablement and written description requirements have a firm historical foundation. Indeed, one example of how the written description and enablement requirements of § 112 constrain the ability of claims to cover after-arising technologies is *O'Reilly v. Morse*, where the Supreme Court invalidated a claim precisely because the specification, while disclosing an embodiment of the invention that could have been built at the time the application was filed, claimed rights that would have covered an after-arising technology.[253] In this regard, it is important to recognize that *O'Reilly v. Morse* is a case regarding the enablement and written description requirements and not the eligibility requirement. There has been much confusion on this point both by courts[254] and in the secondary literature.[255] Thus, a more detailed look at this case is appropriate.

The Supreme Court decided *O'Reilly v. Morse* in 1854 pursuant to the Patent Act of 1836, which the Court summarized in part as requiring

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252. *See, e.g.*, Ariad Pharm., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1349–50 (Fed. Cir. 2010) (en banc) ("[A]n adequate written description of a claimed genus requires more than a generic statement of an invention's boundaries. . . . [A] sufficient description of a genus instead requires the disclosure of either a representative number of species falling within the scope of the genus or structural features common to the members of the genus so that one of skill in the art can 'visualize or recognize' the members of the genus."); PPG Indus., Inc. v. Guardian Indus. Corp., 75 F.3d 1558, 1564 (Fed. Cir. 1996) ("In unpredictable art areas, this court has refused to find broad generic claims enabled by specifications that demonstrate the enablement of only one or a few embodiments and do not demonstrate with reasonable specificity how to make and use other potential embodiments across the full scope of the claim.").

253. O'Reilly v. Morse, 56 U.S. 62 (1853).

254. *See, e.g.*, Ariosa Diagnostics, Inc. v. Sequenom, Inc., 809 F.3d 1282, 1287–93 (Fed. Cir. 2015) (Dyk, J., concurring in the denial of en banc rehearing) (discussing *O'Reilly v. Morse* in the context of patent eligibility rather than the enablement or written description requirement).

255. *See, e.g.*, Joshua A. Kresh, *Patent Eligibility After* Mayo*: How Did We Get Here and Where Do We Go?*, 22 FED. CIR. B.J. 521, 523 (2013) (discussing *O'Reilly v. Morse* in the context of patent eligibility rather than the enablement or written description requirement). *See generally* Adam Mossoff, *O'Reilly v. Morse* (Geo. Mason L. & Econ. Research, Paper No. 14-22, Aug. 18, 2014), http://ssrn.com/abstract=2448363 (describing this dispute among scholars and citing additional examples).

> a written description of [the] invention or discovery, "and of the manner and process of making, constructing, using, and compounding the same," in such exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same.[256]

This initial explanation of the governing law, which described the written description and enablement requirements, is important to consider in the context of the courts' later explanation of its decision. Indeed, it points in the direction of the basis for the Court's holding.

Samuel Morse, the inventor of the telegraph, obtained a patent on his invention in 1840.[257] The parties in this case disputed the validity of the eighth claim in his patent.[258] That claim recited "the exclusive right to every improvement where the motive power is the electric or galvanic current, and the result is the marking or printing intelligible characters, signs, or letters at a distance."[259] The Court found Claim 8 invalid given its breadth.[260] In the words of the Court, "If this claim can be maintained, it matters not by what process or machinery the result is accomplished."[261]

In reaching its conclusion of invalidity, the Court focused on various policies: The prevention of other inventors from making improvements; the ability of Morse to alone make improvements but keep those from the public because of the lack of a need to disclose in a patent application; the idea that the inventor is only entitled to the process or machine disclosed; and the absurdity of past inventors obtaining similar rights, for example Fulton obtaining a right to use steam to propel vessels.[262] But, as shown below, the Court ultimately faulted Morse for *failing to disclose in his specification the process or machinery to achieve the claimed result*; in other words, the claim failed the *enablement and written description requirements*.

The Court faulted Morse for claiming a cause and result rather than the disclosed process or machine.[263] The Court explained that

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256. 56 U.S. 62, 118 (1853). The quoted language is the predecessor to the modern written description and enablement requirements in § 112. *See* 35 U.S.C. § 112(a) (2012).

257. *Morse*, 56 U.S. at 62.

258. *Id.* at 62-63.

259. *Id.* at 112.

260. *Id.* at 62-63.

261. *Id.* at 113.

262. *Id.* at 113–14.

263. *Id.* at 109.

the problem with Morse's Claim 8 was that, "[f]or aught that we now know some future inventor . . . may discover a mode of writing or printing at a distance by means of the electric or galvanic current, *without using any part of the process or combination set forth in the plaintiff's specification.*"[264] Likewise, it faulted Morse for failing to "confine his claim to the machinery or parts of machinery, *which he specifies.*"[265] And the Court found trouble with Morse's claim to "an exclusive right to use a manner and process which he *has not described* and indeed *had not invented,* and therefore *could not describe* when he obtained his patent."[266] Again and again, the Court focused on comparing the scope of the claim to the scope of the disclosure in Morse's patent application to see whether the claimed invention was described and specified.[267] It is in this context that the Court concluded that it was "of [the] opinion that the claim is too broad, and not warranted by law."[268]

Thus, in modern terms, it is quite clear that the problem with Claim 8 in Morse's patent was based on the enablement and written description requirements located in § 112 and not in § 101. To use today's terminology, the specification did not contain a written description of the invention or enable one of skill in the art to make and use what was described in Claim 8 without undue experimentation.[269] In particular, Morse's specification did not provide sufficient information to show he had possession of the invention, let alone to empower someone to make every possible device that could use electromagnetism to print at a distance, which, as a dramatic indicator of the breadth of Morse's claim, would include the Internet. Thus, it is simply incorrect for courts and commentators to cite *O'Reilly v. Morse* as justification for a robust role for § 101. The case belongs in the context of the enablement and written description requirements.[270]

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264. *Id.* at 113 (emphasis added).

265. *Id.* (emphasis added).

266. *Id.* (emphases added).

267. *Id.* at 112–20.

268. *Id.* at 113.

269. *See* Ariad Pharm., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1352 (Fed. Cir. 2010) (en banc) (discussing the enablement and written description requirement using these terms).

270. *See, e.g.*, CRAIG ALLEN NARD, THE LAW OF PATENTS 92 (Aspen, 3d ed. 2014) (placing *O'Reilly v. Moore* in the chapter related to the enablement requirement); *In re* Hyatt, 708 F.2d 712, 714 (Fed. Cir. 1983) (explaining that in *O'Reilly v. Morse* "the claim is properly rejected for what used to be known as 'undue breadth,' but has since been appreciated as being, more accurately, based on the first paragraph of

The Supreme Court, at one point at least, understood this distinction. It fairly clearly made the point in 1928.[271] After quoting the statutory language governing the written description and enablement requirements, the Court found fault with a claim covering a type of starch because

> [a] claim so broad, if allowed, would operate to enable the inventor who has discovered that a defined type of starch answers the required purpose to exclude others from all other types of starch and so foreclose efforts to discover other and better types. The patent monopoly would thus be extended beyond the discovery and would discourage rather than promote invention. . . . That the patentee may not by claiming a patent on the result or function of a machine extend his patent to devices or mechanisms *not described in the patent* is well understood.[272]

In other words, the enablement and written description requirements ensure that a patent may not foreclose efforts to discover other and better types of inventions; the patentee may not claim a result or function to cover "devices or mechanisms not

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§ 112"). In the course of its opinion in *O'Reilly v. Morse*, the Court did state that "the discovery of a principle in natural philosophy or physical science, is not patentable." *Morse*, 56 U.S. at 116. It said so, however, with respect to *another* case (*Neilson v. Harford*), in the course of *distinguishing* that case and, in particular, while presenting a counterfactual representation of the holding in that case. *Id.* ("And if this had been the construction, the court, it appears, would have held his patent to be void; because the discovery of a principle in natural philosophy or physical science, is not patentable."); *id.* at 116-17 ("For Neilson discovered, that by interposing a heated receptacle between the blower and the furnace, and conducting the current of air through it, the heat in the furnace was increased. And this effect was always produced, whatever might be the form of the receptacle, or the mechanical contrivances for heating it, or for passing the current of air through it, and into the furnace. But Professor Morse has not discovered, that the electric or galvanic current will always print at a distance, no matter what may be the form of the machinery or mechanical contrivances through which it passes."). In other words, while *Neilson v. Harford* may have been decided based on one aspect of the law governing patent eligibility, *O'Reilly v. Morse* was not.

271. *See generally* Holland Furniture Co. v. Perkins Glue Co., 277 U.S. 245 (1928).

272. *Id.* at 257 (emphasis added) (citations omitted).

described in the patent."[273] And what case did the Court cite for this proposition? *O'Reilly v. Morse*.[274]

There is a second problem with the law professors' argument.[275] In addition to glossing over important aspects of the enablement and written description requirements, their argument—that § 112 does not address concerns related to follow-on inventions created after the time of filing[276]—ignores both the utility requirement and the proper scope of the experimental use exception to infringement liability. While the law professors argue that "by moving patenting downstream, we both permit competition in research and development and encourage competition among the practical, applied inventions developed by that research,"[277] the reality is that the utility requirement already does so by requiring that claimed inventions have substantial, practical, and immediate usefulness.[278] The very point of the utility requirement is to meet the policy concern they repeatedly articulate concerning the need for claims to cover "practical applications."[279] In addition, the experimental use exception to infringement liability should allow follow-on inventors to experiment on patented inventions to identify, for example,

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273. *Id.*

274. *Id.*

275. Lemley, Risch, Sichelman & Wagner, *supra* note 228, at 1331.

276. *Id.* at 1329–32.

277. *Id.* at 1331.

278. *See* Brenner v. Manson, 383 U.S. 519, 534–35 (1966) ("The basic *quid pro quo* contemplated by the Constitution and the Congress for granting a patent monopoly is the benefit derived by the public from an invention with substantial utility. Unless and until a process is refined and developed to this point—where specific benefit exists in currently available form—there is insufficient justification for permitting an applicant to engross what may prove to be a broad field.").

279. *See* Lemley, Risch, Sichelman & Wagner, *supra* note 228, at 1331. Indeed, it is curious how often the law professors recite the need to ensure that claims cover practical applications of ideas but then, rather than point to the utility requirement that already requires the claim to cover a practical application of an idea, *Brenner*, 383 U.S. at 534–35, use this need as justification for an unconstrained, subjective, and non-statutory eligibility doctrine. Lemley, Risch, Sichelman & Wagner, *supra* note 228, at 1317. One explanation might be that claims ought to describe the practical application, not just be supported by disclosure in the specification concerning the practical application. Another explanation might be that patent examiners and courts fail to apply this aspect of the utility requirement sufficiently to address the underlying concern. *But see* Sean B. Seymore, *Making Patents Useful*, 98 MINN. L. REV. 1046, 1077 (2014) (arguing the utility requirement is superfluous and should be effectively eliminated).

improvements to the patented invention,[280] and the statutory experimental use exception already relieves parties from liability from using patented inventions to develop and submit information to the FDA for the approval of drug applications.[281] Thus, rather than prove that a creative interpretation of § 101 based on relative importance is necessary to fill a gap left by § 112, it highlights the usefulness of the *utility requirement* of § 101 and an appropriate *experimental use exception* for infringement liability to fill any such gap.

