Resolving Patent Eligibility and Indefiniteness in Proper Context: Applying *Alice* and *Aristocrat*

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ABSTRACT

In the wake of the Supreme Court's revolution in § 101 jurisprudence, district courts have begun resolving questions of patent eligibility at an early stage in patent litigation, without evidence or formal claim construction. This chaotic new trend represents a departure from the test set forth in *Mayo/Alice*, which requires courts to determine whether a patent teaches an "inventive concept" or merely recites "conventional" structure—a determination that overlaps with the question of novelty often requires the resolution of significant factual issues. Courts have made a similar departure in the law of indefiniteness, unmooring the analysis from the perspective of the skilled artisan.

This article contends that both eligibility and indefiniteness must be decided *in context*, as they long have been. Context demands that courts adopt the perspective of the skilled artisan, often taking evidence in the form of expert testimony. Particularly with respect to eligibility, it requires that courts assess the claimed invention as part of the field within which it arose. Thus, reading the prosecution history and the prior art will often be necessary. The current tendency among judges to decide these issues "in a vacuum"—absent prior art evidence and without the understanding of the skilled artisan—is rooted in a fear of overly preemptive patents and broad functional claiming. While these concerns are not without merit, current trends have gone much too far, and patents are often being held invalid on scant evidence. To restore balance in these inquiries, this article argues that courts must return to context-based decision-making. This Article illustrates the conflicts within the Federal Circuit's indefiniteness doctrine that wrongly preclude the use of expert testimony and the need to be resolved *en banc*. It also argues that, although the *Mayo/Alice* framework clearly indicates that eligibility doctrine rests on crucial questions of fact—questions usually inappropriate at the motion to dismiss stage—further procedural guidance is necessary to clarify how courts should decide eligibility properly. Judicial intervention comparable to *Markman*, which created so-called *Markman* hearings on claim construction and began a revolution in patent procedure, may be necessary in the eligibility context to clarify how (and when) courts are to decide eligibility and what fact issues are relevant. In the absence of such guidance, it may be necessary for Congress to amend §§ 101 and 112 to clarify the contextual nature of these inquiries.

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I.   INTRODUCTION

Like the ghost in *Hamlet*, the specter of preemption haunts patent doctrine. Whether it appears as a patent drawn to an "abstract idea" or a "purely functional claim," the specter inspires the same fear: that the patent will prove boundless, reaching far beyond the scope of its inventive contribution by sweeping up the "basic tools" of science and thwarting innovation.[1] It looms behind recent revolutions in patent eligibility and indefiniteness jurisprudence,[2] which have made those issues[3] ("virtually unknown twenty years ago") the two

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[1] Since all patents are, by their nature, preemptive to some degree, the issue is whether the patent is *unduly* preemptive, in a way that derails progress. *See* Alice Corp. Pty. Ltd. v. CLS Bank Int'l., 134 S. Ct. 2347, 2354 (2014) ("We have described the concern that drives this exclusionary principle as one of pre-emption…Laws of nature, natural phenomena, and abstract ideas are the basic tools of scientific and technological work. Monopolization of those tools through the grant of a patent might tend to impede innovation more than it would tend to promote it.") (quotations omitted). *See also* Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 WIS. L. REV. 905, 907 (2013) (describing the problem of pure functional claiming as "claiming to own not a particular machine, or even a particular series of steps for achieving a goal, but the goal itself"); Mark A. Lemley et al., *Life After Bilski*, 63 STAN. L. REV. 1315, 1328–29 (2011) (arguing that exceptions to § 101 eligibility operate as a "scope limitation" and are animated by the "worry" that an overbroad patent claim "encroaches upon society's right to unfettered access to scientific truths, fundamental principles, and the like"). Strandburg understands the "preemption rhetoric" as masking concern about "per se exclusion." *See generally* Katherine J. Strandburg, *Much Ado About Preemption*, 50 HOUS. L. REV. 563 (2012).

[2] 35 U.S.C. § 101 (eligibility); 35 U.S.C. § 112 ¶ 2 (definiteness). The exceptions to subject matter eligibility for patenting under § 101 have arisen through common law, though the Supreme Court treats them as 'implicit" in the statute. *See* Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 134 S.Ct. 2347, 2354 (2014).

