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## Irrational Science Breeds Irrational Law

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# IRRATIONAL SCIENCE BREEDS IRRATIONAL LAW

## ABSTRACT

*Current jurisprudence regarding the subject matter eligibility requirement for patents relies upon outdated assumptions in both philosophy of science and the scientific endeavor itself. In relying upon these assumptions, the Supreme Court, especially in its recent decisions covering biotechnology and computer software, has given the arguably more technocratic lower federal court judges a confusing and unworkable test. Scholars have proposed new approaches on subject matter eligibility, urging courts to revisit and revitalize other areas of the patentability analysis: utility and the written description requirement. While these arguments adeptly characterize some solutions to the current predicament, they do so without utilizing the full armament available to them.*

*This Comment proposes that by instead viewing the problems with modern jurisprudence as a misunderstanding in the realm of philosophy of science, the lens provided by Thomas Kuhn in *The Structure of Scientific Revolutions* clarifies such arguments against the Supreme Court's "inventive step" analysis. Kuhn's paradigm model of scientific revolutions gives further precision to what a patent should be, what the patent system should do, and where the Court's problems with subject matter eligibility go wrong. Essentially, the scientific endeavor is not and has never been linear. Instead, each discovery within a paradigm, such as Newton's *Laws of Motion*, serves a purpose within that paradigm, but is incommensurate with earlier or later paradigms, such as Einstein's *General Relativity*. Therefore, there are no "laws of nature" with which the Supreme Court concerns itself. There is only empirical data, rising out of and belonging solely within the paradigm from which it arose.*

*Application of such a theory to modern biotechnology and computer software patents shows that an exceedingly fine subject matter eligibility filter is unworkable. Instead, this Comment argues that the Supreme Court should discard the inventive step model from the last several years and focus, as some lower courts have already done, on using other areas of the patentability analysis, such as the utility and the written description requirements. These latter areas better approximate the scientific endeavor because they align themselves more closely with Kuhn's descriptive model, focusing on the useful problem-solving roles of scientists.*

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## INTRODUCTION

The last twenty or thirty years have revealed an ongoing identity crisis for patent law. Some have correctly labeled this a problem with “audience”<sup>1</sup>—that patent law jurisprudence has forgotten the intended target of clear rules. Yet this development is unsurprising. Patent law is a constitutionally based<sup>2</sup> system devised by a democratically elected Congress and interpreted by indirectly appointed life-term officials with no required background in the technical arts, aimed at promoting innovation among disparate types of research entities. It is therefore difficult to expect clear communication or rules in such an arena, considering not only the sheer number of players involved, but the diverse interests and backgrounds brought to the table.

However, developments in the philosophy of science in the 1900s have given some clarity as to why this disconnect occurs and how it might be fixed. The most prominent development was the widespread recognition that *simple scientific realism*<sup>3</sup>—the fairly widespread notion that the goal and nature of science is to uncover static truths about the physical world—is wrong, both prescriptively and descriptively.<sup>4</sup> Connected to this revolt against what has been called the “naïve view,”<sup>5</sup> some philosophers of science have deemed the scientific endeavor itself to be irrational; the scientific method is a normative construction with little descriptive purpose.<sup>6</sup> Not only is the scientific method

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<sup>1</sup> See Timothy R. Holbrook & Mark D. Janis, *Patent-Eligible Processes: An Audience Perspective*, 17 VAND. J. ENT. & TECH. L. 349, 358 (2015) [hereinafter Holbrook & Janis, *An Audience Perspective*] (arguing that an “eligibility-as-king” type of analysis as presented in *Mayo*, *Alice*, and recent cases does not correctly consider the audience of patent law—the community of inventors); see also J. Jonas Anderson, *Patent Dialogue*, 92 N.C. L. REV. 1049 (2014) (examining the relationship between the Supreme Court and Congress in the area of patent law); Timothy R. Holbrook & Mark D. Janis, *Patent Law’s Audience*, 97 MINN. L. REV. 72 (2012) (arguing that patent law should be tailored to its intended audience).

<sup>2</sup> “[The Congress shall have Power] To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries . . .” U.S. CONST. art. I, § 8, cl. 8.

<sup>3</sup> See PETER GODFREY-SMITH, *THEORY AND REALITY: AN INTRODUCTION TO THE PHILOSOPHY OF SCIENCE* 173 (2003) (describing the tension between the intuitive view that science uncovers real truths about the world as opposed to other theories of science, which do not view the world as a static set of facts to be discovered).

<sup>4</sup> See *infra* Section II.B.2.

<sup>5</sup> See GODFREY-SMITH, *supra* note 3, at 175 (“[I]f we sever scientific realism from common-sense realism, it becomes hard to formulate a general claim about how the aim of science is to describe the real world.”). Even if such a view were true, would it serve us any legitimate purpose? See THOMAS S. KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* 170 (1962) (“Does it really help to imagine that there is one full, objective, true account of nature and that the proper measure of scientific achievement is the extent to which it brings us close to that ultimate goal?”).

<sup>6</sup> See HENRY BAUER, *SCIENTIFIC LITERACY AND THE MYTH OF THE SCIENTIFIC METHOD* 39 (1992) (arguing that the scientific method should be seen as an “admittedly unattainable ideal—not as a description of

virtually nonexistent in practice, but its consistent presence in the popular view of science has resulted in poorly devised law in areas including evidentiary standards,<sup>7</sup> administrative agency regulation,<sup>8</sup> and patents.

The arena most harmed by this inaccurate understanding of the scientific endeavor is patent law's subject matter eligibility criterion, which describes as patentable "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement."<sup>9</sup> Courts have turned many corners on what constitutes these patentable subjects, and recent jurisprudence has engendered confusion for both patentees and the patent office, especially in the fields of biotechnology and software.<sup>10</sup>

This Comment argues that patentable subject matter jurisprudence has been significantly harmed by naïve scientific realism, which insists upon, for example, the existence of true laws of nature and the infallibility and universality of the scientific method. Using the framework provided by Thomas Kuhn and other modern philosophers of science, this Comment examines several recent arguments for shifting courts' focus on patentable subject matter toward other eligibility criteria, such as the written description and utility requirements. The "eligibility-as-king"—focusing on subject matter restrictions over other patent criteria—trend has become restrictive and assumes a naïve view of scientific progress. This Comment concludes that by loosening the subject matter eligibility restriction and relying upon the other eligibility criteria, the jurisprudence can better match the scientific endeavor and resolve confusion in lower courts.

This Comment proceeds in three parts. Part I discusses current patent law jurisprudence, focusing on the increasing reliance upon subject matter eligibility by the Supreme Court, the wasting of the utility analysis, and the growing strength of the written description analysis. Part II summarizes

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actual practice"). Bauer does maintain that the method can be useful, but the "inadequacy of the classical view is not widely enough known" and it is important to recognize that "[t]he corpus of science at any stage always includes only what has, up until then, stood the test of time." *Id.* at 36.

<sup>7</sup> For example, the *Daubert* evidentiary standard stands in direct opposition to Thomas Kuhn's argument against simple scientific realism. See Edward Cheng, *Thomas S. Kuhn and Courtroom Treatment of Science Evidence*, 15 TEMP. EVTL. L. & TECH. J. 195, 198 (1996) ("[T]he *Daubert* standard requires the courts to do the impossible: that is, to directly evaluate the validity and reliability of science.").

<sup>8</sup> For a specific example of simple scientific realism negatively impacting administrative regulations, see Stephanie Tai, *When Natural Science Meets Dismal Science*, 42 ARIZ. ST. L.J. 949 (2010) (arguing that inconsistent views on scientific empiricism between courts has resulted in inconsistent application of the Commerce Clause and subsequently weaker environmental protections).

<sup>9</sup> 35 U.S.C. § 101 (2012).

<sup>10</sup> See *infra* note 12.

developments in the philosophy of science which have created a growing consensus that science does not proceed linearly and natural laws are paradigm-dependent. Part III presents recent arguments calling for a shift away from subject matter eligibility and towards utility and written description requirements, and concludes that the developments in philosophy of science particularly inform the necessary changes in patent law jurisprudence.

## I. CURRENT PATENT LAW JURISPRUDENCE

For an invention to be patent-eligible, the applicant must demonstrate to the U.S. Patent and Trademark Office (PTO) that the potential patent is (1) of the subject matter that ought to be covered by the patent system, (2) useful, (3) nonobvious to persons skilled in the art, (4) novel, and (5) sufficiently described and enabled by a written description.<sup>11</sup> Recently, advancements in biotechnology and information technology have created issues for the subject matter criterion, leading to confusing precedents and unpredictable judicial results.<sup>12</sup> Before discussing how the current law has become so muddled, it is first necessary to describe the history of three of the eligibility requirements. First, and most importantly to this discussion, the Court's focus on the subject matter eligibility criterion can be traced back to the 1970s, where the onset of biotechnology first created issues in determining what should classify as a true invention. Second, this Part discusses the utility requirement, as it serves a potential role in solving the problems with subject matter eligibility. Finally, this Part explores the written description requirement as a solution to issues wrought by current subject matter eligibility jurisprudence.

### A. Patentable Subject Matter

For the first two hundred years of the patent system, answering the question “what should be patentable?” was more straightforward: light bulbs,

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<sup>11</sup> See 35 U.S.C. §§ 101–103, 112. Section 101 covers the subject matter and utility requirements, and §§ 102 and 103 cover the novelty and obviousness requirements, respectively. The fifth requirement, a written description and enablement, is covered under § 112. These requirements are in addition to and, for our purposes, quite separate from administrative requirements such as payments to the patent office.

<sup>12</sup> See *infra* Section I.A.2. Plenty of lower court decisions post-*Alice* have confronted these issues, and no clear rules have arisen. Compare *Intellectual Ventures Inc. v. Capital One Fin. Corp.*, No. PWG-14-111, 2015 U.S. Dist. LEXIS 118817, at \*74 (D. Del. June 11, 2015) (finding “generic hardware and software running an intrusion detection application” not inventive or new), and *GT Nexus, Inc. v. Intra, Inc.*, No. C11-02145-SBA, 2015 WL 6747142, at \*6 (N.D. Cal. Nov. 5, 2015) (finding automation of “booking and tracking shipping containers . . . insufficient to transform the nature of the patents”), with *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1316 (Fed. Cir. 2016) (finding an algorithm for video game artificial facial construction to satisfy an inventive step).

car engines, cotton gins, and other mechanical inventions are clearly inventive applications of known science. But recently, with the advent of biotechnology and computer software in particular, a “fundamental philosophical divide . . . has crystallized at the [United States] Court of Appeals for the Federal Circuit,” between those who wish the subject matter criterion to be a coarse filter, “invoked in . . . extreme cases,” and those who take “patent-eligibility as the uber-doctrine of patentability.”<sup>13</sup> First, it is important to examine the background of this divide. Then, recent issues in the patentable subject matter criterion, especially as they arise in the cases of *Alice Corp. v. CLS Bank International*<sup>14</sup> and *McRO, Inc. v. Bandai Namco Games America Inc.*<sup>15</sup> will show how the jurisprudence has resulted in muddled and unpredictable determinations at both the Federal Circuit and the Supreme Court.