Third, and perhaps most significantly, the law professors overlook the central role of the doctrine of equivalents of constraining the extent to which claims may cover after-arising technologies. Indeed, the very concept of infringement by after-arising technologies finds its doctrinal home in the doctrine of equivalents.[282] And, importantly, that doctrine includes numerous constraints on whether after-arising technologies may infringe a claim. For example, the doctrine of equivalents applies on an

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280. *See, e.g.*, Katherine J. Strandburg, *What Does the Public Get? Experimental Use and the Patent Bargain*, 2004 WIS. L. REV. 81, 83, 91 (2004) (arguing that there are "reasons to believe that a well-designed experimental-use exemption from infringement liability can promote faster cumulative technological progress without significantly diminishing incentives to invest in the original invention" and noting that "[p]atent exclusivity, while promoting inventive progress by providing incentives for innovation, can slow technical progress if the best follow-on inventors are prevented from building upon the inventive idea during the patent term"). *See also* Shamnad Basheer & Prashant Reddy, *The "Experimental Use" Exception Through A Developmental Lens*, 50 IDEA 831, 833 (2010) (arguing that allowing the experimental use exception to cover "the testing of patented inventions with a view to creating improvements or inventing around such patents" is "particularly appealing in the context of developing countries").

281. *See* 35 U.S.C. § 271(e)(1) (2012); Merck KGaA v. Integra Lifesciences I, Ltd., 545 U.S. 193, 202 (2005) ("[W]e think it apparent from the statutory text that § 271(e)(1)'s exemption from infringement extends to all uses of patented inventions that are reasonably related to the development and submission of *any* information under the FDCA. . . . This necessarily includes preclinical studies of patented compounds that are appropriate for submission to the FDA in the regulatory process."); Eli Lilly & Co. v. Medtronic, Inc., 496 U.S. 661, 664 (1990) (affirming the Federal Circuit's holding that under § 271(e)(1) the use of patented inventions "could not constitute infringement if [such use] had been undertaken to develop information reasonably related to the development and submission of information necessary to obtain regulatory approval under the FDCA.").

282. *See* Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 37 (1997) (rejecting the argument that the doctrine of equivalents "should be limited to equivalents that were known at the time the patent was issued, and should not extend to after-arising equivalents").

element-by-element basis, so that the doctrine may not be used to effectively eliminate a claim requirement in its entirety.[283] Thus, an allegedly infringing product must include each and every element of the claimed invention either literally or, in this context, in the form of an equivalent after-arising technology. Also, infringement under the doctrine of equivalents may occur only when there is an insubstantial difference between the accused technology and the claimed technology, or if the accused technology performs a substantially similar function, in a substantially similar way, to achieve a substantially similar result.[284] Thus, the after-arising technology must be insubstantially different compared to the claim element in question; a finding of infringement cannot vitiate a claim element.[285] As another constraint, infringement under the doctrine of equivalents may occur only when prosecution history estoppel does not eliminate the very application of the doctrine, for example, when, during prosecution, a claim has been narrowed for a reason of patentability and no exception applies,[286] or as a result of a clear and unmistakable surrender of claim scope given arguments made during prosecution.[287] In short, the law professors unnecessarily place upon § 101 the burden of addressing scope-related concerns related to infringement by after-arising technologies; existing constraints placed upon the doctrine of equivalents already address those concerns.[288]

Beyond these problems with their creative reconstruction of the analysis required by § 101, the last argument put forward by the group of law professors in favor of their approach is particularly ironic. They argue, admittedly prior to the Supreme Court's unraveling of the law of eligibility in *Mayo* and *Alice*, that "the enablement inquiry itself is extremely difficult and fraught with

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283. *Id.* at 29 ("[T]he doctrine of equivalents must be applied to individual elements of the claim, not to the invention as a whole.").

284. *See id.* at 39–40 (allowing these two formulations of the test for infringement under the doctrine of equivalents).

285. *See* DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc., 469 F.3d 1005, 1017 (Fed. Cir. 2006).

286. *See* Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 737–38 (2002).

287. Conoco, Inc. v. Energy & Envtl. Int'l, L.C., 460 F.3d 1349, 1363 (Fed. Cir. 2006) ("We have recognized that prosecution history estoppel can occur during prosecution in one of two ways, either (1) by making a narrowing amendment to the claim ('amendment-based estoppel') or (2) by surrendering claim scope through argument to the patent examiner ('argument-based estoppel').").

288. *See* Lemley, Risch, Sichelman & Wagner, *supra* note 228, at 1331.

contradiction."[289] This argument is particularly weak now given the even more difficult and rudderless search for abstract ideas and inventive concepts required by the Supreme Court's current approach to § 101. It is simply not a good argument to say that problems with application of the enablement requirement justify—not solving those problems, but instead—the creation of an alternative legal doctrine embodying even worse problems and confusion.

In addition to citing the article written by the group of law professors, the Supreme Court cited a second article written by another law professor, Rebecca Eisenberg, to support its conclusion that § 101 is necessary to fill a gap left in the patent statute.[290] Eisenberg's arguments, however, parallel those of the group of law professors. For example, she argues that the "enablement doctrine hardly offers any clearer or more predictable tools than patentable subject matter for discerning the allowable scope of patent claims."[291] Again, however, rather than suggesting that the enablement requirement be modified as necessary to serve its purpose with more clarity and predictability, she suggests the appropriateness of a parallel doctrine of eligibility, and as I have shown one that has turned out to be less clear. Whatever the warts of the enablement doctrine,[292] the answer is to remove those warts rather than leave those warts alone and create another even more confusing doctrine in the context of patent eligibility. But then she actually recognizes that the written description requirement "has arguably eclipsed enablement doctrine as a limitation on claim scope,"[293] without any concomitant criticism of the doctrine as unworkable. Likewise, she similarly argues that what are "[p]articularly problematic for [the] enablement doctrine are claims that cover future embodiments using technologies that have yet to be invented as of the filing date."[294]

Eisenberg's arguments miss the mark for the same reasons as the group of law professors. The written description and enablement requirements are the statutory tools to invalidate broad claims

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289. *Id.*

290. Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1304 (2012).

291. Eisenberg, *supra* note 228, at 59.

292. *Id.* at 59 n.290 (citing criticisms of the enablement doctrine by Tun-Jen Chiang, Kevin Collins, and Jeffrey Lefstin).

293. *Id.* at 60.

294. *Id.* at 59.

lacking support in the specification. And *O'Reilly v. Morse*, as already described,[295] fully supports use of these requirements to prevent patents from issuing with claims broad enough to cover technologies that have yet to be invented. More recent case law supports the same point, expressly describing how the enablement and written description requirements prevent these claims. In *LizardTech, Inc. v. Earth Resource Mapping Inc.*, for example, the Federal Circuit explained that a specification's "description of one method for creating a [device] does not entitle the inventor . . . to claim any and all means for achieving that objective."[296] The court continued:

> The single embodiment would support such a generic claim only if the specification would "reasonably convey to a person skilled in the art that [the inventor] had possession of the claimed subject matter at the time of filing," . . . and would "enable one of ordinary skill to practice 'the full scope of the claimed invention.'"[297]

In this way, the court explained that both the enablement and written description requirements are not met where a claim is supported only by one or a limited number of embodiments and, as a result, one of skill in the art would not be able to recognize from the description either: (1) how to make and use the full scope of the claimed invention or (2) that the applicant or named inventor had possession of the full scope of the claimed invention.[298] Regardless, Eisenberg's arguments similarly omit consideration of the scope-constraining aspects of the doctrine of equivalents.

Beyond concerns with broad claims generally, the Supreme Court and these law professors' position that the patent statute—outside of the eligibility requirement of § 101—cannot be used to invalidate a claim to a law of nature is likewise incorrect. A claim to a law of nature by definition covers all uses of that law of nature, and it would be exceedingly difficult for any specification to provide

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295. *See supra* p. 44–48.

296. 424 F.3d 1336, 1346 (Fed. Cir. 2005).

297. *Id.* at 1346 (citations omitted) (quoting Bilstad v. Wakalopulos, 386 F.3d 1116, 1125 (Fed. Cir. 2004), and Chiron Corp. v. Genentech, Inc., 363 F.3d 1247, 1253 (Fed. Cir. 2004)). The court explained that, "[a]fter reading the patent, a person of skill in the art would not understand how to make [the device] generically and would not understand LizardTech to have invented a method for making [the device], except by" the particular method disclosed. *Id.* at 1345.

298. *Id.* at 1346.

written description and enablement support—or meet the utility requirement—for the scope of such a claim. Practical applications of the underlying law of nature must be supported in the specification. Even if a claim were drafted to cover every possible practical application, it seems impossible to include written description support, in particular, and even enablement support for such a claim. Moreover, during patent terms any concern with preemption of use of laws of nature may also be addressed by the experimental use exception to patent infringement liability.[299]

In short, § 101 should not be treated as the panacea of patent law; to the extent there are problems with the other statutory conditions and requirements of patentability—or more likely the correct application of those conditions and requirements—those problems should be addressed and resolved, rather than propping up a new and particularly confusing approach to patent eligibility.[300]

4. Even if § 101 Was Needed to Exclude Patenting of Natural Laws and Phenomena, A Simple Statutory Interpretation Would Do So

But even one of § 101's *statutory* patentability requirements—the subject matter requirement—already rules out the patenting of a naturally-occurring phenomenon or law of nature. An important feature of the subject matter requirement is the prerequisite that the invention be the result of human effort. Indeed, every category listed in the statute describes something that is the result of human effort: "process, machine, manufacture, or composition of matter, or any . . . improvement thereof."[301]

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299. *See* 35 U.S.C. § 271(e) (2012) (statutory experimental use exception); Madey v. Duke Univ., 307 F.3d 1351, 1362 (Fed. Cir. 2002) (common law experimental use exception).

300. Any continued concern with preemption of the basic building blocks of human ingenuity, even in light of the written description, enablement, and utility requirements, and even in light of the experimental use exception to infringement liability, still overlooks the limited terms of patents. *See* 35 U.S.C. § 154(a)(2) (2012) (describing the term of the statutory right to exclude). Any preemption is not permanent but temporary. The grant of a right to exclude for a limited time period is the reward for the discovery of the new, non-obvious, useful invention and the disclosure of a specification that clearly claims and describes that invention and how to make and use it without undue experimentation. In other words, Congress has made the policy choice that patents should be available as rewards for this activity. It is presumptuous for the Supreme Court to take the position that Congress does not mean for this reward to be available—unless, of course, doing so would violate the Constitution.

301. 35 U.S.C. § 101 (2012).

Consider the newest category, "process." In 1952 Congress replaced "art" in the patent statute with "process," putting the term "process" in § 101 in the context of the subject matter requirement. At the same time, Congress included a definition of process in § 100, which explains that "[t]he term 'process' means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material."[302] In the House and Senate Reports accompanying this change, the drafters clarified that in this context "art" and "process or method" mean the same thing.[303]

Federico's commentary on the Patent Act of 1952 provides an enlightening description of what led to the replacement of "art" with "process" in § 101 and the inclusion of the definition of process in § 100. Indeed, his discussion sheds so much light on the process category, as well as the other unaltered categories ("machine, manufacture, composition of matter, and . . . improvements thereof"), that it is worth quoting at length:

> In one sense every invention is nothing but the result of new uses of old materials. But discussions of the patentability of new uses are usually concerned with the simple situation in which a discovery has been made that a known substance or thing has some hitherto unknown property, or can be used to obtain a particular result for which i[t] had not been used before. If the new use results in a new machine, or a new manufacture, or a new composition of matter, or an improvement on any of these, a patent may be issued for any of these things provided the necessary conditions can be met. Difficulties arise when no new or improved machine, manufacture or composition of matter has resulted. Since there is no new or improved object produced, the only things left to consider are the acts performed, which leads to a process or method and the statute, as has been said,

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302. 35 U.S.C. § 100(b) (2012).