[3] 35 U.S.C. § 282 (listing defenses to patentability). While indefiniteness is clearly a defense to patentability under § 282(b)(3)(a), there has been some controversy as to whether § 101 eligibility so qualifies. *See, e.g.*, David Hricik, *Why Section 101 is Neither a "Condition of Patentability" Nor an Invalidity Defense*, PATENTLY-O (Sep. 16, 2013), *available at* http://patentlyo.com/hricik/2013/09/why-section-101-is-neither-a-condition-of-patentability-nor-an-invalidity-defense.html. The issue was later litigated

"most successful validity challenges today."[4] If the specter of preemption looms behind every patent, then how do we ward off such astral phenomena? An insistence on *corporeality* has been one response. It maintains that the best way to master the possibility that claims will be drawn to mere abstraction or pure functionality is to confine them within *physical* bounds, requiring tangible embodiments or a particular "structure." An emphasis on corporeality focuses the court's inquiry on whether that structure is sufficiently limiting to trap the abstraction or function inside discernible confines, or whether those structural limits ultimately prove illusory.[5] One example of structure with

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in the context of so-called "covered business method review" proceedings, a variant of administrative post-grant review before the PTO that permits parties to challenge a patent "on any ground that could be raised" under § 282(b)(2)-(3). Hence the question in *Versata Dev.Group, Inc. v. SAP America, Inc.*, 793 F.3d 1306 (Fed. Cir. 2015) was whether § 101 qualified as a "condition for patentability" under § 282(b)(2) and hence was available as a ground for CBM review before the PTO. Versata pointed to the fact that the statutory heading for § 101 is "inventions patentable," whereas §§ 102 and 103, traditionally the most common grounds for challenging patents, are listed under "conditions of patentability." *Id.*, at 1330. The court, however, rejected that argument as "a hyper-technical adherence to form rather than an understanding of substance." *Id.* (noting that "Section 101 validity challenges today are a major industry, and they appear in case after case in our court and in Supreme Court cases, not to mention now in final written decisions in reviews under the AIA."). Interestingly the author of the *Versata* opinion, Judge Plager, seemed sympathetic to the opposite view writing in dissent in *Dealertrack, Inc. v. Huber*, 674 F.3d 1315, 1335 (Fed. Cir. 2012) (Plager, J., dissenting), where he distinguished "the defenses provided in the statute," *i.e.*, "conditions of patentability," from "the jurisprudential morass of § 101."

[4] John R. Allison et al., *Understanding the Realities of Modern Patent Litigation*, 92 TEX. L. REV. 1769, 1801 (2014). Though there can be little question that eligibility has become a potent defense through recent doctrinal changes, there is evidence that the rate of indefiniteness has remained relatively stable in spite of the significant doctrinal developments discussed here. *See* John R. Allison & Lisa Larrimore Ouellette, *How Courts Adjudicate Patent Definiteness and Disclosure*, 65 DUKE L.J. 609, 655-56 (2016). This does not tell the whole story of the impact of *Aristocrat* and its progeny, however. *See generally infra* Section III; *see also infra* note 33.

[5] That is why courts have come close to adopting, and some continue to advocate, a "technological arts" test for eligibility, according to which the