### 1. Background Until Alice and McRO

For over twenty years, the refrain “anything under the sun made by man” encapsulated the patentable subject matter requirement of 35 U.S.C. § 101.<sup>16</sup> However, this inquiry into whether the proposed invention or discovery is man-made misplaces the original, and current, goal of § 101: preemption. In the context of patent law, preemption refers to a patent which covers an object or process so fundamental that a whole field of study is closed off, or preempted, by the restrictive power of patent ownership.<sup>17</sup> The *Diamond v. Chakrabarty*<sup>18</sup> line of questioning resulted in confusing precedent that can be seen in *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*<sup>19</sup> and *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*,<sup>20</sup> although in those decisions the Court moved toward the more recent “inventive step” analysis.<sup>21</sup>

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<sup>13</sup> Holbrook & Janis, *An Audience Perspective*, *supra* note 1, at 352.

<sup>14</sup> 134 S. Ct. 2347 (2014).

<sup>15</sup> *McRO*, 837 F.3d 1299.

<sup>16</sup> *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (first citing S. REP. NO. 1979, at 5 (1952); then citing H.R. REP. NO. 1923, at 6 (1952)); *see also* Peter Yun-hyoung Lee, *Inverting the Logic of Scientific Discovery: Applying Common Law Patentable Subject Matter Doctrine to Constrain Patents on Biotechnology Research Tools*, 19 HARV. J.L. TECH. 79, 82 (2005) (describing *Diamond* as the “most influential contemporary statement of patentable subject matter doctrine”).

<sup>17</sup> *See Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 556 U.S. 66, 72 (2012) (discussing patent claims which “preempt the use of a natural law” and thereby shut down later innovations) (first citing *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972); then citing *Whitman v. Morse*, 56 U.S. 62, 112–20 (1853)).

<sup>18</sup> 447 U.S. at 309.

<sup>19</sup> *See* 569 U.S. 576 (2013).

<sup>20</sup> *See Mayo*, 556 U.S. 66.

<sup>21</sup> *Myriad*, 569 U.S. at 590–91 (differentiating between the ineligible discovery of a “location” of a gene, which Myriad tried to patent, from a “product of invention,” which would be eligible); *Mayo*, 556 U.S.

The problematic inventive step jurisprudence has centered around two cases: *Mayo* and *Alice Corp. v. CLS Bank International*.<sup>22</sup> *Mayo*, a 2012 case, presented the modern conception of § 101's description of patents as a "new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."<sup>23</sup> In *Mayo*, as it had in *Diamond*, the Court explicitly excepted "laws of nature, natural phenomena, and abstract ideas" from patentability.<sup>24</sup> The Court has been quick to cite Einstein's law of  $E=mc^2$  and Newton's Laws of Motion, arguing that such items are "[p]henomena . . . [and therefore] are not patentable, as they are the basic tools of scientific and technological work."<sup>25</sup> A goal of the patent-law system is to promote the "[p]rogress of [s]cience,"<sup>26</sup> and a patent granted too early in the life of a new scientific area hurts downstream innovations.<sup>27</sup>

The Court then developed a new test for patentable subject matter in *Mayo*, saying that a patent must claim "significantly more than a patent upon the natural law itself."<sup>28</sup> Specifically, a step must be taken so that the patent claims "do more than simply state the law of nature while adding the words 'apply it.'"<sup>29</sup> Only a year later, in 2013, the Court decided against the patentability of a computer algorithm in *Alice*.<sup>30</sup> This pair of decisions led to a significant downturn in patent infringement cases the following year due to fears that an asserted patent would be found invalid.<sup>31</sup>

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at 72–73 (resting its decision on earlier cases which "insist that a process that focuses upon the use of a natural law also contain other 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 *Parker v. Flook*, 437 U.S. 584, 598 (1978))).

<sup>22</sup> 134 S. Ct. 2347 (2014); *Mayo*, 556 U.S. 66.

<sup>23</sup> 35 U.S.C. § 101 (2012); *Mayo*, 566 U.S. at 70.

<sup>24</sup> *Mayo*, 566 U.S. at 70 (citations omitted). More specifically, this excepts the above from the "anything under the sun" rule from *Diamond*. See *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (first citing S. REP. NO. 1979, at 5 (1952); then citing H.R. REP. NO. 1923, at 6 (1952)) ("Congress intended statutory subject matter to 'include anything under the sun that is made by man.'").

<sup>25</sup> *Mayo*, 566 U.S. at 71 (citing *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)); see also *Diamond*, 447 U.S. at 309 ("Likewise, Einstein could not patent his celebrated law that  $E=mc^2$ ; nor could Newton have patented the law of gravity.").

<sup>26</sup> U.S. CONST. art. I, § 8, cl. 8.

<sup>27</sup> For a more detailed analysis of the major harms caused by patenting upstream innovations, see Daniel J. Gervais, *The Patent Target*, 23 FED. CIR. B.J. 305 (2013). Gervais groups the harms into (1) "Reduced Creativity in the Use/Development of the Invention," (2) "the erosion of the scientific norm" of free-flowing ideas through universities, and (3) "Impact on Developing Countries." *Id.* at 330, 337, 342.

<sup>28</sup> *Mayo*, 556 U.S. at 73 (citing *Parker v. Flook*, 437 U.S. 584, 594 (1978)).

<sup>29</sup> *Id.* at 72 (citing *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972)).

<sup>30</sup> *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347 (2014).

<sup>31</sup> *Cf.* Press Release, Lex Machina, Lex Machina Releases Annual Patent Litigation Year in Review Report (Mar. 16, 2016), <https://lexmachina.com/media/press/2015-patent-litigation-year-in-review-report/>

## 2. *Alice and McRO: The Fight over Algorithms*

In further elucidating the meaning of § 101, it is helpful to examine a few recent court cases considering the patenting of computer algorithms, primarily *Alice* and *McRO*. *Alice* presented a narrowing of *Mayo*'s two-step test, clearly laying out that the first step in the analysis is to ask whether the patent is “directed to a patent-ineligible concept.”<sup>32</sup> The Court explained these concepts as “abstract idea[s],” something long-deemed non-patentable due to preemption concerns, although the Court refrained from making the connection to preemption until the second step of the analysis.<sup>33</sup> Turning to the facts of the case, the Court found an algorithm for risk-hedging calculations to be drawn to an abstract idea because of its similarities to a risk-hedging concept that the Federal Circuit found to be abstract in *In re Bilski*,<sup>34</sup> but declined to elaborate further on the nature of an abstract idea.<sup>35</sup> Oddly, the Court found pertinent the fact that the *Bilski* reasoning rested on the idea being “fundamental economic practice”—which sounds like a preemption analysis despite the lack of lip service.<sup>36</sup>

The second step of the *Alice* framework<sup>37</sup> calls for the court to examine the claim for an “inventive concept sufficient to transform the claimed idea into a patent-eligible application.”<sup>38</sup> Here, the Court does explicitly reference preemption as a factor, reinstating the long-forgotten goal of subject matter eligibility to protect downstream innovations from upstream patents.<sup>39</sup> In *Alice*,

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(finding a 15% increase in patent cases filed between 2014 and 2015, but noting that fewer cases were filed in 2015 than in 2013).

<sup>32</sup> *Alice*, 134 S. Ct. at 2355.

<sup>33</sup> *Id.* at 2356. “This conclusion accords with the pre-emption concern that undergirds our § 101 jurisprudence.” *Id.* at 2358.

<sup>34</sup> *Bilski v. Kappos*, 561 U.S. 593, 611 (2010).

<sup>35</sup> *See Alice*, 134 S. Ct. at 2357.

<sup>36</sup> *Id.*; *Bilski*, 561 U.S. at 611.

<sup>37</sup> Because *Alice* has caused the greatest uproar with its formulation, I will subsequently call this framework the “*Alice* framework,” even though the initial steps were set forth in *Mayo*.

<sup>38</sup> *Alice*, 134 S. Ct. at 2357 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72, 79 (2012)).

<sup>39</sup> I borrow the terms “downstream” and “upstream” from DNA sequencing litigation. *See, e.g.*, *Biogen, Inc. v. Amgen, Inc.*, 18 F. Supp. 2d 105, 107 n.6 (D. Mass. 1998) (“‘Downstream’ simply refers to the direction in which the sequence of the base components of the nucleotides is read, left to right being ‘downstream,’ right to left being ‘upstream.’”). Lower courts have sometimes referred to these upstream patents as “essential patents”—those that are “incorporated into a standard” and therefore hold significant blocking power in the market. *See, e.g.*, *Research in Motion Ltd. v. Motorola, Inc.*, 644 F. Supp. 2d 788, 790 (N.D. Tex. 2008) (“The term ‘essential patents’ refers to patents that are essential to a standard . . . . Once a patent becomes an essential patent, it gains undue significance as a result.”).

the Court found that the patent failed under the second step.<sup>40</sup> Finding otherwise would “eviscerate the rule” concerning *Myriad*’s exceptions, and would allow for the blocking of downstream innovations: everyone uses business settlements, so a patent on the act of computerizing a settlement calculation would stymie growth in the field.<sup>41</sup> Since *Alice*, lower courts have consistently invalidated patents related to software under § 101,<sup>42</sup> leading some to call the *Alice* test the death knell for such patents.<sup>43</sup>

After *Alice*, but before *McRO*, the Federal Circuit decided the case of *DDR Holdings, LLC v. Hotels.com*.<sup>44</sup> This case highlights how confusing an application of the *Alice* test can be. It also reflects the ability of the Federal Circuit to rest the analysis on the type of problem being addressed in the industry, as opposed to an analysis that looks to the type of solution.<sup>45</sup> In *DDR Holdings*, the court upheld the patentability—despite subject matter concerns—of “systems and methods of generating a composite web page” with many features pertinent to “host” websites.<sup>46</sup> Even though the claim was found to be directed to an abstract idea,<sup>47</sup> the court found that under the second step of *Alice*, the claims “[did] not merely recite the performance of some business practice . . . along with the requirement to perform it on the Internet.”<sup>48</sup> Much of the argumentative legwork is done by the idea that the “claimed solution

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<sup>40</sup> See *Alice*, 134 S. Ct. at 2358 (holding that “mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention”). The patents at issue in *Alice* covered an automated “scheme for mitigating ‘settlement risk’” by creating shadow records throughout the transaction to ensure that both parties perform the exchange. *Id.* at 2352.