303. S. REP. NO. 82-1979, at 5 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2398–99 ("[T]he word 'art' which appears in the present statute has been changed to the word 'process.' 'Art' in this place in the present statute has a different meaning than the words 'useful art' in the Constitution, and a different meaning than the use of the word 'art' in other places in the statutes, and it is interpreted by the courts to be practically synonymous with process or method. The word 'process' has been used to avoid the necessity of explanation that the word 'art' as used in this place means 'process or method,' and that it does not mean the same thing as the word 'art' in other places.").

> recognizes a process or method which involves only a new use of an old material, as within the field of subject matter capable of being patented.[304]

In this passage, Federico highlights that machines, manufactures, compositions of matter, and improvements of these things must be "new" in the sense that they are different as compared to what came before them, or at least their use (a claimed process or method using an old machines, manufactures, compositions of matter) must be different compared to prior uses.

Significantly, at least in the abstract and without regard to the statute, one might suppose this requirement of newness may be applied in a comparison with either prior *natural* materials or prior *manmade* materials. Either way, for a thing to qualify for patenting, that thing must be different as compared to the prior materials (or its use must be different). As Federico explained, if the thing is the same as the old material, then the only way to obtain a patent is to claim a new *use* of the old material. In both respects—with respect to claims to materials and claims to processes—something must be added to what came before the material or process; the focus, in the words of Federico, is on the "result" with respect to materials and "acts performed" with respect to processes.[305]

Now, consider the patent statute. Section 102 already takes care of a comparison of the claimed thing to prior *manmade* materials and processes.[306] But that section seems to be silent with respect to a comparison of the claimed thing to prior *natural* materials and processes. Since § 102 does not expressly contemplate comparing a claimed invention with prior natural materials and processes, an independent requirement of the language in § 101 ("new . . . process, machine, manufacture, or composition of matter, or any new . . . improvement thereof") might be that the claimed material or the claimed process must include something manmade; the material or process must be the result of human effort.[307] This focus on human

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304. P.J. Federico, COMMENTARY ON THE NEW PATENT ACT, 35 U.S.C.A. § 1 (West 1954), *reprinted in* 75 J. PAT. & TRADEMARK OFF. SOC'Y 161, 177–78 (1993).

305. *Id.*

306. S. REP. NO. 82-1979, at 6 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2399 (explaining that § 102 provides a definition of "newness" in § 101).

307. I discuss above that I do not think this is necessary given the enablement and written description requirements. *See supra* Part III.B.2. But even if I am wrong in that regard, the subject matter requirement need not be interpreted other than to require that the claimed subject matter be the result of human effort, as I describe here.

effort is a shorthand way to describe the idea that the claimed material or process cannot be the same as what already existed in nature.

Now consider a dictionary definition of the word "art," which "process" replaced. "Art" provides additional insight on the question of whether "process" should encompass natural processes. "Art" entered the patent statute in the Patent Act of 1790.[308] Notably, as I highlighted above, in Samuel Johnson's dictionary from 1792, the first and most relevant definition of "art" is "[t]he power of doing something not taught by nature and instinct."[309] Recall that in 1952, when Congress replaced "art" with "process," it not only included a definition of "process" that includes "art,"[310] but also prepared reports explaining that "art" and "process or method" mean the same thing.[311]

Notably, this is all consistent with the Supreme Court's historical interpretation of "process" in § 101 as excluding natural processes.[312] The reason "process" does not include natural processes, however, is because "process" as used in § 101 refers to something created by mankind; it is the result of human effort.[313]

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308. Act of Apr. 10, 1790, ch. 7, 1 Stat. 109 (1790).

309. SAMUEL JOHNSON, A DICTIONARY OF THE ENGLISH LANGUAGE 83 (10th ed. 1792).

310. 35 U.S.C. § 100(b) (2012).

311. S. REP. NO. 82-1979, at 5 (1952), *as reprinted in* 1952 U.S.C.C.A.N. 2394, 2398–99 ("[T]he word 'art' which appears in the present statute has been changed to the word 'process.' 'Art' in this place in the present statute has a different meaning than the words 'useful art' in the Constitution, and a different meaning than the use of the word 'art' in other places in the statutes, and it is interpreted by the courts to be practically synonymous with process or method. The word 'process' has been used to avoid the necessity of explanation that the word 'art' as used in this place means 'process or method,' and that it does not mean the same thing as the word 'art' in other places.").

312. *See In re* Bilski, 545 F.3d 943, 952 (Fed. Cir. 2008) (en banc) (recognizing that "the Supreme Court has held that the meaning of 'process' as used in § 101 is narrower than its ordinary meaning" because "the Court has held that a claim is not a patent-eligible 'process' if it claims 'laws of nature, natural phenomena, [or] abstract ideas'") (citing Diamond v. Diehr, 450 U.S. 175, 185 (1981)); Parker v. Flook, 437 U.S. 584, 588–89 (1978) ("The holding [in *Benson*] forecloses a purely literal reading of § 101."); Gottschalk v. Benson, 409 U.S. 63, 67 (1972).

313. An example of a natural process is photosynthesis. *See* Peter M. Kohlhepp, *When the Invention Is an Inventor: Revitalizing Patentable Subject Matter to Exclude Unpredictable Processes*, 93 MINN. L. REV. 779, 805 n.161 (2008) (using photosynthesis as an example of a process that should be deemed unpatentable because it is a natural phenomenon). Under the theory explored here, the first to discover and describe the process of photosynthesis would not have been able to

For eligibility purposes there is no historical requirement that there be an inventive concept, if that phrase means some *relatively significant* contribution to the natural process rather than *any* practical use of that natural process.[314]

So, if "process" as used in § 101 requires human effort, what about the remaining categories listed in § 101? Consider, first, "machine" and "manufacture." "Machine," like "art," entered the patent statute in the Patent Act of 1790,[315] and Samuel Johnson's 1792 dictionary included a first definition of "machine" as "[a]ny complicated piece of workmanship."[316] "Manufacture" also entered the patent statute in 1790,[317] and Samuel Johnson defined this noun in 1792 as "[t]he practice of making any piece of workmanship" and "[a]ny thing made by art."[318] Both of these definitions incorporate terms, "workmanship" and "art," that clearly contemplate human creation or human effort.

Finally, consider "composition of matter," a phrase that entered the patent statute in the Patent Act of 1793, three years after Congress passed the first patent statute.[319] Samuel Johnson defined the term "composition" in 1792 in various ways, the first and most relevant being "[t]he act of forming an integral of various dissimilar parts."[320] Other relevant definitions included "[a] mass formed by mingling different ingredients," and "[t]he state of being

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obtain a patent on it because it was not created by a person; it was not the result of human effort. It inherently existed in nature, whether or not it was known to exist.

314. *See* Lefstin, *supra* note 108, at 565. The historical requirement of a *practical* application of a principle, as distinguished from an *inventive* application of a principle, is seen most clearly in *Le Roy v. Tatham*, 63 U.S. 132 (1859). In that case, the Court no less than eleven times explains that while a principle in and of itself is not eligible for patenting, a practical application of a principle is. *See, e.g.*, *id.* at 135-36 ("A patent will be good, though the subject of the patent consists in the discovery of a great, general, and most comprehensive principle in science or law of nature, if that principle is, by the specification, applied to any special purpose, so as thereby to effectuate a practical result and benefit not previously attained.") (quotation marks omitted) (quoting Household Coal & Iron Co. v. Neilson, Webster's Patent Case 673, 683 (House of Lords 1843)).

315. Act of Apr. 10, 1790, ch. 7, 1 Stat. 109, 110 (1790).

316. SAMUEL JOHNSON, A DICTIONARY OF THE ENGLISH LANGUAGE 538 (10th ed. 1792).

317. Act of Apr. 10, 1790, ch. 7, 1 Stat. 109, 110 (1790).

318. SAMUEL JOHNSON, A DICTIONARY OF THE ENGLISH LANGUAGE 545 (10th ed. 1792).

319. Act of Feb. 21, 1793, ch. 11, 1 Stat. 318, 319 (1793).

320. SAMUEL JOHNSON, A DICTIONARY OF THE ENGLISH LANGUAGE 190 (10th ed. 1792).

compounded; union; conjunction."[321] Johnson defined "compound," in turn, among other ways to mean "[t]o mingle many ingredients together" and "[t]o form by uniting various parts; he *compounded* a medicine."[322] Each of these definitions points in the direction of human effort. Given that these definitions include the terms "act" and "forming," "formed by mingling," and "compounded," it seems clear that a "composition of matter" is not just a collection of matter, but a collection of matter that has been created by a human act; it is the result of human effort.

This understanding—that anything that is the result of human effort is eligible for patenting at least from the perspective of the subject matter requirement—is confirmed by the legislative history of the Patent Act of 1952. In both the Senate and House Reports accompanying the Patent Act of 1952, Federico explained that "anything under the sun that is *made by man*" qualifies as eligible subject matter.[323] Here is the full statement from the legislative history: "A person may have 'invented' a machine or a manufacture, which may include anything under the sun that is made by man, but it is not necessarily patentable under section 101 unless the conditions of [this] title are fulfilled."[324]

This statement highlights two aspects of modern patent law. First, it speaks to the structure of the patent statute. In particular it illustrates that the determination of patentability is a two-step process. The two requirements of § 101 (statutory subject matter and utility) must be analyzed, and then the conditions of §§ 102 and 103 (novelty, statutory bars, and non-obviousness) must also be analyzed. Despite Judge Mayer's recent protestations to the contrary,[325] it is clear that these requirements may be analyzed in

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321. *Id.*

322. *Id.* at 190-91.

323. S. REP. NO. 82-1979, at 5 (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2399 (emphasis added).

324. *Id.*

325. *See* Ultramercial, Inc. v. Hulu, LLC, 772 F.3d 709, 718–20 (Fed. Cir. 2014) (Mayer, J., concurring) (referring to § 101 as the "gateway to the Patent Act" and describing alleged benefits of addressing § 101 as a threshold question); I/P Engine, Inc. v. AOL, Inc., 576 F. App'x 982, 995–96 (Fed. Cir. 2014) (Mayer, J., concurring) ("To fail to address at the very outset whether claims meet the strictures of section 101 is to put the cart before the horse. Until it is determined that claimed subject matter is even eligible for patent protection, a court has no warrant to consider subordinate validity issues such as non-obviousness under 35 U.S.C. § 103 or adequate written description under 35 U.S.C. § 112."); MySpace, Inc. v. GraphOn Corp., 672 F.3d 1250, 1264 (Fed. Cir. 2012) (Mayer, J., dissenting) ("This court must

any order.[326] Indeed, there is reason to think, given the confusion around § 101, that §§ 102 and 103 should be analyzed first.[327] Anyway, the point is that only when a patent application satisfies all of these requirements and conditions may it be deemed to include a "patentable invention." Of course, for any patent to issue covering this patentable invention, the patent applicant must also satisfy other requirements under the statute, including primarily the specification requirements expressed in § 112.[328] Second, Federico's statement shows that the statutory subject matter requirement (and in particular the machine and manufacture categories) is so broad that all it prohibits is subject matter *not* made by man—in modern terminology subject matter that is not created by, or in other words the result of, human effort.

The Supreme Court continues to misunderstand Federico's statement.[329] Justice Stevens, for example, confuses the two points the statement teaches. In *Bilski*, for example, Justice Stevens states:

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first resolve the issue of whether the [] patents are directed to an unpatentable 'abstract idea' before proceeding to consider subordinate issues related to obviousness and anticipation.").