only inventions patentable would be strictly limited to physical improvements. DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245, 1265 (Fed. Cir. 2014) (Mayer, J., dissenting); Ultramercial, Inc., v. Hulu, LLC, 772 F.3d 709, 717-22 (Fed. Cir. 2014) (Mayer, J., concurring) ("*Alice*…for all intents and purposes, set out a technological arts test for patent eligibility" and suggesting a "rule" according to which "claims are impermissibly abstract if they are directed to an entrepreneurial objective, such as methods for increasing revenue, minimizing economic risk, or structuring commercial transactions, rather than a technological one" and must "not only 1) describe a technological objective, but 2) set out a precise set of instructions for achieving it"); I/P Engine, Inc. v. AOL Inc., 576 F. App'x. 982 (Fed. Cir. 2014) (Mayer, J., concurring). *See also* Network Apparel Group, LP v. Airwave Networks Incorporated, 2015 WL 9661571, at *15 (W.D. Tex. Dec. 30, 2015) (citing Mayer's concurrence in *Ultramercial* for the proposition that *Alice* set out a technological arts test); *see also* Affinity Labs of Tex., LLC v. DirecTV, LLC, 109 F.Supp.3d 916 (W.D. Tex. Jul. 7, 2015); Mirror Worlds Techs., LLC v. Apple Inc. 2015 WL 6750306, at *8 (E.D. Tex. Jul. 7, 2015) (same); Affinity Labs of Tex., LLC v. Amazon.com, Inc.*,* 2015 WL 3757497, at *11 (W.D. Tex. Jun. 12, 2015). *But see* RaceTech, LLC v. Kentucky Downs, LLC, 2016 WL 843382, at *3 & *9 (W.D. Ky. Mar. 1, 2016) (recognizing that a "technological arts test has not been considered by the Supreme Court" but reading *Bilski* to have "invit[ed]" the "Federal Circuit [to] develop parameters in this regard" and finding such a test "may be helpful," while characterizing is as an "alternative test"); Abraham Kasdan, C*an You Patent Software and Business Methods in the U.S.? How Did We Get Here and Where Do We Now Stand?*, 24 FED. CIR. B.J. 649, 667 (2015) (recognizing that "the Supreme Court has not expressly stated that the additional 'inventive concept' has to be in the "'technological arts'" and implying that its rejection of "the Federal Circuit's position that the 'machine-or-transformation' test should be used to determine what is or is not an abstract idea" indicates that in the Supreme Court's view a technological arts test is not required). Indeed, unless one is prepared to say that the Supreme Court in *Alice* reversed itself in *Bilski* (which it cited approvingly throughout *Alice*), it is difficult to suggest that *Alice* be read as intending a technological arts approach. Moreover, the Federal Circuit rejected such a test in its *en banc* decision in *In re Bilski*, 545 F.3d 943, 960 (Fed. Cir. 2008) ("We perceive the contours of such a test, however, would be unclear because the meanings of the terms 'technological arts' and 'technology' are both ambiguous and ever-changing."), *aff'd sub nom*. Bilski v. Kappos, 561 U.S. 593 (2010).

such phantom significance, the general purpose computer, has often been invoked where these concerns were present.[6] The Federal Circuit's dread of pure functional claiming was the catalyst for its new rule of indefiniteness in *Aristocrat*.[7] There, the court held that a general purpose computer is not sufficiently structural and an "algorithm" must be disclosed to render the claims definite.[8] And in *Alice*—after a fractured Federal Circuit could not agree on conditions for eligibility in what Chief Judge Rader described as "the greatest failure of my judicial career"[9]— the Supreme Court held that merely implementing an "abstract idea" on a "generic computer" was insufficient to confer eligibility.[10] In both of these cases and their progeny, courts searched for structure rising above the level of a generic or general purpose computer because such a machine has been deemed to be insufficiently limiting, as evanescent as the mist.

As a boundary, then, the general purpose computer has frequently been found wanting. Where offered as definite structure, or as the basis for a patent-eligible invention under § 101, courts reject it as a ploy, a disguise for patents that really claim the function or abstract idea. Courts accept the general purpose computer only where the patent owner offers *evidence* indicating that *something more* is present, something demonstrating that the claim reads on "special purpose"

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[6] Litigants today routinely assert that "a general purpose computer is not *per se* structural." Brief for Appellee Apple, Smartflash LLC v. Apple Inc., No. 16-1059 (Fed. Cir. Apr. 21, 2016), 2016 WL 1638438, at *16.

[7] Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech., 521 F.3d 1328 (Fed. Cir. 2008).

[8] When this Article refers to "pure functional claiming," and in its discussion of *Aristocrat* and its progeny throughout, it refers to claims drafted in means-plus-function form. *See generally* Lemley, *supra* note 1. However, the implications of *Aristocrat* are not limited solely to means-plus-function claims but are much broader, in my view, especially in view of Lemley's proposal that the doctrine be expanded to apply to "functional" claims that may not be drafted in obviously means-plus-function format. *Id.* at 943-44.

[9] Brian Mahoney, *Software Ruling a Major Judicial Failure*, *Rader Says*, LAW360 (Oct. 25, 2013), http://www.law360.com/articles/482264/software-patent-ruling-a-major-judicial-failure-rader-says.

[10] Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 134 S. Ct. 2347, 2358 (2014).

hardware, an algorithm, some "inventive concept" rendering it a new machine.

Where courts have found this something more, the decisive element, at least in the field of computing, has typically been either special programming software or a hardware improvement. With so many patents to computer-implemented inventions, it is of prime importance that courts recognize claims to a general purpose computer that provides no limit in scope in contrast to those tied to a special purpose computer, whose limits are squarely within the physical realm. But precisely what distinguishes the latter from the former has been difficult to specify.