<sup>41</sup> See *id.* at 2358 (quoting *Mayo*, 566 U.S. at 77) (finding that “generic computer implementation” provides no “practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself”).

<sup>42</sup> See Timothy B. Lee, *Software Patents Are Crumbling, Thanks to the Supreme Court*, VOX (Sept. 12, 2014, 3:50 PM), <http://www.vox.com/2014/9/12/6138483/software-patents-are-crumbling-thanks-to-the-supreme-court>.

<sup>43</sup> See *CLS Bank Int’l v. Alice Corp.*, 717 F.3d 1269, 1313 (Fed. Cir. 2013) (en banc) (Moore, J., dissenting in part), *aff’d*, 134 S. Ct. 2347 (2014).

<sup>44</sup> *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014).

<sup>45</sup> Recall, however, that the Supreme Court specifically delineated laws of nature and abstract ideas as patent ineligible. This makes the sudden focus on looking at the problem solved in the industry rather jarring.

<sup>46</sup> *DDR Holdings*, 773 F.3d at 1248. Inputs from customers into the program “may combine the logo, background color, and fonts of the host website.” *Id.*

<sup>47</sup> *Id.* at 1257. Importantly, the court notes that “identifying the precise nature of the abstract idea is not as straightforward as in *Alice*” especially due to “syndicated commerce on the computer using the Internet.” *Id.*

<sup>48</sup> *Id.* The court is drawing a clear parallel to *Alice*’s argument that one cannot simply perform a calculation on the computer instead of on paper to make it patent eligible. Some have pointed to this logic as being highly suspicious on epistemological grounds by utilizing the common comparison of von Neumann machines to the human brain, arguing that if the human brain is nothing more than a computer, the Supreme Court’s argument in *Alice* because it reduces modern computers to “calculating machines” incapable of performing any real inventive step).

amounts to an inventive concept for resolving this particular Internet-centric problem, rendering the claims patent-eligible.”<sup>49</sup>

Finally, in September 2016 the Court of Appeals for the Federal Circuit decided *McRO, Inc. v. Bandai Namco Games America Inc.*, holding an algorithm patent to be eligible under the *Alice* test.<sup>50</sup> The patent in that case covered an algorithm for automating a process for animating facial expressions.<sup>51</sup> This automation allowed for more lifelike animation in video games.<sup>52</sup> The court expressly referenced the “preemption concern” mentioned in *Alice*, casting the analysis as looking “to whether the claims in these patents focus on a specific means or method that improves the relevant technology or are instead directed to a result or effect that itself is the abstract idea and merely invoke generic processes and machinery.”<sup>53</sup> In this case, the Federal Circuit reversed the trial court on the first step of the *Alice* test, determining that McRO’s algorithm “is employed to perform a distinct process to automate a task previously performed by humans.”<sup>54</sup> However, the prior art tasks performed by humans still did not fall within McRO’s claim’s scope because, unlike the McRO patent, the prior art did not “evaluate sub-sequences, generate transition parameters or apply transition parameters.”<sup>55</sup> By adding such specific rules, the McRO patent avoided preemption of both lip synchronization *and* all techniques for automating 3-D animation that rely on rules.<sup>56</sup>

The modern conception of subject matter eligibility has bred confusion for lower courts.<sup>57</sup> As this Comment argues, one solution to clarifying exactly

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<sup>49</sup> *DDR Holdings*, 773 F.3d at 1259; *see also* *Alice Corp. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2357 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72, 79 (2012)).

<sup>50</sup> *See* *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1316 (Fed. Cir. 2016).

<sup>51</sup> *Id.* at 1306–07.

<sup>52</sup> *See id.* at 1307. The defendants in the original litigation were “generally video game developers and publishers,” giving them decent grounds from which to argue preemption. *Id.* at 1308.

<sup>53</sup> *Id.* at 1314 (citing *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1336 (Fed. Cir. 2016)).

<sup>54</sup> *Id.*

<sup>55</sup> *Id.* This sort of analysis resembles not subject matter eligibility, but something more akin to novelty or even normal claim construction infringement analysis.

<sup>56</sup> Clearly, the second of these is the more pressing concern due to its breadth. *See id.* at 1315 (“The limitations in claim 1 prevent preemption of all processes for achieving automatic lip-synchronization of 3-D characters.”); *see also* Robert R. Sachs, *McRO: Preemption Matters After All*, BILSKI BLOG, (Sept. 15, 2016) <http://www.bilskiblog.com/blog/2016/09/mcro-preemption-matters-after-all-is-there-a-split-in-the-cafc.html> (arguing that allowing for patents to avoid preemption of rules-based algorithms opens the door for software patents to survive *Alice* analysis, since almost all forms of computer code operate on logical rules such as IF/OR).

<sup>57</sup> *See supra* note 12.

what should be patentable relies on relaxing the filter of subject matter and instead relying on either the utility or written description analysis.<sup>58</sup>

### B. Utility

While the determination of whether a submitted patent can qualify as “patentable subject matter” is the primary focus of this Comment, this section examines a second requirement for a would-be patent: utility. This Comment argues that the strict subject-matter advocates are wrong; courts should rely on other prerequisites of patentability such as utility. Subject matter eligibility analysis acts as a fishing net, helping prevent upstream patents that might block downstream innovation.<sup>59</sup> If the subject matter eligibility requirements are loosened, other areas of the analysis, such as utility, will be required to pick up the slack.

The notion that a patent must be useful is perhaps the most constitutionally grounded of all patent law concepts.<sup>60</sup> Early in the 1800s, the circuit courts decided that determining the usefulness of a patent was well beyond the expertise of judges, instead merely declaring that a patent “should not be frivolous or injurious to the well-being, good policy, or sound morals of society.”<sup>61</sup>

Late 1900s jurisprudence matured, expressing a distaste for answering both teleological and existential questions of utility. Existential questions arose when the court, using admittedly constrained knowledge of scientific consensus, judged on whether an invention was scientifically believable. For example, the oft-cited and humorous example of *Newman v. Quigg* highlights the Federal Circuit’s understanding that perpetual motion machines are

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<sup>58</sup> See *infra* Sections III.B–C.

<sup>59</sup> See *supra* note 39.

<sup>60</sup> See U.S. CONST. art. I, § 8, cl. 8. Promoting the “useful Arts” was identified as a listed power of Congress in the United States Constitution; the first patent in the United States was granted to Samuel Hopkins in 1790 for a process of making potash. See David W. Maxey, *Samuel Hopkins, The Holder of the First U.S. Patent: A Study of Failure*, 122 PA. MAG. HIST. & BIOGRAPHY 3, 3–6 (1998).

<sup>61</sup> *Lowell v. Lewis*, 15 F. Cas. 1018, 1019 (C.C.D. Mass. 1817) (No. 8,568). *Lowell* was decided by Circuit Justice Story, an important early figure in the development of patent law jurisprudence in the United States. Notably, Justice Story was also a fan of striking down patents based upon subject matter eligibility. See, e.g., *Stone v. Sprague*, 23 F. Cas. 161, 162 (C.C.D.R.I. 1840) (No. 13,487) (finding that the method “of communication of motion from the reed to the yarn beam” was too abstract). Justice Story grounded this analysis in the “mode described by the plaintiff in his specification,” something that is lacking in recent § 101 jurisprudence. *Id.*; see also *infra* Section III.B. (arguing, along with Professor Timothy Holbrook and others, that judges should first examine the specification and perform claim analysis before deciding anything concerning subject matter eligibility).

impossible,<sup>62</sup> given current scientific understanding.<sup>63</sup> Such epistemological questions focus on determining whether an invention can actually work.<sup>64</sup> One framework, described by Professor Michael Risch, explains these epistemological questions as “Operable Usefulness,” excluding “perpetual motion machines” (as impossible), untested pharmaceuticals (as unworkable or prophetic), and believable but incompletely disclosed inventions.<sup>65</sup>

Recent jurisprudence surrounding the utility standard fails to address rapidly changing methods in the research-industrial complex.<sup>66</sup> The modern analytical framework considers utility under two steps.<sup>67</sup> First, a court determines whether the PTO “has [met] the initial burden of challenging a presumptively correct assertion of utility in the disclosure.”<sup>68</sup> Second, the burden to demonstrate utility can shift to the applicant “only after the PTO provides evidence showing that one of ordinary skill in the art would reasonably doubt the asserted utility.”<sup>69</sup> In addition, an aspect known as “substantial” utility can be relevant in modern applications of the utility requirement.<sup>70</sup> Risch describes this substantial utility requirement as the area of “Practical Usefulness,” distinguishing it from the epistemological questions mentioned above.<sup>71</sup> This substantial utility doctrine closely relates to the 35 U.S.C. § 112 enablement and definiteness requirements. The U.S. Supreme Court has outlined that a claimed invention must be precisely delineated to “avoid inefficient blocking patents”<sup>72</sup> and “requir[es] those who obtain a patent to show real technological progress.”<sup>73</sup> As this Comment argues, the precise delineation requirement presented by utility will allow the utility requirement to step into the validity analysis and pick up the slack created by loosening the subject matter eligibility requirement.<sup>74</sup>

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<sup>62</sup> 877 F.2d 1575, 1576–77 (Fed. Cir. 1989).

<sup>63</sup> This caveat will appear often throughout this Comment because of its central argument that our patent-law system is oddly constrained by what it views as science’s role in uncovering universal truths.

<sup>64</sup> Daniel C. Rislove, Comment, *A Case Study of Inoperable Inventions: Why Is the USPTO Patenting Pseudoscience?*, 2006 WIS. L. REV. 1275, 1284–85 (2006).

<sup>65</sup> Michael Risch, *Reinventing Usefulness*, 2010 BYU L. REV. 1195, 1202 (2010).