326. *MySpace, Inc.*, 672 F.3d at 1260 ("Rather than taking the path the dissent urges, courts could avoid the swamp of verbiage that is § 101 by exercising their inherent power to control the processes of litigation . . . and insist that litigants initially address patent invalidity issues in terms of the conditions of patentability defenses as the statute provides, specifically §§ 102, 103, and 112. If that were done in the typical patent case, litigation over the question of validity of the patent would be concluded under these provisions, and it would be unnecessary to enter the murky morass that is § 101 jurisprudence. This would make patent litigation more efficient, conserve judicial resources, and bring a degree of certainty to the interests of both patentees and their competitors in the marketplace."); *see also Ultramercial*, 657 F.3d at 1325 ("This court has never set forth a bright line rule requiring district courts to construe claims before determining subject matter eligibility. Indeed, because eligibility is a 'coarse' gauge of the suitability of broad subject matter categories for patent protection . . . claim construction may not always be necessary for a § 101 analysis."), *cert. granted and judgment vacated sub nom.* WildTangent, Inc. v. Ultramercial, LLC, 132 S. Ct. 2431 (2012).

327. *See MySpace, Inc.*, 672 F.3d at 1260.

328. 35 U.S.C. § 112 (2012).

329. Indeed, Justice Stevens may have even misunderstood arguments made concerning this phrase. He, for example, dismissed arguments in *Bilski* based on a straw-man: "We have never understood that piece of legislative history to mean that any series of steps is a patentable process." Bilski v. Kappos, 561 U.S. 593, 642 (2010) (Stevens, J., concurring in the judgment). In context, he seems to use "patentable process" to refer to a claimed process that should issue in a patent. *See supra* Part III.A.

> Viewed as a whole, it seems clear that this language does not purport to explain that "anything under the sun" is patentable. Indeed, the language may be understood to state the exact opposite: that "[a] person may have 'invented' . . . anything under the sun," but that thing "is not necessarily patentable under section 101."[330]

Justice Stevens then goes on to interpret § 101 to do more than eliminate eligibility for things not "made by man." He interprets § 101 broadly to prohibit so-called "business method" patents, which he views as undeserving of patent protection.[331] What Justice Stevens means, then, in context, is that § 101 itself requires more than subject matter that both falls within the identified categories[332] and is the result of human effort.

Justice Stevens misunderstands the statement from the legislative history.[333] His confusion, in part, may result from confusion over the meaning of the word "patentable," as I have already discussed.[334] To Justice Stevens, "patentable" seems to mean that a patent shall issue. In other words, what he seems to be saying is that, even if something is made by man, that alone does not mean that a patent shall issue. So much as it goes, that is true, but that is true only because the other statutory conditions and requirements must be met, not because a so-called "implicit exception" to § 101 needs to be met. This is where Justice Stevens goes wrong in his analysis. He believes § 101 itself, divorced from the other statutory sections, must do all the work to prohibit claims from being patented. In particular, there is no independent requirement in § 101 that the subject matter be novel as compared to prior art. Nor is there any independent requirement in § 101 that the subject matter be "inventive" as compared to prior art. Those are matters of concern for the separate statutory sections addressing them, §§ 102 and 103. Even the word "new" in § 101 does not require a novelty analysis

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330. *Bilski*, 561 U.S. at 642 (Stevens, J., concurring in the judgment).

331. *See id.* at 643–56 (Stevens, J., concurring in the judgment).

332. *In re* Nuijten, 500 F.3d 1346, 1357 (Fed. Cir. 2007) (affirming the rejection of a claim for signals because signals do not fall within any of the categories listed in § 101).

333. Justice Stevens is not alone in his misunderstanding; even a senior judge on the Federal Circuit misconstrues the legislative history. *See also* Ultramercial, Inc. v. Hulu, LLC, 772 F.3d 709, 720 (Fed. Cir. 2014) (Mayer, J., concurring).

334. *See supra* Part III.A.

with respect to prior art, because that is the exact function of § 102.[335]

His confusion also may stem from the fact that, under the patent statute—and despite its awkward phraseology—§ 101 is the granting provision. That is, § 101 indicates that when a patent applicant satisfies the requirements and conditions of Title 35, that applicant may obtain a patent for his or her invention.[336] The following sections of Title 35 state conditions precedent to the grant of rights expressed in § 101. Section 102, for example, explains that "[a] person shall be entitled to a patent unless" the conditions expressed in that section are not met.[337] Section 103, moreover, explains that "[a] patent for a claimed invention may not be obtained" if another condition expressed in that section is not met.[338] Justice Stevens's confusion in this regard is highlighted by his omission of the critical, final phrase from Federico's statement: "A person may have 'invented' . . . anything under the sun," but that thing "is not necessarily patentable under section 101 *unless the conditions of [this] title are fulfilled.*"[339]

Justice Stevens's reliance on *Diamond v. Chakrabarty*[340] is misplaced. Justice Stevens argues that, "even in the *Chakrabarty* opinion, which relied on this quote, we cautioned that the 1952 Reports did not 'suggest that § 101 has no limits or that it embraces every discovery.'"[341] Of course § 101 does have limits and, in particular, does not embrace every discovery. But that tautology does not necessarily mean anything other than the fact that the discovery must be applied, such that what is claimed is something "made by man"; and that is consistent with the requirement that what is claimed must be a human creation or, in other words, the result of human effort. The statutory subject matter requirement, for example, does not permit the patenting of $E=mc^2$ because that formula does not express anything made by man. As a result, even though Albert Einstein was the first to identify this equation, he could not obtain a patent on the equation itself. The fact that the equation was novel, could be useful, and was non-obvious did not

335. S. REP. NO. 82-1979, at 6 (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2399.

336. 35 U.S.C. § 101 (2012).

337. 35 U.S.C. § 102(a) (2012).

338. 35 U.S.C. § 103 (2012).

339. Bilski v. Kappos, 561 U.S. 593, 642 (2010) (Stevens, J., concurring in the judgment) (emphasis added).

340. 447 U.S. 303 (1980).

341. *Bilski*, 561 U.S. at 642 (Stevens, J., concurring in the judgment) (quoting *Chakrabarty*, 447 U.S. at 309).

make it patentable. To obtain a patent, Einstein would have had to apply the formula in a new process or to make something new that used the formula. Unfortunately, Justice Stevens's confusion has taken root: In *Mayo* and *Alice*, Justice Breyer perpetuated Justice Stevens's position.[342]

In sum, the Supreme Court's creative approach to interpreting § 101 to limit claim scope is simply not necessary. The *statutory* doctrines found in §§ 101, 102, 103, and 112—subject matter, utility, enablement, written description—already do the work of limiting the scope of claims and prohibiting the patenting of laws of nature. Moreover, they do so using doctrines rooted in the patent statute that have well-developed objective tests. Likewise, the statutory experimental use exception—and a properly interpreted common-law experimental use exception—should allow follow-on inventors to experiment on patented inventions to identify, for example, improvements to patented inventions.[343]

C. Claim Abstractness

Beyond concerns with the breadth of claims, claims that cover prior art, and preemption of the basic building blocks of human ingenuity, consider the Supreme Court's expressed concern with abstractness of claim language.

1. Problems with the Supreme Court's Test

In its recent decisions, the Supreme Court has focused its concern on claim abstractness. In *Bilski*, in particular, the Court concluded that "[t]he concept of hedging . . . is an unpatentable abstract idea."[344] In *Mayo*, the Court was focusing on abstractness when it stated that "to transform an unpatentable law of nature into a patent-eligible *application* of such a law, one must do more than simply state the law of nature while adding the words 'apply it.'"[345]

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342. *See generally* Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347 (2014); Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289 (2012).

343. The common law experimental use exception does not except from infringement liability all experiments conducted with the purpose of identifying improvements to the patented technology. *See* Madey v. Duke Univ., 307 F.3d 1351, 1362 (Fed. Cir. 2002).

344. *Bilski*, 561 U.S. at 611 (concluding that "[t]he concept of hedging, described in claim 1 and reduced to a mathematical formula in claim 4, is an unpatentable abstract idea").

345. *Mayo*, 132 S. Ct. at 1294.

And in *Alice*, the Court held that "the claims at issue are drawn to the abstract idea of intermediated settlement, and that merely requiring generic computer implementation fails to transform that abstract idea into a patent-eligible invention."[346]

Despite this concern with abstractness of claims, one of the most significant problems with asking patent examiners and courts to decide whether claims are abstract is that no one really knows how to determine whether claims are abstract. In *Bilski*, all the Court could do was analogize to its precedents; it never explained exactly what an abstract claim is, let alone provide objective guidelines to make such a determination.[347] And the only way the Supreme Court suggested in *Mayo* to make the determination—effectively to summarize the claim and ignore or at least discount its express limitations[348]—is wrong for at least three reasons.

First, it flatly contradicts its own precedent in *Diamond v. Diehr* to the extent it requires ignoring claim limitations.[349] In *Alice*, the Court attempted to show how *Mayo* did not contradict *Diehr* by requiring an analysis of the whole claim, even if a separate analysis allows limitations to be ignored.[350] But *Alice*'s analysis of the whole claim wrongly focuses on whether limitations are "conventional" versus "inventive," which is an analysis reserved for the more definitive test of non-obviousness pursuant to § 103 and its objective guidelines.[351] In effect, *Alice* sanctions ignoring conventional

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346. *Alice*, 134 S. Ct. at 2352.

347. *See Bilski*, 561 U.S. at 609–13.

348. *Mayo*, 132 S. Ct. at 1296–97.

349. *Compare id.* at 1298 ("To put the matter more succinctly, the claims inform a relevant audience about certain laws of nature; any additional steps consist of well-understood, routine, conventional activity already engaged in by the scientific community; and those steps, when viewed as a whole, add nothing significant beyond the sum of their parts taken separately. For these reasons we believe that the steps are not sufficient to transform unpatentable natural correlations into patentable applications of those regularities.") *with* Diamond v. Diehr, 450 U.S. 175, 188–89 (1981) ("In determining the eligibility of respondents' claimed process for patent protection under § 101, their claims must be considered as a whole. It is inappropriate to dissect the claims into old and new elements and then to ignore the presence of the old elements in the analysis.").

350. *Alice*, 134 S. Ct. at 2355 n.3 ("Because the approach we made explicit in *Mayo* considers all claim elements, both individually and in combination, it is consistent with the general rule that patent claims 'must be considered as a whole.'") (quoting *Diehr*, 450 U.S. at 188).

351. *See generally* Giles S. Rich, *Laying the Ghost of the "Invention" Requirement*, 1 APLA Q.J. 26 (1972), *reprinted in* 41 AIPLA Q.J. 1 (2013) (discussing

limitations, but it is those very limitations that may indicate that the claimed subject matter is a practical application of an idea.

Second, the Court's approach—summarizing the claim and ignoring or at least discounting express limitations to determine whether the claim is abstract[352]—is wrong because it is wholly circular. It is less a method of determining whether a claim is abstract than a method of determining whether the idea underlying the claim is abstract. And, by definition, that idea *is* more abstract than the claim that is not summarized and whose limitations are not ignored or discounted. If after taking an abstraction of a claim one asks, "is this abstract," the answer quite clearly will always be "yes," at least if the only relevant comparison is the abstracted claim compared to the original claim. And the Supreme Court did not provide any guidance to make any other comparison.[353]

Third, without any objective guidelines, the current eligibility analysis leaves a patent examiner or court to determine whether a claim is too abstract and whether there is any inventive concept based on a purely subjective assessment.