Guidance in this endeavor is precisely what the law now lacks. Courts invoking *Alice* and *Aristocrat* speak of the general purpose computer, but they are doing so without good criteria for distinguishing it from more specific hardware or for understanding what they mean by the machine they regard as pseudo-structure. As one district court judge politely put it, "the Federal Circuit has provided little guidance for determining when a recited structure is merely 'a general purpose computer.'"[11] Neither the Supreme Court nor the Federal Circuit has defined what counts as a generic or general purpose computer. As a result, district courts have difficulty distinguishing claims that are definite and inventive from those in which the disclosure of a general purpose computer masks purely functional claiming or an underlying abstraction.

This lack of clarity will only become more problematic now that courts have thrown open the floodgates to eligibility challenges,[12] already perhaps the greatest source of uncertainty

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[11] SIPCO, LLC v. Abb, Inc., 2012 WL 3112303, at *298 (E.D. Tex. Jul. 30, 2012).

[12] *See, e.g.*, Intellectual Ventures I LLC v. Erie Indem. Co., 2015 WL 5686643 (W.D. Pa. Sep. 25, 2015) ("In the wake of *Alice*…the proverbial motions practice floodgates have opened," and eligibility is "being litigated daily (if not hourly) in federal courts across the country."); Stanacard v. Rubard, LLC, 2015 WL 7351995, at *1 n. 1 (S.D.N.Y. Nov. 18, 2015)

in patent doctrine today.[13] In fact, the current doctrinal mess has prompted calls from mainstream figures in the patent community to consider abandonment of § 101 altogether.[14] Given the situation in district courts today, one can see why. An informal study of § 101 challenges found that courts are invalidating patents 73% of the time at the district level, while the Patent Trial and Appeal Board (PTAB) is holding them invalid in virtually every case.[15] With many of these cases now making their way to appeal, oral arguments before the Federal Circuit have been replete with comments from the judges which range from ridicule and frustration to outright exasperation with the Supreme Court's test for eligibility.[16]   Most of these

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(referring to eligibility challenges as "the newest wrinkle in patent litigation").

[13] *See* Oral Argument at 14:40–14:50, Enfish, LLC v. Microsoft Corp., (Fed. Cir. Feb. 5, 2016) (No. 15-1244), *available at* http://www.cafc.uscourts.gov/oral-argument-recordings/search/audio.html?title=&field_case_number_value=15-1244&field_date_value2%5Bvalue%5D%5Bdate%5D=, (Judge Taranto: "There is tremendous uncertainty about what constitutes an abstract idea.").

[14] Ryan Davis*, Kappos Calls For Abolition Of Section 101 Of Patent Act*, LAW360, Apr. 12, 2016, http://www.law360.com/articles/783604/kappos-calls-for-abolition-of-section-101-of-patent-act (quoting former PTO Director David Kappos as saying that "decisions like *Alice* on the issue are a 'real mess' and threaten patent protection for key U.S. industries"). *See also* Max Stul Oppenheimer, *Patents 101: Patentable Subject Matter and Separation of Powers*, 15 VAND. J. ENT. & TECH. L. 1 (2012) (proposing that Congress amend § 101 to eliminate the judicial exceptions to patent eligibility because of the "uncertainty" introduced by the incoherent jurisprudence in this area); *cf.* David Taylor, Confusing Patent Eligibility, 84 TENN. L. REV. __ (forthcoming) (criticizing the test for eligibility as confusing and inadministrable, and calling for legislative amendments to § 101, if not outright repeal).

[15] Robert R. Sachs, *#Alicestorm for Halloween: Was it a Trick or a Treat?*, BILSKIBLOG, FENWICK & WEST, LLP (Nov. 6, 2015), http://www.bilskiblog.com/blog/2015/11/alicestorm-for-halloween-its-scary-out-there-.html. I thank Bob Sachs for clarifying that these statistics are tracked from the date of the Supreme Court's decision in *Alice* through Westlaw and Docket Navigator, and that care was taken to identify decisions that were actually on eligibility, rather than those that merely cited the case.