<sup>66</sup> See *infra* Section III.C.

<sup>67</sup> *In re Brana*, 51 F.3d 1560, 1566 (Fed. Cir. 1995).

<sup>68</sup> *Id.*

<sup>69</sup> *Id.*

<sup>70</sup> Risch, *supra* note 65, at 1203.

<sup>71</sup> *Id.*

<sup>72</sup> *Id.* at 1224 (citing Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 870–71 (1990)); see also *id.* at 1227 (“Allowing patents before a use is discovered could impede the development of useful technical and market information.”).

<sup>73</sup> ROBERT P. MERGES, *JUSTIFYING INTELLECTUAL PROPERTY* 175 (2011).

<sup>74</sup> See *infra* Section III.C.

### C. *Written Description and Enablement*

Utility is not the only option for improving our fishing-net analogy—catching patents that might fall through by loosening the subject matter eligibility requirement. One of the most fundamental requirements of the patent application is a description of what is being claimed by the inventor.<sup>75</sup> This written description accomplishes two central goals: first, it enables persons skilled in the art to recognize that the inventor truly invented the claimed material; and second, it provides information sufficient to explain what is new and useful.<sup>76</sup>

In the recent case of *Ariad Pharmaceuticals, Inc. v. Eli Lilly & Co.*, the Federal Circuit explained that, when considering whether a specification meets legal requirements, courts must consider whether it conveys to “a person of ordinary skill in the art . . . that the inventor actually invented the invention claimed.”<sup>77</sup> Specifying what is being claimed recalls the comparison of patents to true property rights, just as a deed to land would describe a geographical location. The Supreme Court recently noted in *Nautilus, Inc. v. Biosig Instruments, Inc.* that the specification requirement protects against creating a “zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims.”<sup>78</sup> Words and phrases such as “zone” and “may enter” leave little room for doubt that the Court sees the connection between the specification requirement and physical property rights.

The written description requirement, along with the utility requirement, can both function as tools in fixing current jurisprudence around subject matter eligibility.

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<sup>75</sup> See *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1350 (Fed. Cir. 2010) (citing *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1568 (Fed. Cir.1997) (“[A]n adequate written description requires a precise definition, such as by structure, formula, chemical name, physical properties, or other properties, of species falling within the genus sufficient to distinguish the genus from other materials.”).

<sup>76</sup> *Id.* at 1353 (“Requiring a written description of the invention limits patent protection to those who actually perform the difficult work of ‘invention’ . . . and disclose the fruits of that effort to the public.”).

<sup>77</sup> *Id.* at 1351.

<sup>78</sup> 134 S. Ct. 2120, 2129 (2014) (quoting *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228, 236 (1942)). However, specification of an invention is never as easy as it sounds. “[S]ome modicum of uncertainty . . . is the ‘price of ensuring the appropriate incentives for innovation.’” *Id.* at 2128 (quoting *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 732 (2002) (discussing uncertainties that arise from inherently vague language). In fact, this uncertainty encourages litigation, which, besides providing work for patent litigators, helps the patent market avoid stagnation. See Gretchen Ann Bender, *Uncertainty and Unpredictability in Patent Litigation: The Time Is Ripe for a Consistent Claim Construction Methodology*, 8 J. INTELL. PROP. L. 175, 211 (2001) (“[T]he natural ambiguity of a claim can (and will) be exploited in litigation because claim construction is so critical to the infringement suit.”).

## II. WHY AN IRRATIONAL SCIENCE BETTER DESCRIBES THE SCIENTIFIC ENDEAVOR

As previously discussed, one of the most difficult challenges in any analysis is accurately determining what something *is*.<sup>79</sup> Science itself presents no exception to this rule. Precisely because the idea of science is so difficult to pin down, it is no surprise that Congress and the courts have such a difficult time creating a coherent, workable patent system.

The philosophy of science seeks to understand, often both normatively and prescriptively, the nature of humanity's unique endeavor of technological advancement. This Part first discusses the groundwork of modern philosophy, which provides background sufficient to understand the state of the field.<sup>80</sup> Second, this Part discusses the work of Thomas Kuhn and shows how examining the history of science results in a "paradigm" view of scientific revolutions and change.<sup>81</sup> Finally, this Part examines the theories of Paul Feyerabend, the champion of irrational scientific descriptivism, and provides evidence of the failed assumptions underlying our modern patent-law system.<sup>82</sup>

### A. *Progression in Philosophy of Science from Pragmatism to Kuhn and Feyerabend*

Before Kuhn and Feyerabend, the philosophy of science was dominated by the Pragmatists, a group whose views seemed to be the natural extension of Descartes and Hume as applied to modern science. Following the Pragmatists, Karl Popper advocated for what he called "falsificationism," which held that scientific truths can only be proven incorrect; true empirical certainty about a correlation in nature is impossible.<sup>83</sup>

#### 1. *Pragmatism*

Perhaps the earliest proponents of a grounded theory that science does not aim towards a "universal truth" were the Pragmatists. One of the central questions asked by pragmatism is "what difference would it practically make

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<sup>79</sup> See *supra* INTRODUCTION.

<sup>80</sup> See *supra* Section II.A.

<sup>81</sup> See *infra* Section II.B.1.

<sup>82</sup> See *infra* Section II.B.2.

<sup>83</sup> Often, this is characterized as the "Problem of Induction." GODFREY-SMITH, *supra* note 3, at 60. One might devise a statement such as "all swans are white," since (for the purposes of this demonstration) all swans ever seen are white. However, unless one can know that all swans have been observed, such a statement may never be entirely proven.

to anyone if *this* notion rather than *that* notion were true?”<sup>84</sup> For the present discussion, and for many of the Pragmatists, this question is often applied to the objective reality theory of science.<sup>85</sup> If one subscribes to the objective reality theory, one believes that the progression of science is, for both practical and metaphysical purposes, monotonically increasing.<sup>86</sup>

Pragmatists usually arrive at the opposite conclusion. As modern Pragmatist Richard Rorty states: “[T]ruth is not a goal of inquiry. . . . A goal is something you can know that you are getting closer to, or farther away from. But there is no way to know our distance from truth, nor even whether we are closer to it than our ancestors were.”<sup>87</sup> More relevant to the Pragmatists’ view of science, “[t]he truth of an idea is not a stagnant property inherent in it. Truth *happens* to an idea. It *becomes* true . . . .”<sup>88</sup> Thus, in thinking about patent eligibility, the pragmatist view indicates an obvious skepticism toward laws of nature.

## 2. Falsificationism

The immediate precursor to Thomas Kuhn’s revolutionary *The Structure of Scientific Revolutions* was falsificationism, initially advocated by Karl Popper.<sup>89</sup> Popper was influential in finally turning the philosophy of science into a descriptive, rather than prescriptive, philosophy.<sup>90</sup> Falsificationism posits

<sup>84</sup> WILLIAM JAMES, *What Pragmatism Means*, in PRAGMATISM: A NEW NAME FOR SOME OLD WAYS OF THINKING 27, 28 (Frederick Burkhardt ed., 1975) (emphasis added).

<sup>85</sup> See GODFREY-SMITH, *supra* note 3, at 184 (linking the pragmatists to the idea that questions about a “real reality” serve no practical relevance: as long as our scientific theories can give us results they are good enough).

<sup>86</sup> *Id.* at 178 (“Realists sometimes claim that there is a general argument from the *success* of scientific theories to their truth.”). Godfrey-Smith goes on to advocate for a modified version of scientific realism, but agrees that an “optimism” about real progress being made to uncover how the world works is acceptable for the realist. *Id.* at 179.

<sup>87</sup> 3 RICHARD RORTY, TRUTH AND PROGRESS: PHILOSOPHICAL PAPERS 3–4 (1998); *cf.* KUHN, *supra* note 5, at 170–71. Kuhn looks to Darwin’s discovery of evolution for evidence that not all processes need to head towards a particular goal or truth. Science itself need not maintain a focus on an “ultimate goal,” because “[d]oes it really help to imagine that there is some one full, objective, true account of nature . . . ?” *Id.*

<sup>88</sup> WILLIAM JAMES, *Pragmatism’s Conception of Truth*, in PRAGMATISM: A NEW NAME FOR SOME OLD WAYS OF THINKING, *supra* note 84, at 95, 97.

<sup>89</sup> See GODFREY-SMITH, *supra* note 3 at 57–58.

<sup>90</sup> *Id.* at 57 (writing that “hardly ever does a philosopher [of science] succeed in *inspiring* scientists in the way Popper has,” explaining that Popper was regarded by scientists as a hero in his explanation of their craft). Kuhn built on many of Popper’s concepts but ultimately rejected falsificationism in favor of a “verificationist” theory in which “verification is like natural selection: it picks out the most viable among the actual alternatives in a particular historical situation. Whether that choice is the best that could have been made if still other alternatives had been available or if the data had been another sort is not a question that can usefully be asked.” KUHN, *supra* note 5, at 145.

that perhaps *the* defining feature of science is that claims are subject to falsification, or proof by counterexample.<sup>91</sup> This view grounds the scientific endeavor in its epistemological roots, as Popper understood that no scientist ever truly believes even the most fundamental of concepts are axiomatic or irrefutable.<sup>92</sup>

### B. Kuhn's Revolution and Feyerabend's Anarchy

Building on the pragmatist and falsificationist philosophies, Thomas Kuhn espoused a view of science consisting of paradigms and revolutions.<sup>93</sup> Paradigms fill the gaps between revolutions, which occur when enough discoveries challenge the established view in a field to cause a massive shift in a field's methodology, goals, and language.<sup>94</sup> Feyerabend followed Kuhn, but pushed the boundaries of science even further, arguing that science is more randomness and serendipitous discovery than any true method or purposeful advancement.<sup>95</sup>

#### 1. Thomas Kuhn's Scientific Revolution

True scientific descriptivism took hold when Thomas Kuhn published his *Structure of Scientific Revolutions*. As a historian of science, he saw that the "truth" at any one period in time only stayed "true" until theories came along that better fit emerging data.<sup>96</sup> For Kuhn, the scientific endeavor is akin to puzzle-solving, because—like the ability to solve puzzles—science involves a "strong network of commitments—conceptual, theoretical, instrumental, and methodological."<sup>97</sup> "Normal science" is that which is followed by scientists at a particular time. Normal science is not intended to find novelty, but rather to affirm a current paradigm. However, the rules of normal science change when

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<sup>91</sup> See GODFREY-SMITH, *supra* note 3, at 60 ("We never increase our confidence in the truth of the theory; and ideally, we should never stop trying to falsify it."). Popper's views on falsificationism changed near the end of his life, when he began to advocate a more nuanced version that does not hold such strict claims. *See id.* I anticipate this was due to him being fed up with being asked, "Are you sure you want to drive over that bridge, Karl? You can't prove that it will stay up!"