2. Existing Statutory Requirements Address Abstractness, Yet the Supreme Court Has Not Even Addressed Them

The irony with respect to the problem of subjectivity in determining whether a claim is too abstract or whether the claim includes an inventive concept, is that the existing utility, written description, and definiteness requirements, as well as the statutory limit on functional claiming, already address concerns with abstractness, while the non-obviousness requirement already seeks to identify whether there is an inventive concept claimed. And the law that has developed around those doctrines have objective guidelines to provide meaningful direction to patent examiners and courts.

I have already discussed the written description, enablement, and utility requirements in the context of restraining claim scope.[354] Those doctrines, taken as a whole, also address the problem of abstractness. The written description requirement ensures that a claim describes what an inventor actually invented, rather than

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§ 103's role in shifting the focus of patentability from "invention" to non-obviousness).

352. *Mayo*, 132 S. Ct. at 1296–97.

353. *See generally id.*

354. *See supra* Part III.

some abstraction of what was invented, by mandating that a patent's specification clearly allow someone of ordinary skill in the art to recognize that the inventor invented what is claimed.[355] By mandating that the specification describe the "manner and process of making and using [the claimed invention], in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same,"[356] the enablement requirement ensures that a claim describes something specific that is reproducible rather than some abstraction. And by mandating that a claimed invention have substantial, practical, and immediate usefulness,[357] the utility requirement ensures that a claimed invention has a presently available, specific utility rather than some abstract notion of how the claimed invention might be useful in the future.

Also consider the definiteness requirement. By ensuring that claims are reasonably certain,[358] the definiteness requirement ensures that a claim is not vague. While it may be true that, standing alone, the definiteness requirement cannot invalidate abstract claims—because the definiteness requirement "asks whether a person having ordinary skill in the art (PHOSITA) could understand the claims, regardless of how abstract or applied they might be"[359]—it does help ensure that claims are clear so that it is possible to determine their scope. Beyond eliminating vagueness (which really is one type of abstractness), therefore, the definiteness requirement serves an important helping function; only when a patent examiner or court can determine the scope of a claim can it determine whether that scope is supported by a disclosure in the specification that meets the written description, enablement, and

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355. *See* Ariad Pharm., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1340 (Fed. Cir. 2010) (en banc) (reaffirming that § 112, first paragraph, contains a written description requirement separate from the enablement requirement).

356. 35 U.S.C. § 112(a) (2012).

357. *See* Brenner v. Manson, 383 U.S. 519, 534–35 (1966) ("The basic *quid pro quo* contemplated by the Constitution and the Congress for granting a patent monopoly is the benefit derived by the public from an invention with substantial utility. Unless and until a process is refined and developed to this point—where specific benefit exists in currently available form—there is insufficient justification for permitting an applicant to engross what may prove to be a broad field.").

358. Nautilus, Inc. v. Biosig Instruments, Inc., 134 S. Ct. 2120, 2124 (2014) ("[W]e hold that a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.").

359. *See* Lemley, Risch, Sichelman & Wagner, *supra* note 228, at 1331.

utility requirements, which as discussed above are the statutory doctrines that prevent claims from covering mere abstractions.[360]

But there is more. Yet another doctrine that reins in claim abstraction is the statutory limit on functional claiming expressed in § 112(f).[361] It allows for an element in a claim to be expressed in functional language ("as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof"), but limits the construction of this language "to cover the corresponding structure, material, or acts described in the specification and equivalents thereof."[362] Thus, while one might express a claim in terms of a result, the claim must be interpreted to be limited to the way to achieve that result that is identified in the specification (and its equivalents). Section 112(f) therefore works to limit claims to specific embodiments or applications rather than abstract ideas.[363]

Finally, it is important to recognize that the Supreme Court's test for patent eligibility—couched as a test to control abstract claiming in *Alice*—turns, in the end, on whether a claim includes an inventive concept.[364] On this issue it is quite clear that the non-obviousness requirement is the statutory doctrine that replaced the inquiry of whether there is an inventive concept claimed. Congress included the non-obviousness requirement in § 103 to overrule aspects of the "invention" requirement.[365] And, as I have discussed, the non-obviousness analysis includes relevant objective guidelines to provide constraint and direction to the analysis.[366]

It is important to recognize that, unlike the Supreme Court's consideration of whether the existing statutory requirements address the underlying concerns with claim breadth,[367] the Court

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360. *See supra* Part III.

361. 35 U.S.C. § 112(f) (2012).

362. *Id.*

363. Lemley likewise criticizes the doctrines courts have used to analyze functional claiming. Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 WIS. L. REV. 905, 964 (2013) (arguing that "[i]t is time to end functional claiming (again)"). The Federal Circuit, however, has recently tightened its application of § 112(f) to ensure that more claims require disclosure of supporting structure and algorithms. *See* Williamson v. Citrix Online, LLC, 792 F.3d 1339, 1351–54 (Fed. Cir. 2015) (en banc).

364. Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347, 2355 (2014).

365. Rich, *supra* note 351, at 33–34 ("The first policy decision underlying § 103 was to cut loose altogether from the century-old term 'invention.'").

366. *See supra* Part III.B.2.

367. *See supra* Part III.A.

has not even considered whether the existing statutory requirements address its concern with abstractness. Indeed, while the Court's central concern in *Alice* was abstractness,[368] the Court did not analyze whether the enablement requirement (or any of the other statutory requirements) adequately addresses abstractness. Instead, the Court simply adopted wholesale the two-part test from *Mayo*.[369]

Moreover, while I have already mentioned that § 101's statutory patentability requirements already rule out the patenting of mere ideas, the search for an inventive concept actually contradicts the utility requirement. This simple fact should not be discounted. An important feature of the utility requirement is the condition that only practical applications of ideas are eligible for patenting.[370] This search for a *practical* application—a test rooted in precedent and policy and one relatively easy to apply—is the opposite of the test the Court adopted in *Alice*, the search for an "*inventive* application" of an idea.[371]

In sum, the Supreme Court's creative approach to interpreting § 101 to prohibit abstract claiming is simply not necessary. *Statutory* doctrines found in §§ 101, 103, and 112—written description, enablement, utility, definiteness, the limitation on functional claiming, and non-obviousness—already do the work of prohibiting the patenting of abstract ideas. Moreover, they do so using doctrines rooted in the patent statute that have well-developed objective tests.[372]

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368. *See Alice*, 134 S. Ct. at 2349-50.

369. *Id.* at 2355. Interestingly, the Court did not even pay lip service to its more recent decision on eligibility, *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107 (2013), which itself did not use *Mayo*'s two-part test. *See generally Alice*, 134 S. Ct. at 2347.

370. *See supra* note 326.

371. *Alice*, 134 S. Ct. at 2358 (citing Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1299 (2012)).

372. The actual concern underlying the prohibition on patenting "abstract ideas" might be one with claims covering non-technological inventions. This may have been Justice Stevens's concern in *Bilski*, although he did not cloak his concern under the guise of prohibiting abstract ideas. *See* Bilski v. Kappos, 561 U.S. 593, 614 (2010) (Stevens, J., concurring) ("Rather than making any broad statements about how to define the term 'process' in § 101 or tinkering with the bounds of the category of unpatentable, abstract ideas, I would restore patent law to its historical and constitutional moorings. For centuries, it was considered well established that a series of steps for conducting business was not, in itself, patentable."). This concern explains the Federal Circuit's use of the prohibition on patenting abstract ideas to affirm rejections of claims in recent cases. *See, e.g.*, *In re* Smith, 815 F.3d 816, 818 (Fed. Cir. 2016) ("[W]e conclude that Applicants' claims, directed to rules for

IV. LACK OF ADMINISTRABILITY

Beyond confusing relevant policies and doctrines, the current approach to determining patent eligibility lacks administrability. It is exceedingly difficult to understand whether an patent examiner or a court should find subject matter eligible for patenting given the overarching test for eligibility articulated by the Supreme Court. That test includes no objective guidance but leaves the determination of eligibility to the unconstrained, subjective opinion of a patent examiner or judge.

Of the four decisions in the past six years on the issue of patent eligibility, the most confusing might be the most recent, *Alice v. CLS Bank*.[373] As I have described, *Alice* sets forth the two-part test now governing the issue of eligibility.[374] With respect to both parts of the test, *Alice* ensured there would be substantial confusion in the governing law. To review: First, the examiner or judge must determine whether a patent claim is directed to an ineligible concept: a law of nature, a physical phenomenon, or an abstract idea.[375] Second, the examiner or judge must determine whether something in the claim transforms the nature of the claim into a patent-eligible application of the ineligible concept, an analysis identified as the search for an inventive concept—one that sufficiently ensures that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself.[376] This test for ineligibility requires two increasingly confusing analyses. To use a term coined by Justice Scalia with respect to his understanding of another patentability test, the test for ineligibility is "gobbledygook."[377] Take each part of the test in turn.

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conducting a wagering game, compare to other 'fundamental economic practice[s]' found abstract by the Supreme Court."); Planet Bingo, LLC v. VKGS LLC, 576 F. App'x 1005, 1008 (Fed. Cir. 2014) (affirming the rejection of "claims . . . directed to the abstract idea of 'solv[ing a] tampering problem and also minimiz[ing] other security risks' during bingo ticket purchases"). And it provides a basis to reject claims to a diaper service, Rich, *supra* note 90, at 393–94, a method of shooting a free throw, or a purely mental process. These claims are not really abstract but instead cover non-technological inventions.

373. 134 S. Ct. 2347.

374. *See supra* Part II.B.

375. *Alice*, 134 S. Ct. at 2355.

376. *Id.*

377. Transcript of Oral Argument at 41, KSR Int'l v. Teleflex Inc., 550 U.S. 398 (2007) (No. 04-1350) (Scalia, J.) (discussing his understanding of the Federal Circuit's teaching, suggestion, or motivation to combine test).

A. Whether a Claim is Directed to a Law of Nature, Physical Phenomenon, or Abstract Idea

Consider the first part of the test.[378] What does it mean for a claim to be "directed" to an ineligible concept? Use of the term "directed" seemingly invites courts to ignore claim language. On the one hand, that, in fact, is what the Supreme Court and lower courts have done; if the claim language merely describes something conventional, then courts effectively ignore it.[379] But the Supreme Court itself has said, on the other hand, that that is not what courts should do.[380] In *Diamond v. Diehr*, the Court held that:

> In determining the eligibility of respondents' claimed process for patent protection under § 101, their claims must be considered as a whole. It is inappropriate to dissect the claims into old and new elements and then to ignore the presence of the old elements in the analysis. This is particularly true in a process claim because a new combination of steps and a process may be patentable even though all of the constituents of the combination were well known and in common use before the combination was made. The "novelty" of any element or steps in the process, or even of the process itself, is of no relevance in determining whether the subject matter of a claim falls within the § 101 categories of possible patentable subject matter.[381]

There is great logic behind the idea that courts should not ignore claim language. While there is a fear that patent drafters will be able to draft claim language creatively to avoid a holding of invalidity based on ineligibility, that should be exactly what the system prefers. The point is to cause the patent drafter to draft the claim language so it describes something specific that may be compared to prior art and to any allegedly infringing product or

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378. *Alice*, 134 S. Ct. at 2355.

379. *See, e.g., id.* at 2359 ("Taking the claim elements separately, the function performed by the computer at each step of the process is '[p]urely conventional.'") (quoting Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1298 (2012)); Versata Dev. Grp. v. SAP Am., Inc., 793 F.3d 1306, 1334 (Fed. Cir. 2015) ("Taking the claim limitations separately, the function performed by the computer at each step is purely conventional.").