[16] *See* Oral Argument at 42:15–42:24, Amdocs (Israel) Ltd. v. Openet Telecom, Inc., (Fed. Cir. Oct. 8, 2015) (No. 2015-1180), *available at*

decisions have found the claims invalid as ineligible under *Alice*, many because they were held to disclose nothing more than an abstract idea implemented on a generic computer,[17] with little notion of what does *not* constitute a generic computer. Though the scholarship is replete with criticism of the "highly nebulous"[18] abstract idea standard, and rightly so, this paper does something different: it challenges the application of eligibility and indefiniteness doctrine devoid of context, an approach that is particularly visible in cases where the bête noire is some ill-defined notion of the general purpose computer. Courts are improperly resolving these cases in a vacuum, substituting their own perspective for that of the skilled artisan and ignoring critical fact issues.[19]

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http://www.cafc.uscourts.gov/oral-argument-recordings/search/audio.html?title=&field_case_number_value=2015-1180&field_date_value2%5Bvalue%5D%5Bdate%5D= (Judge Plager referring to § 101 cases as "a plague on the patent system nowadays" and observing that "almost every other case comes in [to the Federal Circuit] on a § 101 basis).

[17] *See* Kroy IP Holdings, LLC v. Safeway, Inc., 107 F.Supp.3d 677, 689 (E.D. Tex. 2015) (stating that the "great majority" of eligibility challenges have resulted in decisions that "have held the claims unpatentable"). The Federal Circuit's Judge Bryson began sitting in a number of cases in the Eastern District, including *Kroy*, pursuant to General Order Assigning Civil Cases to U.S. Circuit Judge William C. Bryson, No. 13-22 (E.D. Tex. Dec. 16, 2013).

[18] Arti K. Rai, *Patent Validity Across the Executive Branch: Ex Ante Foundations For Policy Development*, 61 DUKE L. J. 1237, 1246 n. 35 (2012); *see also* Kevin Emerson Collins, Bilski *and the Ambiguity of 'An Unpatentable Abstract Idea,'* 15 LEWIS & CLARK L. REV. 37 (2011); Jeffrey A. Lefstin, *The Three Faces of* Prometheus*: A Post-*Alice *Jurisprudence of Abstractions*, 16 N.C. J.L. & TECH. 647, 649, 663 (2015) ("[T]here is little agreement on how the analysis of patent-eligibility should be structured," and while "[i]t might seem more intuitive to begin with *Mayo* step one, by defining abstract ideas . . . . [I]f we desire to begin with what we know with the most certainty, we should begin with *Mayo* step two.").

[19] *See, e.g.*, MacroPoint, LLC v. FourKites, Inc., 2015 WL 6870118, at *2 (N.D. Ohio Nov. 6., 2015) (refusing to "consider the expert affidavit offered by plaintiff as evidentiary matters outside of the complaint are not to be considered by a Court in addressing a motion under Rule 12," and finding the patent ineligible under § 101 and granting motion to dismiss); Datatrak Int'l, Inc. v. Medidata Solutions, Inc., 2015 WL 6870109, at *2 (N.D. Ohio Nov.

But giving content to the dividing line between an unduly preemptive claim and a permissible claim is not so easy, as can be seen from the following consideration: there are at least two senses in which we might understand the "general purpose computer" that marks the impermissible side of that line. In the first and broader sense, we might understand it to mean the general purpose computer *as such*, any real-world incarnation of the abstract Universal Turing machine.[20] But inventions falling under the rubric of general purpose computer cannot be what we want to exclude from patenting, for it would exclude all *improvements* to machines that are nonetheless general purpose computers. A glance at the history of computing is enough to see that the general purpose computer has appeared in many variations.[21] Such machines are, so to speak, "special" general purpose computers,[22] machines that are still general purpose in that they can perform multiple functions, but nonetheless have a

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6, 2015); Evolutionary Intelligence, LLC v. Sprint Nextel Corp., 2015 WL 5829783, at *4 n. 5 (N.D. Cal. Oct. 6, 2015) (refusing to consider plaintiff's expert declaration because it "is not appropriate for the court to consider on a motion to dismiss or motion for judgment on the pleadings," and finding the patent ineligible under §101 and granting motion to dismiss).

[20] *See, e.g.*, BORUT ROBIC, THE FOUNDATIONS OF COMPUTABILITY THEORY 119 (2015) ("The existence of the universal [Turing Machine] indicated that it might be possible to design a general-purpose computing machine— something that is today called the general-purpose computer.").

[21] *See*, *e.g.*, SUBRATA DASGUPTA, IT BEGAN WITH BABBAGE: THE GENESIS OF COMPUTER SCIENCE 104 (2014) (noting that one early definition of a general purpose computer "used somewhat arbitrary criteria" and "suffered from the pitfalls of present-centered . . . history," and hence its authors' "judgment of what was a general purpose computer was colored by their perspectives circa 1981; they both imposed their latter day perceptions on earlier situations").