<sup>92</sup> *Id.* at 59 ("Popper placed great emphasis on the idea that we can never be *completely sure* that a theory is true.")

<sup>93</sup> *See infra* Section II.B.1 (discussing Kuhn's approach).

<sup>94</sup> *See infra* note 98.

<sup>95</sup> *See infra* Section II.B.2 (discussing Feyerabend's arguments).

<sup>96</sup> KUHN, *supra* note 5, at 40–41. A paradigm also dictates what types of problems scientists can understand in the first place. *See id.* at 41 ("[T]he corpuscular conception of the universe told scientists what many of their research problems should be.")

<sup>97</sup> *Id.* at 42.

a “revolution” occurs, shifting the science into a new paradigm.<sup>98</sup> New paradigms are adopted because of their superior puzzle-solving ability.<sup>99</sup> Historical examples of new paradigms replacing normal science can be found throughout Kuhn’s work and subsequent literature.<sup>100</sup> A brief, relatable example is presented here.

Until the mid-1700s, it was well established that a substance called phlogiston was present in all combustible materials, and the reason that materials lost weight when burned was due to the loss of their phlogiston component.<sup>101</sup> Inconsistencies in the theory began to arise when certain materials—many metals—were noted to gain weight upon burning.<sup>102</sup> In 1783, Antoine-Laurent Lavoisier presented a theory of “oxygen,” the true material behind the combustion process, but was scorned until a new generation of chemists adopted the theory.<sup>103</sup>

Kuhn’s notion of progress differs quite clearly from the “Progress of Science” referred to in the U.S. Constitution.<sup>104</sup> Based on Kuhn’s ideas, an argument can be made that patents overall “deter scientific exchange within prevailing paradigms . . . [by] encourag[ing] the generation of alternate theories that drive paradigm shifts.”<sup>105</sup> However, this argument focuses on applying Kuhn’s relativistic scientific model to current developments in the

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<sup>98</sup> *Id.* at 23–24 (“[N]ormal-scientific research is directed to the articulation of those phenomena and theories that the paradigm already supplies.”). Kuhn’s “paradigm shift” is described in more detail as “the community’s rejection of one time-honored scientific theory in favor of another incompatible with it. Each produced a consequent *shift* in the problems available for scientific scrutiny and in the standards by which the profession determined what should count as an admissible problem or legitimate problem-solution.” *Id.* at 6 (emphasis added).

<sup>99</sup> *See* KUHN, *supra* note 5, at 23 (“Paradigms gain their status because they are more successful than their competitors in solving a few problems that the group of practitioners has come to recognize as acute.”).

<sup>100</sup> *See infra* notes 101, 109.

<sup>101</sup> *See* KUHN, *supra* note 5, at 54 (discussing eighteenth-century chemist Antoine-Laurent Lavoisier and Lavoisier’s critic, Joseph Priestly); AM. CHEM. SOC’Y, THE CHEMICAL REVOLUTION I (1999).

<sup>102</sup> AM. CHEM. SOC’Y, *supra* note 101, at 2.

<sup>103</sup> *Id.* at 2–3. The idea that a new generation of scientists entering the field causes the paradigm shift is a central tenet of Kuhn’s work because these new members of the scientific community are “little committed by prior practice to the traditional rules of normal science” and “likely to see that the rules no longer define a playable game and to conceive another set that can replace them.” KUHN, *supra* note 5, at 90.

<sup>104</sup> *See* U.S. CONST. art. I, § 8, cl. 8; *see also* Peter Lee, Note, *Patents, Paradigm Shifts, and Progress in Biomedical Science*, 114 YALE L.J. 659, 669 (2004) (arguing that patent scholars are preoccupied with Kuhn’s “normal progress” and describing arguments that the patent system is currently flawed in that it “deter[s] scientific exchange within prevailing paradigms” and hinder the changes leading to paradigm shifts).

<sup>105</sup> *See* Lee, *supra* note 104, at 669. Of course, it remains up for debate whether the patent-law system should be encouraging paradigm shifts at all, considering that such shifts initially cause a great deal of chaos. This discussion presumes, however, that paradigm shifts come with an increase in problem solving power in the long run and therefore present desirable outcomes.

field of patent law, especially those related to subject matter eligibility for biotechnology and computer algorithms.

## 2. *Paul Feyerabend and the Revolt Against Method*

As an important corollary to Kuhn's work, it is necessary to examine a close contemporary of Kuhn: Paul Feyerabend. If Kuhn was a Socrates, artfully demonstrating that the world was not quite how his audience imagined, then Feyerabend was a Diogenes, the raving firebrand living on the street, advising a thoroughly skeptical worldview to the point of solipsism.<sup>106</sup> Feyerabend intended to set the scientific method on fire before throwing it out the window. In *Against Method*, he argued that "aesthetic criteria, personal whims and social factors have a far more decisive role in the history of science than rationalist or empiricist historiography would indicate."<sup>107</sup> For Feyerabend, science cannot be explained by a single model; the only rule of science is that "anything goes."<sup>108</sup>

Certain developments in 1900s physics support Feyerabend's description of science over Kuhn's. Following Einstein's refutation of Newtonian mechanics, 20th century physicists have not agreed upon a singular paradigm with uniform set of tools. Instead, string theory, quantum mechanics, and general relativity have survived, and researchers continually argue over which theory best fits incoming data.<sup>109</sup> These arguments align with Feyerabend's writings, in which he advocated "the growth of knowledge will be better served by 'the active interplay of various tenaciously held views' than by the dominance of a single view."<sup>110</sup>

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<sup>106</sup> See PAUL FEYERABEND, *KILLING TIME: THE AUTOBIOGRAPHY OF PAUL FEYERABEND* 142 (1995) ("I loved to shock people . . . . The world, including the world of science, is a complex and scattered entity that cannot be captured by theories and simple rules.").

<sup>107</sup> John Preston, *Paul Feyerabend*, STAN. ENCYCLOPEDIA PHIL., <http://plato.stanford.edu/archives/win2016/entries/feyerabend/> (last updated Sept. 21, 2016).

<sup>108</sup> *Id.* (quoting FEYERABEND, *supra* note 106, at 179–80 ("One of my motives for writing *Against Method* was to free people from the tyranny of philosophical obfuscators and abstract concepts such as 'truth', 'reality', or 'objectivity', which narrow people's vision and ways of being in the world.")).

<sup>109</sup> Corey Powell, the editor in chief of *Scientific American*, wrote a beautifully illustrated and well-explained description of this ongoing battle, describing it as "a clash of genuinely incompatible descriptions of reality." Corey S. Powell, *Will Quantum Mechanics Swallow Relativity?*, NAUTILUS (Oct. 29, 2015), <http://nautil.us/issue/29/scaling/will-quantum-mechanics-swallow-relativity>.

<sup>110</sup> Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1059 (1989) (quoting Paul Feyerabend, *Consolations for the Specialist*, in *CRITICISM AND THE GROWTH OF KNOWLEDGE* 197, 201–09 (Imre Lakatos & Alan Musgrave eds., 1970)).

Much of Feyerabend's work has been heavily criticized for its loose argumentative style.<sup>111</sup> For present purposes, his importance is relegated to the occurrence and prevalence of serendipitous invention. Because science for Feyerabend is not one idea, but instead many: insistence upon an overarching scientific method or agenda is fanciful and unfounded; pure accident and chance plays a major role in developing a new theory.<sup>112</sup>

This background of scientific anti-realism—from the historical perspective of Thomas Kuhn and the anarchical, irrational perspective of Paul Feyerabend—highlights the problematic assumptions underlying the modern patent-law system. Our system assumes scientific linearity, yet science is anything but linear. Our system presumes methodological certainty and pedagogical supremacy, yet science proceeds irrationally, surprisingly, and is anything but impartial.

### III. DRAWING THE CONNECTION BETWEEN KUHN AND RECENT PATENT-LAW JURISPRUDENCE

Conflict between the models proposed by Kuhn and Feyerabend and the underlying assumptions of the modern patent-law system have created recent jurisprudence that results in inconsistent rulings. Such problems are only exacerbated by the unique problem patent law faces: the existence of the Federal Circuit to stand in contention with the Supreme Court as the only appellate court for matters arising under patent law.<sup>113</sup>

This Part first looks to further crystallize the connection between Thomas Kuhn's paradigm models, Paul Feyerabend's radical view of science, and the

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<sup>111</sup> Cf. Preston, *supra* note 107 (noting that Feyerabend himself says he places more faith in believable stories than in logical argumentation, an unsurprising conclusion given his philosophy of science).

<sup>112</sup> See *id.* (“[Feyerabend] suggest[ed] that aesthetic criteria, personal whims and social factors have a far more decisive role in the history of science than rationalist or empiricist historiography would indicate.”). Such arguments present issues for courts considering scientific evidence, especially under the *Daubert* standard. See Mary L. Lyndon, *Tort Law and Technology*, 12 YALE J. ON REG. 137 (1995) (discussing how courts should deal with increasing diversification in the scientific evidence arena). *But cf.* Deborah M. Hussey Freeland, *Speaking Science to Law*, 25 GEO. INT'L ENVTL. L. REV. 289, 325–26 (2013) (arguing that encouraging judges to be gatekeepers of scientific truth in the courtroom “promotes the ability of lawyers to get evidence excluded by exaggerating the articulated uncertainties that characterize rigorous science”).