380. *See* Diamond v. Diehr, 450 U.S. 175, 188–89 (1981).

381. *Id.*

service. Ignoring "conventional" claim limitations ignores the specific. But in *Mayo* and one of the cases it relied upon for this approach, *Parker v. Flook*, this is exactly what the Court has done, effectively ignore claim limitations.[382] While the Court has weakly denied that it is ignoring claim limitations,[383] it effectively is. In short, ignoring claim language is inappropriate, the Court's precedent is inconsistent with respect to whether claim language may effectively be ignored, and, unfortunately, the two-part test encourages the practice without setting clear guidelines on how to determine whether to ignore claim language, because the Court has not explained how to determine whether technology is conventional.

And what does it mean for a claim to be directed to a "law of nature," "physical phenomenon," or "abstract idea"?[384] Every claim necessarily implements a law of nature, physical phenomenon, or idea. They are the basic building blocks of any invention; "Only God works from nothing."[385] Paraphrasing Justice Scalia, but in the context of eligibility: It is misleading to say that the whole world is embraced within these three phrases (law of nature, physical phenomenon, and abstract idea), and then to define those phrases to mean anything that renders a claim ineligible. "This is

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382. *See* Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289 (2012); Parker v. Flook, 437 U.S. 584 (1978).

383. *See Alice*, 134 S. Ct. at 2355 n.3 ("Because the approach we made explicit in *Mayo* considers all claim elements, both individually and in combination, it is consistent with the general rule that patent claims 'must be considered as a whole.'") (quoting *Diehr*, 450 U.S. at 188); *Flook*, 437 U.S. at 594 ("Our approach to respondent's application is, however, not at all inconsistent with the view that a patent claim must be considered as a whole."). The attempt in *Alice* to reconcile *Flook*, *Diehr*, and *Mayo* is unpersuasive; the better approach, anyway, is *not* to ignore claim language. The law should foreclose this possibility clearly.

384. *See, e.g.*, Funk Bros. Seed v. Kalo Inoculant Co., 333 U.S. 127, 134–35 (1948) (Frankfurter, J., concurring) ("It only confuses the issue, however, to introduce such terms as 'the work of nature' and the 'laws of nature.' For these are vague and malleable terms infected with too much ambiguity and equivocation. Everything that happens may be deemed 'the work of nature,' and any patentable composite exemplifies in its properties 'the laws of nature.' Arguments drawn from such terms for ascertaining patentability could fairly be employed to challenge almost every patent. On the other hand, the suggestion that 'if there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end' may readily validate Bond's claim.").

385. Howard T. Markey, *Why Not the Statute?*, 65 J. PAT. OFF. SOC'Y 331, 334 (1983).

gobbledygook. It really is, it's irrational."[386] In other words, what is a law of nature? Likewise, what is a physical phenomenon? And what is an abstract idea? The *Bilski* and *Alice* decisions addressed the last of the three facially ineligible concepts, an abstract idea.[387] Notably, the Supreme Court struggled to identify why the claims at issue were directed to abstract ideas. All the Court could do was summarize its precedent and then conclude that the claim was directed to an abstract idea.[388] Even worse, as already described, only by ignoring claim limitations has the court concluded that a claim merely describes a natural law, physical phenomenon, or abstract idea. Particularly with respect to the abstract idea exception, this logic is circular. It is hardly surprising that an abstraction of the actual claim language is found to be abstract.[389]

In short, the first part of the Supreme Court's test for eligibility provides no objective guidelines. The determination of whether a claim is "directed" to an "abstract idea," in particular, is a wholly subjective task. One way of describing how to make this determination is the phrase coined by Justice Stewart to describe when pornography qualifies as obscenity: "I know it when I see it."[390] And that is no way to engineer a patent system that is supposed to provide incentives for inventors and businesses to make decisions to invest in research and development.

B. Whether a Claim Includes an Inventive Concept

The Supreme Court's test for eligibility also lacks administrability, particularly with respect to the second aspect of that test. In particular, the way that the Court has decided to address its concerns with claim breadth and abstractness is, ultimately, to ask whether a claim includes any inventive concept. In *Mayo*, for example, the Court explained that its precedents in the area of patent eligibility "insist that a process that focuses upon the use of a natural law also contain other elements or a combination of elements, sometimes referred to as an 'inventive concept,' sufficient to ensure that the patent in practice amounts to significantly more

386. Transcript of Oral Argument at 41, KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398 (2007) (No. 04-1350) (Scalia, J.).

387. *See generally* Bilski v. Kappos, 561 U.S. 593 (2009); *Alice*, 135 S. Ct. 2347.

388. *See Alice*, 134 S. Ct. at 2352 (holding that the claims at issue were drawn to an abstract idea); Bilski v. Kappos, 561 U.S. 593, 612 (2010) (same).

389. *See supra* Part II.C.

390. Jacobellis v. Ohio, 378 U.S. 184, 197 (1964) (Stewart, J., concurring).

than a patent upon the natural law itself."[391] Likewise the Court characterized a claim at issue in a prior case as including steps "that in terms of patent law's objectives had significance—they transformed the process into an inventive application."[392] In *Myriad*, the Court similarly focused on its belief that "separating [a] gene from its surrounding genetic material is not an act of invention."[393] And in *Alice*, the Court indicated the same search for an inventive concept is appropriate for determining, not just whether a claim extends beyond a mere natural law, but also whether a claim is too abstract: "[W]e must examine the elements of the claim to determine whether it contains an inventive concept sufficient to transform the claimed abstract idea into a patent-eligible application."[394] In all these cases the Court is concerned that the U.S. Patent and Trademark Office (USPTO) is issuing and courts are sustaining claims that do not include anything "inventive."

How does one decide whether a claim includes an inventive concept? Unfortunately, no one really knows what an inventive concept is.[395] As with abstractness, you apparently just know an inventive concept when you see it.[396] But this should not be surprising. The struggle with inventiveness is not new. Indeed, given the unconstrained, unpredictable nature of the "invention" requirement, the Patent Act of 1952 eliminated any investigation into inventiveness in favor of the question of non-obviousness.[397] It is like we have entered a time machine and returned to 1951.

The statutory doctrine that replaced the "invention" requirement, and thus makes unnecessary the search for an inventive concept, is the requirement of non-obviousness.[398] The ultimate question of a claim's non-obviousness is subjective; it is not a question of objective fact but one based at least partly on suggestion and supposition. As highlighted above, the modern

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391. Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1294 (2012) (citing Parker v. Flook, 437 U.S. 584, 594 (1978)).

392. *Id.* at 1299. *See also id.* (explaining that precedent found "no 'inventive concept' in the claimed application").

393. Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 133 S. Ct. 2107, 2117 (2013).

394. Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347, 2357 (2014) (quotation marks omitted) (quoting *Mayo*, 132 S. Ct. at 1294, 1298).

395. *See infra* Part V.

396. Jacobellis v. Ohio, 378 U.S. 184, 197 (1964) (Stewart, J., concurring).

397. *See* Rich, *supra* note 351, at 26 (discussing the history of § 103).

398. *See supra* Part I.

approach to analyzing non-obviousness, however, includes important objective guidelines.[399]

Indeed, Congress expressly contemplated the problem of subjectivity during the process leading to the enactment of the non-obviousness requirement. In 1951, when the current statutory approach was being considered by Congress, a commentator called for § 103 to include a functional relationship test rather than or as an explanation of the non-obviousness requirement.[400] The argument was that, without a functional relationship test, § 103 would put in place a subjective test rather than an objective one.[401] Congress obviously rejected the argument, and today we have what is, in the end, a subjective non-obviousness test with objective constraints on the analysis.[402] Judge Rich later explained how helpful the objective guidelines can be to constrain the non-obviousness analysis. Indeed, his explanation is so helpful to understand the objective constraints § 103 employs that I will include the extended quotation:

> "What difference does it make, it must still be a subjective decision?" True, but now the statute provides a standard according to which the subject of decision must be made. There is a vast difference between basing a decision on exercise of the inventive or creative faculty, or genius, ingenuity, patentable novelty, flashes, surprises and excitement, on the one hand, and basing it on unobviousness to one of ordinary skill in the art on the other. It is possible to determine what art is involved, what type of skills possessed by ordinary workers in it, and come to some conclusion as to what "ordinary skill" would be at a given time. This may present knotty problems but it is a definite pattern of thinking and does not leave the Patent Office or the courts free to conclude that a thing is not patentable for any old reason and stand on the proposition that something indefinable and impalpable called "invention" was not involved. At least they have to talk in terms of obviousness to a [person] of ordinary skill in the art. While the ultimate decision as to what his skill would be and what would be

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399. *See supra* Part III.B.2.

400. *Patent Law Codification and Revision: Hearing on H.R. 3760 before Subcommittee No. 3 of the Committee on the Judiciary*, 82nd Cong. 113–49 (1951) (statement of G. Write Arnold, Senior Member, Arnold & Mathis).

401. *Id.*

402. 35 U.S.C. § 103 (2012).

> obvious to him is subjective, it is one definite proposition on which evidence can be adduced.[403]

In other words, the statutory non-obvious requirement includes objective constraints; the "invention" requirement did not. In particular, to prove obviousness the scope and content of the prior art must be identified. The level of ordinary skill in the art must be identified. And the question of non-obviousness must be asked from the perspective of a person having ordinary skill in the art.[404]

The Supreme Court's search for an inventive concept, by contrast, is just as subjective and unconstrained as the Supreme Court's old "invention" requirement. The Supreme Court invokes an unfettered subjective analysis when in *Mayo* it says that "the underlying functional concern here is a *relative* one: how much future innovation is foreclosed relative to the contribution of the inventor."[405] The basic problem is that the Court never explains how to determine when the "foreclosure" of future innovation is too much. The Court does say that its "cases have endorsed a bright-line prohibition against patenting laws of nature, mathematical formulas and the like, which serves as a somewhat more easily administered proxy for the underlying 'building-block' concern."[406] The Court's cases, however, do not endorse any bright-line prohibition when they exclude "abstract ideas" without any suggestion of how to determine when an idea is too abstract and, when in the very case in which this suggestion is made, the Court endorses a test that is based on whether the application of a natural law is "inventive" based on whether it adds "significantly more" or "enough"—whatever those words mean in terms of their application.[407] In short, given the non-obviousness requirement, the search for an inventive concept is just as unnecessary, inappropriate, and problematic as the old "invention" requirement.

The lack of administrability of the Supreme Court's two-part test for eligibility is not lost on patent practitioners.[408] Consider a sample

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403. Rich, *supra* note 90, at 406.

404. *See supra* text accompanying note 194 (discussing Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966)).

405. Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1303 (2012).

406. *Id.*

407. *Id.* at 1294, 1297.