<sup>113</sup> The Federal Circuit is typically loath to lose patent-related cases, no matter how tenuous the connection, to the other twelve Courts of Appeals. See, e.g., *Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059 (Fed. Cir. 1998) (connecting an antitrust case to patent law to maintain jurisdiction); *Atari, Inc. v. JS & A Grp., Inc.*, 747 F.2d 1422 (Fed. Cir. 1984) (denying petition to transfer to the Seventh Circuit by connecting a copyright claim to a patent claim). *But cf.* Paul R. Gugliuzza, *Saving the Federal Circuit*, 13 CHI.-KENT J. INTELL. PROP. 350 (2014) (suggesting that sufficient “percolation” exists for the Federal Circuit to advance, not hinder, the progress of patent law jurisprudence).

patent-law system.<sup>114</sup> Then, this Part presents two arguments, one by Professor Michael Risch concerning the near abolition of the patentable subject matter requirement entirely, and one by Professor Timothy Holbrook advocating for a return to patent law's true audience.<sup>115</sup> Based on Kuhn's paradigm models and Feyerabend's views of science, this Part concludes that courts should loosen the subject matter requirement and instead rely on utility and the written description requirement to further the goals of patent law.<sup>116</sup>

### A. *Patent Law and Paradigms*

The patent-law system walks a fine line within Kuhn's system of paradigms. Weaker patent rights imply more available use of the underlying tools that are used to conduct what Kuhn calls "normal science."<sup>117</sup> The network of research tools and community research are what give the paradigm its defining characteristic: problem-solving power.<sup>118</sup> This was the central premise of the Court's arguments in *Mayo* and *Myriad*.<sup>119</sup> Taking away the building blocks of a whole area of research, especially a *new* area such as biotechnology, shuts down innovation by giving control to patent holders and restrictive licenses, or so the argument goes.<sup>120</sup> But how does this relate to the paradigmatic view of science, which at its strongest point argues that as we shift paradigms, the world shifts with us?<sup>121</sup> Is the Court engaging in bad science when it speaks about "laws of nature"?

This Comment argues that relaxing the current judicially imposed subject matter restrictions will satisfy the goals of the patent-law system and clarify

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<sup>114</sup> See *infra* Sections III.A–B.

<sup>115</sup> See *infra* Section III.C.

<sup>116</sup> See *infra* Section III.D.

<sup>117</sup> The next section will show that this over-generalization is complicated by the commercial-research complex. See *supra* notes 96–105 and accompanying text (discussing Kuhn's theory of paradigms).

<sup>118</sup> See *supra* Section II.B.1.

<sup>119</sup> See *supra* Section I.A.1.

<sup>120</sup> See, e.g., Patrick Hall, *Patent Law Broken, Abused to Stifle Innovation*, WIRED (July 2013) <https://www.wired.com/insights/2013/07/patent-law-broken-abused-to-stifle-innovation/> (highlighting the efforts of large smartphone companies and patent assertion entities, also known as "patent trolls," to abuse the patent system and prevent innovation).

<sup>121</sup> More correctly, this is the result of Kuhn's incommensurability thesis. This thesis will be expanded on later, but for now it suffices to say that when paradigms shift, we must adopt an entirely new language to deal with a new set of problems and problem-solving tools. Even the types of problems we consider relevant change. KUHN, *supra* note 5, at 108 ("[P]aradigms provide scientists not only with a map but also with some of the directions essential for map-making. In learning a paradigm the scientist acquires theory, methods, and standards together, usually in an *inextricable* mixture. Therefore, when paradigms change, there are usually significant shifts in the criteria determining legitimacy both of problems and of proposed solutions." (emphasis added)).

the system's connection to its intended audience. In fact, "abandoning subject matter restrictions in favor of rigorous application of patentability requirements" will cut out an unnecessarily burdensome and confusing area of the patent-law system.<sup>122</sup> This argument is not limited to academics. Judge Rader, dissenting in *Bilski* at the Federal Circuit, wrote that the other restrictions on patentability—utility, novelty, non-obviousness, and written description—are more than capable of "serv[ing] the function of screening out unpatentable inventions."<sup>123</sup>

Several arguments proposed by recent scholars are presented here and then critiqued under the framework provided by Kuhn and modern philosophy of science. First, Professor Risch's view is presented: everything should be patentable on subject matter grounds but remain subject to heightened restrictions on the other factors of patentability. Second, this Comment will examine an argument that a stronger focus on the written description requirement of patentability will supply the clarity lacking in subject matter analysis.<sup>124</sup>

### *B. Everything Is Patentable for Kuhn*

In *Everything Is Patentable*, Risch gives three primary reasons why subject matter rules created by the judiciary fail to achieve the goals of the patent-law system: (1) judges lack the necessary "empirical information";<sup>125</sup> (2) they must tailor opinions to a "single case," which leads to "unintended effects" for entire industries not currently at bar;<sup>126</sup> and (3) judges should not be in the business

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<sup>122</sup> Michael Risch, *Everything Is Patentable*, 75 TENN. L. REV. 591, 595 (2008).

<sup>123</sup> *In re Bilski*, 545 F.3d 943, 1015 (Fed. Cir. 2008) (Rader, J., dissenting); see also Risch, *supra* note 122, at 591 n.3 (citing *Merck & Co. v. Olin Mathieson Chem. Corp.*, 253 F.2d 156, 162 (4th Cir. 1958)) (noting that discarding subject matter eligibility as a patentability criterion is not a new theory).

<sup>124</sup> This argument is presented most notably by scholars Timothy Holbrook, Sean Seymore, and Jacob Sherkow. See, e.g., Holbrook & Janis, *An Audience Perspective*, *supra* note 1, at 363–77 (discussing claim construction as a means to address eligibility problems); Sean B. Seymore, *Patently Impossible*, 64 VAND. L. REV. 1491, 1495 (2011) (arguing that an "enablement-based approach would eliminate the need for the § 101 operability requirement [and] . . . would also streamline patent examination, improve patent quality, yield more technically robust patents, and ultimately foster innovation"); Jacob Sherkow, *The Natural Complexity of Patent Eligibility*, 99 IOWA L. REV. 1137 (2014) (arguing that courts should analyze eligibility within the context of a patent's specification and claims).

<sup>125</sup> Risch, *supra* note 122, at 595. This type of technical expertise is precisely why the concept of a person having ordinary skill in the technical arts (PHOSITA), plays such a role in other patentability criteria. See, e.g., *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007) (applying the PHOSITA analysis to non-obviousness criteria).

<sup>126</sup> Risch, *supra* note 122, at 595.

of creating categories not devised by statute.<sup>127</sup> But instead of recognizing these restrictions, judges have consistently jumped to subject matter analysis when another eligibility criterion could work instead. For example, in the case of *Parker v. Flook*, the patent at issue sought to cover a method determining the variables for automobile catalytic converters, triggering an alarm based upon mathematical algorithms for acceptable limits.<sup>128</sup> However, instead of deciding that the invention was incorrectly described, the Court decided the case by saying that an “algorithm cannot be novel” because it is a “basic tool[] of scientific and technological work.”<sup>129</sup>

To fight the confusion among patentability criteria, especially the vagueness of subject matter requirements, Risch proposes what he calls “rigorous patentability.”<sup>130</sup> Importantly, this approach gives relatively little weight to the subject matter criterion and attempts to do away with the moratorium on all “law[s] of nature,”<sup>131</sup> arguing instead for broad statutory categories and the ability for other criteria to make up for the slack.<sup>132</sup> Rigorous patentability would agree with the Court’s judgment in *Alice*, for example, but disagree with the majority opinion that the result follows due to a laws of nature type analysis—rather, tax methods “would be considered obvious,” and “automation alone is not patentable unless the means for automation are novel and nonobvious.”<sup>133</sup> Similarly, an algorithm alone has no “practical utility,” so allowing algorithms to survive the murky subject matter tests will not simply result in thousands of patents on algorithms.<sup>134</sup> As other scholars have noted, such a misplaced focus on a laws of nature analysis

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<sup>127</sup> *Id.* (“Of course, broad congressional action that suffers from the same problems as judicial opinions may not be desirable.”).

<sup>128</sup> 437 U.S. 584, 585–86 (1978).

<sup>129</sup> Risch, *supra* note 122, at 604 (quoting *Flook*, 437 U.S. at 584 (1978)). *Flook*, along with *Gottschalk v. Benson*, has become known as a precedential basis for presenting patentability concerns toward algorithms based on a laws of nature analysis. See *Flook*, 437 U.S. at 589 (citing *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972)). It seems odd to compare early computers, which truly performed merely faster versions of pen-and-paper work, with modern computers, which can use decades of advancements in machine learning theory to not merely perform a human function faster, but in fact allow an altogether new type of calculation or even invent new calculations itself. Cf. Ben Hattenbach & Joshua Glucoft, *Patents in an Era of Infinite Monkeys and Artificial Intelligence*, 19 STAN. TECH. L. REV. 32, 34 (2015) (arguing that machine learning has led to computer-created creative material, questioning the necessity of human ingenuity in the patentability analysis).

<sup>130</sup> Risch, *supra* note 122, at 606.

<sup>131</sup> *Id.* at 607. Again, such laws, even if they existed, only serve to muddle the patentability analysis. See *supra* Section I.A.2 (discussing the issues presented by the patentability of algorithms).

<sup>132</sup> Risch, *supra* note 122, at 607.

<sup>133</sup> *Id.* at 612 (citing *Dann v. Johnston*, 425 U.S. 219, 230 (1976)). While the Court in *Dann* held automation of bookkeeping to be obvious, the connection to the *Alice* case a few years later is quite clear. See *Dann*, 425 U.S. at 230.

<sup>134</sup> Risch, *supra* note 122, at 622–23.

prevents the courts from utilizing the more developed jurisprudence found in other patent eligibility criteria.<sup>135</sup> Lower courts have made similar arguments, even if the Supreme Court has yet to see the confusion caused by the laws of nature focus.<sup>136</sup>

A shift away from subject matter eligibility and toward the more developed areas of patent eligibility is in accord with Thomas Kuhn's paradigm model and with a more descriptive view of scientific research. The Court developed its moratorium on all "laws of nature," "natural phenomena," and "products of nature" primarily out of a search for an "easily administered proxy" for the "building-blocks" of scientific research, which it wanted to remove from patentability.<sup>137</sup> But this sort of proxy breeds more confusion than it resolves. Even if laws of nature worked according to classical, scientific realism standards, they are nearly impossible to use as guideposts.<sup>138</sup> Even if one supposes the existence of underlying true facts in the physical universe, identifying what truly represents a law of nature proposes a far more complex question.<sup>139</sup> For instance, can a biological circumstance created by the randomness of evolution be such a law? Such a correlation hardly seems a law of nature; when compared to concepts like laws of gravitational motion, biological correlations differ vastly in that they are neither static nor predetermined by earlier facts.<sup>140</sup>

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<sup>135</sup> See Vincent Chiappetta, *Patentability of Computer Software Instruction as an "Article of Manufacture: Software as Such as the Right Stuff*, 17 J. MARSHALL J. COMPUTER & INFO. L. 89, 93 (1998) ("[F]ailure to clearly and properly define the actual nature of software inventions by applying the patentable subject matter analysis leads to inadequate identification of prior art and insufficiently stringent review for novelty and non-obviousness.").

<sup>136</sup> See, e.g., *State St. Bank & Tr. Co. v. Signature Fin. Grp., Inc.*, 149 F.3d 1368, 1375 (1998) (arguing that instead of focusing on which category of invention in which the patent belongs, that the correct analysis should focus on "the essential characteristics of the subject matter, in particular, its practical utility" and that "[s]ection 101 specifies that statutory subject matter must also satisfy the other 'conditions and requirements' of Title 35, including novelty, nonobviousness, and adequacy of disclosure and notice").

<sup>137</sup> *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 89 (2012) (declining to establish any distinction between types of laws of nature based on philosophical or scientific inquiry, rigorous or otherwise).

<sup>138</sup> The traditional definition of a law of nature can be taken from David Hume, who described it as "a constant conjunction" combined with causation, where B must *always* follow A. Sherkow, *supra* note 124, at 1159 (citing THE OXFORD COMPANION TO PHILOSOPHY 506 (Ted Honderich ed., 2d ed. 2005)). The problem of induction raised by this definition is not explored here because it is tangential to this Comment's application of Kuhn's historical philosophy of science perspective to the patent-law system.

<sup>139</sup> See *Funk Bros. Seed Co. 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.").

<sup>140</sup> Sherkow, *supra* note 124, at 1158 (citing NICHOLAS RESCHER, COMPLEXITY: A PHILOSOPHICAL OVERVIEW 50-52 (1998)) (describing the growth of scientific research, information, spending, and facilities).

In fact, the sort of laws of nature presupposed by the Court in *Mayo* align better with Kuhn's paradigm model, even though by adopting such a model the terminology must change dramatically. Although there are no underlying laws of nature scattered about the world, waiting to be uncovered,<sup>141</sup> each paradigm we enter shifts our scientific language so dramatically that if our predecessors were to encounter a word such as "electron," for example, it would not mean anything to them at all.<sup>142</sup> In fact, such a time traveler would need to undergo the gestalt shift called for by Kuhn to even be taught.<sup>143</sup>

Despite Kuhn's framework providing a better vehicle for the approach taken by the Court, the fact remains that the current jurisprudence surrounding subject matter eligibility is deeply flawed in its inability to capture how science actually proceeds. The central purpose of a scientific paradigm is to increase problem-solving power.<sup>144</sup> This idea becomes clearest when one realizes that scientific revolutions happen and paradigms shift because a new paradigm can solve more problems than the previous one.<sup>145</sup>

Applying this focus on problem solving to the eligibility fight is tricky. On one hand, the paradigm model is not easily applied to mathematics because math has never been grounded in physical necessity, but has been constructed by academia for thousands of years.<sup>146</sup> On the other hand, in a field such as

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<sup>141</sup> NANCY CARTWRIGHT, *Fitting Facts to Equations*, in HOW THE LAWS OF PHYSICS LIE 128, 129 (1983) ("[N]ature is not governed by simple quantitative equations of the kind we write in our fundamental theories. . . . [F]undamental equations do not govern objects in reality; they govern only objects in models.").

<sup>142</sup> See KUHN, *supra* note 5, at 110 ("[P]aradigm changes do cause scientists to see the world of their research-engagement differently. . . . [W]e may want to say that after a revolution scientists are responding to a different world.").

<sup>143</sup> *Id.* at 110 ("Only after a number of such transformations of vision does the student become an inhabitant of the scientist's world, seeing what the scientist sees and responding as the scientist does."). Kuhn was describing the general student of science, but it applies equally to our make-believe time traveler. "Gestalt" is typically used to describe the shift in view discussed by Kuhn. *Id.* at 85 (describing how a scientist's vision of the world flips); cf. Jonathan Corum, *Is That Dress White and Gold or Blue and Black*, N.Y. TIMES (Feb. 28 2015), <http://www.nytimes.com/interactive/2015/02/28/science/white-or-blue-dress.html>; Eric W. Weisstein, *Young Woman-Old Woman Illusion*, WOLFRAM MATHWORLD, <http://mathworld.wolfram.com/YoungGirl-OldWomanIllusion.html> (last updated Dec. 21, 2017). The white-and-gold or blue-and-black dress controversy shook social media with a modern-day question of gestalt, when some individuals only saw one perspective, some only another, but some were able to gradually refocus their eyes to see the dress from either perspective. For Kuhn, a more typical example would be the shift from classical mechanics into quantum mechanics.

<sup>144</sup> See *supra* notes 96, 99 and accompanying text (discussing paradigms as methods of puzzle-solving).

<sup>145</sup> See *supra* note 99 and accompanying text. Interestingly though, these shifts can never take place through rational argumentation. See KUHN, *supra* note 5, at 99 (arguing that reason alone is not enough to cause a paradigm shift, but that other factors, including, but not limited to, the natural turnover of scientists in the field, contribute to a revolution).

<sup>146</sup> See Sherkow, *supra* note 124, at 1161 (quoting John Beatty, *The Evolutionary Contingency Thesis*, in CONCEPTS, THEORIES, AND RATIONALITY IN THE BIOLOGICAL SCIENCES 45, 46-47 (Gereon Wolters et al. eds.,

biotechnology, which seems to have existed in a steady paradigm since the adoption of DNA theory, the problem-solving power comes from the correlations discovered between DNA, cDNA, and other basic cell reproductive building blocks.<sup>147</sup>

From the perspective of philosophy of science, this comparison directly highlights the differences between “necessary” and “contingent” facts. Necessary facts are those axiomatically true, like mathematical relationships; whereas contingent facts, such as the biological correlations mentioned above, could have turned out differently had evolution taken an alternative route.<sup>148</sup> Contingent facts should not be barred from patentability merely because they are contingent, but rather because they do not satisfy every patent requirement; for example, a biological correlation will not always be “useful” or “well described.” Such an analysis allows those other areas of the patentability analysis to step in where subject matter eligibility fails.

### C. *The Audience of a Paradigm*

Having generally explained the importance of relying upon other criteria of the patentability analysis due to the murkiness inherent in determining subject matter eligibility, this section now highlights how one of those criteria—written description—serves to both fulfill the goals of Kuhn’s paradigm model and present a better method for adjudicating patentability.

Approaching patent eligibility from the perspective of its audience—a community of inventors—is best done by avoiding vague formulations. These formulations subsequently create “virtual distance between the source of a legal pronouncement and its ultimate intended audience,”<sup>149</sup> like the Court’s current “eligibility-as-king” trend.<sup>150</sup> Ultimately, an “enablement-based approach” should be employed to mitigate the effects of distance to the audience.<sup>151</sup>

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1995)) (arguing that the “complexity of biological diversity is, after all, simply the product of historical accident,” making it merely “contingently true” as opposed to axiomatically or necessarily true, like math).

<sup>147</sup> For a discussion of the differences between types of DNA, see generally Ass’n for Molecular Pathology v. Myriad Genetics, Inc., 569 U.S. 576 (2013). Despite this discussion, the opinion’s focus on determining subject matter eligibility seems ultimately misguided.

<sup>148</sup> See *supra* note 147.

<sup>149</sup> Holbrook & Janis, *An Audience Perspective*, *supra* note 1, at 360 (positing that the game of telephone currently taking place between Congress, the courts, patentees at court, and the industry at large defeats the goals of the patent system).

<sup>150</sup> *Id.* at 377.

<sup>151</sup> See *id.* at 373 (arguing that conducting subject matter analysis without involving claim construction creates a missed “opportunity to formulate eligibility rules that can be more predictably translated into

One way to reduce this problem is to push back on the eligibility-as-king-style analysis in favor of more consistent written description legwork on the part of judges. The most obvious recent instance of this issue appeared in *Mayo*. In *Mayo*, the Court paid lip service<sup>152</sup> to the idea of interpreting claims as a whole, but instead looked only at the patent's first claim.<sup>153</sup> The Court concluded that the claim "recit[ed] a law of nature" and followed up this determination with a search for an "inventive concept."<sup>154</sup> Because the claim merely recited a correlation, the Court subsequently found that it did not add enough to the law of nature to transform the claim into a patent-eligible application of the law.<sup>155</sup>

*Mayo* shows the deep flaws with the eligibility-as-king-style analysis. Putting aside the issues presented earlier concerning laws of nature and their dubious existence,<sup>156</sup> the selection of only one claim in a patent for an inventive concept search differs greatly from a thorough examination of the claims both individually and as a whole.<sup>157</sup> The tunnel vision of focusing on subject matter eligibility led the Court in both *Mayo* and *Alice* to issue its judgments "without the need to qualify any single piece of evidence as prior art or consult the immense jurisprudence of Sections 102 or 103."<sup>158</sup>

Certainly, the work of Paul Feyerabend cuts against such a simple dismissal by the *Alice* Court. If all science proceeds irrationally,<sup>159</sup> how can something ever be routine? Characterizing the invention in a case as a

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practical guidance for the research community"); Seymore, *supra* note 124, at 1495 (arguing that an "enablement-based approach . . . would also streamline patent examination, improve patent quality, yield more technically robust patents, and ultimately foster innovation").

<sup>152</sup> Holbrook & Janis, *An Audience Perspective*, *supra* note 1, at 373 n.126; *see also id.* at 373 ("[I]t is problematic to formulate eligibility rules in a vacuum, without regard for the inevitable interaction between those rules and other inquiries, such as claim construction.").

<sup>153</sup> *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75 (2012) ("For present purposes we may assume that the other claims in the patents do not differ significantly from claim 1.").

<sup>154</sup> Holbrook & Janis, *An Audience Perspective*, *supra* note 1, at 378.

<sup>155</sup> *Mayo*, 566 U.S. at 77 ("[D]o the patent claims add *enough* to their statements of the correlations to allow the processes they describe to qualify as patent-eligible processes that *apply* natural laws? We believe that the answer to this question is no.").

<sup>156</sup> *See supra* Section II.B.1.

<sup>157</sup> *Alice Corp. v. CLS Bank Int'l.*, 134 S. Ct. 2347, 2359 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1298 (2012)); *see also* Holbrook & Janis, *An Audience Perspective*, *supra* note 1, at 379 (noting that the "inventive concept" analysis allows the Court to combine patentability criteria in such a way that some criteria are not considered fully). Holbrook and Janis apply a similar analysis to *Alice*, in which the court held that "[t]aking the claim elements *separately*, the function performed by the computer at each step of the process is '[p]urely conventional.'" *Id.* (alterations in original) (emphasis added) (internal quotation marks omitted) (quoting *Alice*, 134 S. Ct. at 2359).