408. Prior to *Mayo* and *Alice*, the Supreme Court seemed to expect the Federal Circuit to provide clearer guidelines regarding the appropriate way to determine eligibility. *See* Bilski v. Kappos, 561 U.S. 593, 612–13 (2010) ("In disapproving an

of comments on the affect of *Mayo* and *Alice*:

- "The fact-specific nature of post-*Alice* eligibility disputes suggests a need for further guidance."[409]
- "[I]n the one year since *Alice* has come out, district courts have had a tough time coming to grips with what exactly is an abstract idea and what addition qualifies as an inventive concept."[410]
- Decrying "widespread tumult and confusion surrounding such a fundamental patent law issue."[411]
- "One year after the *Alice* decision, we remain in a confusing state where validity under § 101 is unclear for any particular software-based patent or patent application. Of course, this confusion is not surprising, as the Alice decision was shockingly deficient in defining key terms such as 'abstract,' 'routine conventional activities' and 'fundamental economic concepts.'"[412]
- "What's unclear is how exactly to apply the so-called *Mayo* second step."[413]
- "The *Alice* decision did nothing to clarify the principles in the *Mayo* decision, and, one year later, the consequences of that failure have been far-reaching."[414]
- "One year into *Alice*, we still need clarity into what 'abstract' and 'significantly more' mean. This is especially important as to how Alice is applied in patent prosecution."[415]
- "[T]here do not appear to be any objective standards in the way § 101 rejections are handled and that § 101 rejections are often set forth without adequate explanation. Applicants are often at the whim of the

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exclusive machine-or-transformation test, we by no means foreclose the Federal Circuit's development of other limiting criteria that further the purposes of the Patent Act and are not inconsistent with its text.").

409. *Where Do We Stand One Year After Alice?*, LAW360 (Jun. 17, 2015 8:27 PM), http://www.law360.com/articles/668773/where-do-we-stand-one-year-after-alice (reporting a statement of Robert M. Barrett).

410. *Id.* (reporting a statement of Padmaja Chinta).

411. *Id.* (reporting a statement of Brian Dunne).

412. *Id.* (reporting a statement of Barry S. Goldsmith).

413. *Id.* (reporting a statement of Hiroyuki Hagiwara).

414. *Id.* (reporting a statement of Herbert D. Hart III).

415. *Id.* (reporting a statement of Steven Wong).

> particular examiner, which can lead to significant variance and unpredictability of prosecution."[416]

The outcry for more clarity and guidance, regarding the governing test for eligibility in particular, has been deafening. Indeed, one of the most significant problems with the current approach to patent eligibility is its lack of administrability.[417]

V. PERVERSE IMPACT

Ironically, while the underlying policies have been confused and the proper analysis of patent eligibility under the Supreme Court's recent precedent lacks administrability, the result of all this confusion is seemingly clear: the result seems to be that, when challenged, patent applications and issued patents in certain technology areas (software and biotechnology most prominently) probably do not satisfy the requirement of eligibility. This is beause of the two overarching problems with the current test governing eligibility, the unfettered access the test provides to the smorgasbord of supporting policies justifying different limits on patentability, and the test's subjective nature. At least it is the perception that that these patent applications and patents do not satisfy the requirement of eligibility. We are not quite to the point where we could say, as Justice Jackson quipped in the context of U.S. patent law's now-discredited "invention" requirement, that "the only patent that is valid is one which [the Supreme] Court has not been able to get its hands on."[418] After all, the Supreme Court did find for the patent owner on the issue of eligibility—at least in part—in one of the four cases it heard in the past six years on point.[419] Application of the

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416. *Id.* (reporting a statement of Steven Wong).

417. Given the Supreme Court's recent denial of certiorari in *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*—a case in which the Federal Circuit cried out for guidance—it seemingly falls upon the Federal Circuit alone to somehow create an administrable framework for eligibility. *See* Sequenom, Inc. v. Ariosa Diagnostics, Inc., 136 S. Ct. 2511 (2016) (denying certiorari).

418. Jungerson v. Ostby & Barton Co., 335 U.S. 560, 572 (1949) (Jackson, J., dissenting).

419. *Compare* Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347, 2360 (2014) (finding claims ineligible); Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1305 (2012) (same); Bilski v. Kappos, 561 U.S. 593, 611–12 (2010) (same) *with* Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 133 S. Ct. 2107 (2013) (finding some claims ineligible and some claims eligible).

Supreme Court's eligibility test by lower courts, however, has been more stark.

A. The Impact of the Supreme Court's Recent Cases on Lower Court Decisions

In the first year after *Alice*, the Supreme Court's last decision on patent eligibility, the Federal Circuit invalidated every set of patent claims challenged as ineligible in twelve of its thirteen opinions on point.[420] The high rate of invalidations might be explained by pointing to incorrect decisions by patent examiners to grant these patents. In other words, one explanation is that there has been a clearing of the deck of patents that never should have been issued in the first place.

Beyond the high rate, however, consider one of the most shocking examples of invalidations based on the Supreme Court's two-part test of ineligibility. Indeed, perhaps the best example of how far the Supreme Court went off the rails, at least in terms of putting in place a test that causes an absurd result, is the case of *Ariosa v. Sequenom*.[421] The patent at issue in the case covered a new method for "prenatal diagnosis of fetal DNA that avoids the risks of widely-used techniques that took samples from the fetus or placenta."[422] In particular, the inventors "discovered cell-free fetal DNA ('cffDNA') in maternal plasma and serum, the portion of maternal blood samples that other researchers had previously discarded as medical waste."[423] Given that cffDNA can be used to determine fetal characteristics, such as gender and Down's Syndrome, the inventors "implemented a method for detecting the small fraction of paternally inherited cffDNA in maternal plasma or serum."[424] This novel, non-obvious process had significant medical benefits given both the ability of doctors to make prenatal diagnoses as well as the non-invasive nature of the process.[425]

The Federal Circuit, however, affirmed a finding of invalidity of the claims at issue under the Supreme Court's two-part test from

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420. *See supra* note 20. Even in the lone exception, *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1248 (Fed. Cir. 2014), the Federal Circuit judges split 2-1. *Id.* at 1263–66 (Mayer, J., dissenting).

421. Ariosa Diagnostics, Inc. v. Sequenom, Inc., 788 F.3d 1371 (Fed. Cir. 2015).

422. *Id.* at 1373.

423. *Id.*

424. *Id.*

425. *See id.* at 1376.

Mayo. Applying the first part of the test, the court noted that "[it] is undisputed that the existence of cffDNA in maternal blood is a natural phenomenon."[426] The court then held that "[t]he method . . . begins and ends with a natural phenomenon. Thus, the claims are directed to matter that is naturally occurring."[427] Applying the second part of the test, the court "conclude[d] that the practice of the method claims does not result in an inventive concept that transforms the natural phenomenon of cffDNA into a patentable invention."[428] On this point, the Federal Circuit cited Supreme Court precedent for the proposition that "process claims encompass[ing] natural phenomena" must include steps beyond the natural law that are "new and useful."[429] Unfortunately for the patent owner, the additional steps in the claims beyond those describing the newly-discovered natural phenomena were not new; they were "well-understood, routine, and conventional activity."[430] As a result, the Federal Circuit held the claims invalid as ineligible.[431]

Judge Linn's concurring opinion focused on the absurdity of the holding. He joined the court's opinion only because he felt "bound by the sweeping language of the test set out in *Mayo*."[432] He pointed out that "the breadth of the second part of the test was unnecessary to the decision reached in *Mayo*."[433] In more detail, Judge Linn's problem with the second part of the test was that it represented a "blanket dismissal of conventional post-solution steps."[434] In his own words, "[t]his case represents the consequence—perhaps unintended—of that broad language in excluding a meritorious invention from the patent protection it deserves and should have been entitled to retain."[435] He pointed out that the invention here eliminated the need for invasive measures and their attendant risks to mothers and pregnancies, reduced the time and expensive equipment necessary to make prenatal diagnoses, and increased accuracy of those diagnoses.[436] He cited evidence that the invention was "groundbreaking," received praise from experts in the field,

426. *Id.*
427. *Id.*
428. *Id.*
429. *Id.* at 1377.
430. *Id.*
431. *Id.* at 1380.
432. *Id.*
433. *Id.*
434. *Id.* at 1381.
435. *Id.* at 1380.
436. *Id.* at 1381.

represented "a paradigm shift in non-invasive prenatal diagnosis," and had been introduced successfully into the market by the inventors.[437] Importantly, he restated the traditional legal reason the claims should be found to be eligible: "Sequenom 'effectuate[d] a practical result and benefit not previously attained,' so its patent would traditionally have been valid."[438] He concluded his opinion by remarking: "But for the sweeping language in the Supreme Court's *Mayo* opinion, I see no reason, in policy or statute, why this breakthrough invention should be deemed patent ineligible."[439]

Judge Linn's focus on the fact that the claimed invention "effectuated a practical result and benefit not previously attained" demonstrates the appropriate application of the subject matter and utility requirements, the two patentability requirements that collectively form the eligibility requirement of § 101. Sequenom's claimed invention meets the subject matter requirement because the claims at issue describe processes that include steps that were created by or are the result of human effort. Claim 1, for example, requires "amplifying a paternally inherited nucleic acid from the serum or plasma sample" and "detecting the presence of a paternally inherited nucleic acid of fetal origin in the sample."[440] Regardless of whether these process steps were conventional, they represent human effort, and thus satisfy the subject matter requirement. Likewise the claimed invention meets the utility requirement because the inventors disclosed in their patent specification practical applications of the newly-discovered natural phenomenon. Claim 1, for example, describes "detecting the presence of a paternally inherited nucleic acid of fetal origin in the sample,"[441] and the specification describes the benefits of this particular step of the claimed invention as allowing for non-invasive prenatal (1) sex determination and (2) detection of paternally-inherited diseases, including Down's Syndrome.[442] It is the combination of the subject

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437. *Id.*

438. *Id.* (citing Le Roy v. Tatham, 63 U.S. 132, 135–36 (1859) (quoting Household Coal & Iron Co. v. Neilson, Webster's Patent Case 673, 683 (House of Lords 1843)); Le Roy v. Tatham, 55 U.S. 156, 175 (1852) (same); Lefstin, *supra* note 120).

439. *Ariosa*, 788 F.3d at 1381.

440. *Id.* at 1374 (reciting limitations from Claim 1 of U.S. Patent No. 6,258,540).

441. U.S. Patent No. 6,258,540, col. 23, ll. 60–67.

442. *Id.* at col. 4, l. 19–col. 5, l. 53 (sex determination); col. 3, ll. 25–52 (Down's Syndrome); col. 5, l. 54–col. 8, l. 49 (aneuploidy pregnancies, which include Down's Syndrome).

matter and utility requirements that effectively screens claimed inventions for eligibility.[443]

Another case illustrating how off the rails the eligibility analysis has gone is *Thales Visionix, Inc. v. United States*.[444] In this case, the Court of Federal Claims concluded that the claim at issue was ineligible for patenting because it was directed to an abstract idea, despite the facts that (1) the claimed invention was a system that included limitations requiring sensors to be mounted on an object and a reference frame; and (2) the claimed invention involved determining an orientation of an object relative to a moving reference frame based on signals received from the sensors.[445] The court, applying the first part of the two-part test of *Alice*, concluded that "the claims are directed to the abstract idea of tracking two moving objects, and incorporate laws of nature governing motion, both of which are ineligible for patent protection."[446] Then, applying the second part of the two-part test, decided that "[a]lthough the concept of tracking the motion of a moving object relative to a moving reference frame may have been novel and nonobvious, the claimed system does nothing to ground this abstract idea in a specific way."[447]

The court's analysis represents just how far courts have strayed from analyzing patents using traditional patentability and specification requirements. Indeed, any problem with respect to the claim at issue in *Thales Visionix* in truth had nothing to do with ineligibility. The alleged problem—that the claimed system did not "ground this abstract idea in a specific way"—related to the fact that the claim itself did not include the particular algorithm to determine the orientation of the object. Thus, the alleged problem should have been addressed using the enablement requirement, which would have asked whether the specification provided enabling support for

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443. The combination of these requirements eliminates the eligibility of claims to mathematical equations or expressions of relationships. Take as a first example a claim to an equation, for example Albert Einstein's theory of special relativity, E = mc2. Besides failing to fall into any subject matter category listed in § 101, such a claim fails to involve any human effort. As a second example consider a claim to making a calculation using the equation and printing the result of the calculation. While now the claim is to an enumerated category (a process) and involves human effort (making the calculation and printing the result of the calculation), the claimed invention does not have any practical utility.

444. Thales Visionix, Inc. v. United States, 122 Fed. Cl. 245 (Fed. Cl. 2015).

445. *See id.* at 249.

446. *Id.* at 252.

447. *Id.* at 253.

the full scope of the claim. The claim at issue, moreover, may have been subject to analysis using § 112(f), given that the limitation at issue ("an element. . . configured to determine an orientation of the object relative to the moving reference frame based on the signals received from the first and second inertial sensors") arguably represents a means-plus-function limitation. Relatedly, any such means-plus-function limitation may have been indefinite pursuant to § 112(b). Thus, this case highlights how courts have extended the *Alice* test unnecessarily to invalidate patent claims without using the well-developed, objective tests provided by traditional patent law doctrines.

B. Reduced Incentives to Invest in Research and Development

Given the expansive application of the Supreme Court's test to invalidate claims like those in *Ariosa* in particular, a resulting concern is that the current environment substantially reduces incentives to invest in research and development, particularly in the biotechnology and software technology areas. If the prevailing perception is that, because of the eligibility requirement, patents will not be available to protect inventions, individuals and companies may not invest efficiently in research and development. And this is the prevailing perception.

Consider, first, the views of some of the former leaders of the very government institutions Congress created to create the appropriate incentives for invention, the Federal Circuit and the USPTO. Paul Michel, a former Chief Judge of the Federal Circuit, has expressed dismay with the Supreme Court's approach and its effect on inventors and investors. He has explained, in particular, that "'[a]bstractness' is a vague and subjective notion that has proven entirely unworkable, and unavoidably yields inconsistent and unpredictable results" for all involved, including examiners, judges, and patent attorneys, as well as the "inventors, business leaders, and investors who need to interpret the law when making decisions about investing in patents."[448] Likewise, David Kappos, a former Director of the USPTO, has criticized the Supreme Court's recent decisions precisely because of a "risk to innovation: that [the Court's recent] discriminatory jurisprudence will lead to a lack of faith in the patent system's ability to protect certain categories of innovation, sapping investment in the very fields that hold the most promise of

448. Brief of Amicus Curiae Paul R. Michel in Support of Neither Party, Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347 (2014) (No. 12-298), 2014 WL 295767.

propelling us toward the exciting discoveries of tomorrow."[449] As he explained, "[w]hen courts and the USPTO take the 'I know it when I see it' approach to Section 101 jurisprudence, businesspeople, investors and innovators will allocate resources away from innovation in those industries that are perceived to fall on the wrong side of the fence."[450] As another example from the USPTO, Robert Stoll, a former Commissioner of the USPTO, has stated that the Supreme Court's approach "will drive investment into research in these technologies to other areas. We will lose our edge in the world and many further valuable contributions to science will not come to fruition."[451]

Also consider the views of active Federal Circuit judges who, given their inferior status relative to the Supreme Court, seem less likely to comment negatively on the Supreme Court's approach. We have already seen that Judge Linn has expressed dismay with the Supreme Court's two-part test for eligibility.[452] He would focus on the presence or absence of a "practical result and benefit not previously attained."[453] Judges Lourie and Moore have likewise expressed the view that the Supreme Court's two-part test incorrectly excludes certain claims from patent eligibility.[454] They would (1) exclude *exact* statements of natural laws but not "methods that *utilize* laws of nature" or "actual" and "practical uses" of

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449. David Kappos, *Over-Reliance on Section 101 Puts Innovation at Risk*, LAW.COM (May 7, 2015), http://www.law.com/sites/lawcomteam/2015/05/07/over-reliance-on-section-101-threatens-innovation/?slreturn=20150704135508.

450. *Id.*

451. Robert L. Stoll, *Courts are making bad patent law*, THE HILL (Jul. 16, 2015), http://thehill.com/blogs/pundits-blog/the-judiciary/248054-courts-are-making-bad-patent-law. *See also* Gene Quinn, *A Patent Eligibility in Crisis: A Conversation with Bob Stoll*, IPWATCHDOG (Oct. 10, 2014), http://www.ipwatchdog.com/2014/10/10/a-patent-eligibility-in-crisis-a-conversation-with-bob-stoll/id=51616 ("I think we are in a very confusing state at the moment. I think that the courts are actually undermining patent eligibility in many different areas.").

452. *See supra* text accompanying notes 432–443.

453. Ariosa Diagnostics, Inc. v. Sequenom, Inc., 788 F.3d 1371, 1381 (Fed. Cir. 2015).

454. Ariosa Diagnostics, Inc. v. Sequenom, Inc., 809 F.3d 1282, 1287 (Fed. Cir. 2015) (Lourie, J., concurring in the denial of the petition for en banc rehearing) ("In sum, it is unsound to have a rule that takes inventions of this nature out of the realm of patent-eligibility on grounds that they only claim a natural phenomenon plus conventional steps, or that they claim abstract concepts. But I agree that the panel did not err in its conclusion that under Supreme Court precedent it had no option other than to affirm the district court.") (joined by Moore, J.).

physical phenomena;[455] and (2) exclude "essentially mental steps" but not methods including "physical, and not insignificant, steps *requiring human intervention*."[456] Finally, Judge Newman, while taking the unique position among all of the Federal Circuit judges that the Supreme Court's precedent does not prohibit the correct test for eligibility, would similarly ask whether "science is put to practical use."[457] These judges have thus coalesced around the idea that patent eligibility merely requires a practical application of a natural law, physical phenomena, or idea.

What is perhaps just as remarkable is that Judge Dyk—with Judge Mayer, one of the only Federal Circuit judges to indicate something positive about *Mayo* and *Alice*—even thinks that the Supreme Court's two-part test for eligibility is wrong as a matter of policy.[458] He sums up the policy concern of all of these judges, at least in the context of biotechnology:

> I share the concerns of some of my colleagues that a too restrictive test for patent eligibility under 35 U.S.C. § 101 with respect to laws of nature (reflected in some of the language in *Mayo*) may discourage development and disclosure of new diagnostic and therapeutic methods in the life sciences, which are often driven by discovery of new natural laws and phenomena.

As exemplified by Judge Dyk, the disagreement of these Federal Circuit judges with the Supreme Court's two-part test for eligibility is rooted in concern with the very purpose of the patent system—the

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455. *See id.* at 1286.

456. *Id.* at 1285–86.

457. *Id.* at 1293 (Newman, J., dissenting from the denial of en banc rehearing) ("I agree with my colleagues that this case is wrongly decided. However, I do not share their view that this incorrect decision is required by Supreme Court precedent. . . . In *Mayo* . . . the Court recognized the principle that patent eligibility is not disabled when science is put to practical use.").

458. *See id.* at 1287 (Dyk, J., concurring in the denial of en banc rehearing) ("In my view the framework of *Mayo* and *Alice* is an essential ingredient of a healthy patent system, allowing the invalidation of improperly issued and highly anticompetitive patents without the need for protracted and expensive litigation. Yet I share the concerns of some of my colleagues that a too restrictive test for patent eligibility under 35 U.S.C. § 101 with respect to laws of nature (reflected in some of the language in *Mayo*) may discourage development and disclosure of new diagnostic and therapeutic methods in the life sciences, which are often driven by discovery of new natural laws and phenomena.").

encouragement of investment in research and development, resulting in the identification and disclosure of new and useful applications of natural laws, physical phenomena, and ideas.

Beyond these former and current leaders of the Federal Circuit and USPTO, numerous patent practitioners have expressed similar views concerning the effect of the Supreme Court's approach in *Mayo* and *Alice* on investment in research and development:

- "If *Alice* is applied as it has been, then investors may well take a step back and wonder what the point is of investing in new software innovations. . . . Without the ability to patent their inventions, such developers will necessarily retreat to trade secret protection. The end result will be a dramatic reduction in information sharing, publication and cooperation. Funding sources will also dry up as investors who already struggle with patents will find valuing a trade secret portfolio (discounted by the problems in protecting and scaling such businesses) impossible to sell to their investment committees."[459]
- "[T]he value of, and investment in, first mover companies in the software and business method arts will continue to decrease."[460]
- "Perhaps many who believe that the patent system stifles innovation or denies access to basic discoveries celebrate this trend. However, many others who work in high technology industries are confronted with uncertainty that only serves to dampen the substantial investments needed to develop new technologies."[461]
- "Will investors continue to be as willing to take a chance on early stage innovators that are expecting to protect their innovations with patents? Only time will tell."[462]

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459. Chris Donegan, *Alice in patent land: investment strategy in a post-Alice world*, LEXOLOGY (Oct. 8, 2014), http://www.lexology.com/library/detail.aspx?g=47df823c-1251-4ffe-a21c-ce2bf4ae3789.

460. *Where Do We Stand One Year After Alice?*, LAW360 (Jun. 17, 2015 8:27 PM), http://www.law360.com/articles/668773/where-do-we-stand-one-year-after-alice (reporting a statement of Richard Baker).

461. *Id.* (reporting a statement of David L. Suter).

462. *Id.* (reporting a statement of Jaime A. Siegel).

Each of these quotations highlights a perception that the Supreme Court's approach to the question of patent eligibility has had a negative effect on investment in research and development.

Given the confusion, lack of administrability, and risk of reduced investment in research and development—particularly given the invalidation of an invention so clearly meritorious as the one in *Ariosa*—I come to a similar conclusion as Bernard Chao: "With the [USPTO] rejecting applications on potentially life-saving inventions, it is time to reconsider what should and should not be patent-eligible. Many inventions that use laws of nature, natural phenomena and abstract ideas should still be patentable."[463] Congress should amend the patent statute to eliminate the current crisis.

CONCLUSION

Shortly after enactment of the Patent Act of 1952, Dean O.S. Colclough of the George Washington School of Law stated that the patent law community (patent law practitioners, professors, and leaders of the relevant government agencies) ought to be vigilant that courts might confuse patent law.[464] In 1953, he cautioned that "the same problems of keeping debris from collecting around the law faces us today as faced us before the 1952 Act. And with old debris cleared away there is more room for new debris to collect."[465] He "emphasize[d] the necessity for maintaining a high order of vigilance so that the law will not re-collect the granite-like . . . incrustations of a type which statutes have a habit of forming about themselves when the people do not understand or are no longer concerned with adequate understanding of them."[466] "[O]ur basic problem to further improve, to understand, to teach, to guard and preserve the system is still with us."[467] New debris (the two-part test put forward in *Mayo*) and granite-like incrustations (consider the Court's doubling down on that test in *Alice*) have collected as a result of the Supreme Court's recent treatment of the law governing patent eligibility, treatment that reflects a lack of understanding of the relevant

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463. Bernard Chao, *USPTO Is Rejecting Potentially Life-Saving Inventions*, LAW360 (Dec. 18, 2014, 11:05 AM), http://www.law360.com/articles/604808/uspto-is-rejecting-potentially-life-saving-inventions.

464. *See* O.S. Colclough, *A New Patent Act—But the Same Basic Problems*, 35 J. PAT. OFF. SOC'Y 501, 511 (1953).

465. *Id.* at 508.

466. *Id.* at 510.

467. *Id.* at 511.

statutory provisions, precedent, and policies already undergirding the patent statute. As a result, the time has come, like in 1952, to clear away the debris; the time has come for Congress to amend the patent statute to resolve the present crisis of confusion.