<sup>158</sup> Holbrook & Janis, *An Audience Perspective*, *supra* note 1, at 379.

<sup>159</sup> *See supra* note 107 (describing Feyerabend's theory of scientific change).

straightforward application of a business deal<sup>160</sup> completely misses how science truly proceeds, with years of random guessing, trial and error, or serendipitous discovery.

The most pressing evidence against eligibility-as-king analysis comes from one of its central tenets: a patentable subject matter “must represent more than a trivial appendix to the underlying abstract idea.”<sup>161</sup> How can one begin to make such a judgment without first completing a claim analysis then taking steps to truly understand the elements at issue and how they work together to develop an inventive idea? By stepping away from the vague standards of subject matter eligibility and focusing on the more robust written description analysis, patent law jurisprudence can better align with the scientific endeavor.

#### *D. Application of Paradigm Science to Alice and Post-Alice Decisions*

Finally, this Comment concludes with an application of loosened subject matter eligibility to the recent decisions in *Alice* and *McRO*. *Alice* need not turn out differently under the type of analysis proposed in this Comment. It is entirely consistent with paradigm science and the absence of true laws of nature that the settlement risk mitigation patent in *Alice* be ruled invalid. However, such a decision would recognize that, under Kuhn’s philosophy, the transcription of mathematical formulas could not be rejected from patentability wholesale, since laws only survive under the paradigm effecting them.<sup>162</sup> For example, most purely algorithmic patents could be knocked out using utility, since math on its own does not seem to fulfill a purposeful societal function.<sup>163</sup> While *Alice*’s patent goes a step beyond a pure algorithm,<sup>164</sup> it seems worth the Court’s time to examine the inventive step under utility grounds instead of a shoehorned subject matter eligibility analysis. Alternatively, if the Court pursued a stronger written description analysis, as advocated by Holbrook,<sup>165</sup> a claim-by-claim analysis would aid discussion under utility or any ruling available to the Court. Either way, such arguments are significantly bolstered by the work laid down by Kuhn and Feyerabend, and would more closely align

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<sup>160</sup> The Court did this in *Alice*. See 134 S. Ct. at 2359.

<sup>161</sup> *CLS Bank Int’l v. Alice Corp.*, 717 F.3d 1269, 1283 (Fed. Cir. 2013) (en banc) (Lourie, J., concurring), *aff’d*, 134 S. Ct. 2347 (2014).

<sup>162</sup> See *supra* Section II.B.1.

<sup>163</sup> See *supra* Section I.B.1.

<sup>164</sup> The *Alice* Court may not agree with this statement, since it states unequivocally that the claims “merely require generic computer implementation.” *Alice*, 134 S. Ct. at 2357. However, as discussed below, even generic computer implementation is often hardly anything but straightforward, and certainly involves more than a simple recitation of formulas.

<sup>165</sup> See *supra* Section III.C.

with the way practicing scientists view their own work; our current scientific truths are only scientific truths until the next revolution arrives.

A few post-*Alice* opinions from the Federal Circuit have realized the necessity of dodging the subject-matter-eligibility question and subsequent inventive concept inquiry.<sup>166</sup> Instead of balking at the mere mention of an algorithm, the Federal Circuit in *McRO* decided to wade into the depths of the patent's specification.<sup>167</sup> By refusing to focus on a vague inventive concept analysis, the *McRO* court determined that the patent had not been preempted based upon the "subjective determinations" of the animator, rather than merely applying mathematical laws.<sup>168</sup>

Such a conclusion is no surprise to anyone with even a beginner's knowledge of computer code. An implementation of simple multiplication or exponential regression requires very little subjective input on the part of the coder. However, algorithms can be implemented thousands of ways; the name "algorithm" does not imply that a fundamental law of nature is being used generically. If a software company devotes countless resources to devising a new method for finding large primes, preventing them from getting a patent (and thereby discouraging disclosure) does not serve the goal of technological advancement.

The Federal Circuit's decision in *McRO* makes three implicit arguments, as pointed out by Robert Sachs on *Bilski* Blog.<sup>169</sup> Subject matter eligibility, as the opinion notes, does not "require a method to 'be tied to a machine or transform an article.'"<sup>170</sup> Importantly, the *McRO* opinion implicitly criticizes the inventive step approach from *Alice* as not focusing enough on the specific claim limitations.<sup>171</sup>

Other courts have been less subtle about their criticism of the inventive step approach. In *California Institute of Technology v. Hughes Communications Inc.*,<sup>172</sup> the court painstakingly traversed the patent claim by

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<sup>166</sup> See, e.g., *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1255–59 (Fed. Cir. 2014) (analyzing the interactions between a patent's claims to find that the patent claimed eligible subject matter beyond mere abstraction).

<sup>167</sup> See *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1311–16 (Fed. Cir. 2016).

<sup>168</sup> *Id.* at 1314.

<sup>169</sup> Sachs, *supra* note 56.

<sup>170</sup> *McRO*, 837 F.3d at 1315 (citing *Bilski v. Kappos*, 561 U.S. 593, 603 (2010)).

<sup>171</sup> See Sachs, *supra* note 56 (citing *McRO*, 837 F.3d at 1313) ("Whether at step one or step two of the *Alice* test, in determining the patentability of a method, a court must look to the claims as an ordered combination, without ignoring the requirements of the individual steps.").

<sup>172</sup> 59 F. Supp. 3d 974 (C.D. Cal. 2014).

claim, finding each to contain “inventive concepts that make them patentable.”<sup>173</sup> Additionally, Judge Pfalzer noted that although *Alice* failed to clarify when software patents survive a § 101 analysis, courts cannot presume that software patents are prima facie ineligible because “courts should not read into the patent laws limitations and conditions which the legislature has not expressed.” The opinion concludes with an argument that “[t]he Supreme Court in the future may provide a clearer outline for applying § 101 to software, but to this Court, it at least must be true that § 101 protects a unique computing solution that addresses a unique computing problem.”<sup>174</sup> This sort of analysis, looking to the uniqueness of the problem and the problem’s solution, certainly aligns with Holbrook’s view that the Court ought to rely more upon the patent’s specification and claim construction, rather than adhering to a vague inventive step.<sup>175</sup> Instead of assuming a linearly progressing science with discoverable laws of nature, a reliance upon the specific problem-solving aspects of the invention would cause the Court to shift focus toward the more-helpful paradigm view espoused by Kuhn. By loosening the restrictions on subject matter eligibility and instead relying upon the forgotten requirement of utility or robustly detailed analysis of written description, the courts can better develop a patent law jurisprudence that matches the reality of science.

## CONCLUSION

Like many areas of constitutionally based law, the patent system suffers from the inability of its creators to foresee future developments in science. Yet unlike, for example, the Fourth Amendment’s new application in an era of drone surveillance, the area of patent law has also been fundamentally challenged by developments in philosophy.

Since the 1970s, innovations in both biotechnology and computer software have plagued courts. Although initially “anything under the sun” seemed to be patentable,<sup>176</sup> the Supreme Court has repeatedly backpedaled, recently arriving at a vague inventive step model in the cases of *Mayo* and *Alice*.<sup>177</sup> This analysis moves away from the original goal of subject matter eligibility, which

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<sup>173</sup> *Id.* at 974, 993–1000.

<sup>174</sup> *Id.* at 1000.

<sup>175</sup> Holbrook & Janis, *An Audience Perspective*, *supra* note 1, at 379. Holbrook does not hide his disdain for the *Alice* construction: “The purpose of identifying the inventive concept, *aside from jettisoning* claim construction . . . .” *Id.* at 381 (emphasis added).

<sup>176</sup> *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).

<sup>177</sup> *See supra* notes 21, 37 and accompanying text.

sought to prevent preemption of innovation, and has instead prompted judges to engage in a formless discussion of the type of problem to be addressed and how the market has been addressing it. Such questions are arguably important to patentability, but the idea that they somehow belong in a subject matter eligibility analysis offends and discards other areas of the validity analysis. For example, Timothy Holbrook argued that if such questions are to be examined, certainly at least a claim analysis should take place, and data concerning the knowledge of the PHOSITA should be examined.<sup>178</sup> Recently, the Federal Circuit decided *McRO*, in which a claim analysis did result in a finding of validity, due to a recognition that inventiveness was present in the creation of an algorithm.<sup>179</sup> Not all algorithms are created equal, and nearly all algorithms that reach beyond the basics of mathematics involve at least some level of human creativity.<sup>180</sup> Such algorithms, and by symmetry, such human-discovered biological mechanisms, should be analyzed on their claims or perhaps under utility analysis to determine validity instead of being immediately cast aside as being too basic or close to a law of nature.

Thomas Kuhn presents a historically founded, anti-realist, and eminently non-linear view of scientific progress in his work *The Structure of Scientific Revolutions*. In doing so, he paints a picture of science adamantly at odds with the assumptions underlying the Supreme Court's views in *Mayo* and *Alice*. The inventive step advocated for in those cases fails to correctly grasp how the scientific endeavor truly works. Such a focus on the inventiveness of a patent seems far too vague a standard. In fact, if the work of Paul Feyerabend is to be given any credit, the scientific endeavor cannot simply be characterized by any one method or process, especially not one aimed at inventiveness at all.

By adjusting the validity analysis to loosen the filter of subject matter eligibility, the courts can more appropriately use frameworks provided by both utility and written description requirements. This refocusing will encourage

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<sup>178</sup> Holbrook & Janis, *An Audience Perspective*, *supra* note 1, at 372 n.123.

<sup>179</sup> *McRO, Inc. v. Bandai Nameo Games Am. Inc.*, 837 F.3d 1299, 1316 (Fed. Cir. 2016).

<sup>180</sup> Importantly, algorithms are the ultimate puzzle-solvers. Discovering new ways to solve puzzles is a key component of Kuhn's paradigm model, and giving more attention to the patentability of algorithms as opposed to a blanket opposition, as *Alice* has encouraged, will both further the existing paradigms and could even incentivize the onset of new revolutions.

more in-depth analysis of the mythical “person who is skilled in the arts,” causing expert witness testimony to play a key role. Bringing real scientists into the fore when determining patent validity will better align the patent system with a descriptivist view of science and reduce current confusion at lower courts.

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