[22] One of the amici in Dann v. Johnston, 425 U.S. 219 (1976), made a similar argument, albeit referring to improvements in the general purpose computer effectuated by software. *See infra*, note 74 and accompanying text (quoting argument of amicus curiae that "new circuits" in the "*general purpose machine*" made it into either a "*special purpose machine* or an *enhanced/extended general purpose machine* having problem-solving capabilities which qualitatively or quantitatively extend beyond the capabilities of the general purpose machine").

particular structure.[23] I mean this in a different sense than the one usually given, according to which the general purpose computer is thought to be rendered "special purpose" either through particular software programming or through modifications to its circuitry.[24] Here, I am thinking primarily of hardware improvements that do not alter a computer's general purpose character, but nonetheless constitute recognizable improvements in computing technology.

The second, narrower, sense in which we might understand the "general purpose computer" is as *conventional* structure,[25] as, essentially, the off-the-shelf computer of the day. Again, although the usage of general purpose computer can denote something essential about its functioning, in this second sense it is used to denote conventional hardware.[26] The

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[23] *See* ARTHUR W. BURKS, *Programming and the Theory of Automata*, *in* COMPUTER PROGRAMMING AND FORMAL SYSTEMS 83, 87 (P. Braffort & D. Hirschberg eds., 1963) ("Moreover, as 'special-purpose' and 'general-purpose' are normally used by computer people they connote practical rather than theoretical concepts. Most so-called special purpose machines are universal control automata . . . . Moreover any actual special-purpose computer is used to solve a number of problems, not just to compute one number . . . and hence is programmed in some sense. A computer is called general-purpose when it is relatively easy to program or use it on any of a wide variety of problems, and it is called special-purpose when in practice it can only be used to solve a relatively narrow class of problems.").

[24] *See, e.g.*, WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339, 1348 (Fed. Cir. 1999) ("A general purpose computer, or microprocessor, programmed to carry out an algorithm creates a new machine, because a general purpose computer in effect becomes a special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software. The instructions of the software program that carry out the algorithm electrically change the general purpose computer by creating electrical paths within the device. These electrical paths create a special purpose machine for carrying out the particular algorithm.") (internal citations omitted); *see also infra* Section II.

[25] Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1298 (2012) (finding "well-understood, routine, conventional activity" insufficient to transform a patent-ineligible concept into one that is patent-eligible).

[26] *See* David Chisnall, *No Such Thing As a General-Purpose Processor*, 57 COMMUNICATIONS OF THE ACM 44, 46 (2014) (contrasting the usage of "general-purpose processor" that refers to one that "can run any algorithm"

reference in *Alice* to the "generic" computer (in contrast to "general purpose"), whether intended by the court or not,[27] comports with this meaning: "generic" refers to a machine's conventionality and lack of particularity or uniqueness. A claim tied to the conventional computer of the day is effectively a claim to whatever abstract idea or function that computer performs because these have "no substantial practical application except in connection with" the computer.[28] Where the patent claims novel improvements to the computer—especially hardware improvements—the scope of the claim is clearly limited.[29] There is more controversy when the claim recites only a general purpose computer but still teaches novel functionality, for example through software.[30]

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with a usage that simply refers to the conventional hardware of the day, and noting that "[s]ome devices that are now regarded as microcontrollers were considered general-purpose CPUs before the ability to run a multitasking, protected-mode operating system became a core requirement").

[27] Most probably, of course, the *Alice* court adopted the term "generic" from its use in briefs from the parties and amici, and was not thinking about these nuances of meaning.

[28] Gottschalk v. Benson, 409 U.S. 63, 71–72 (1972) (rejecting patent for an algorithm tied to a computer as ineligible because it would "wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself").

[29] Obviously, a hardware improvement could involve a novel *combination* of existing elements (rather than some wholly new device), as *Alice* contemplates. *See* Alice Corp. Pty. Ltd. 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) (considering "the computer components" as "an ordered combination")).

[30] Here arises the well-known controversy as to whether software is patentable. *See infra* Section II. In the indefiniteness context, *Aristocrat* limits computer-implemented means-plus-function claims to the particular "algorithms" that implement the claimed function. This strongly resembles the approach rejected, in the eligibility context, by the Supreme Court in *Benson*, but resurrected controversially in *Alappat*. *See infra* Section II. Since *Aristocrat* springs from *Alappat*'s assumptions, and the vitality of *Alappat* is in doubt, there is thus an important question regarding the viability of the *Aristocrat* rule under the current regime of *Alice*. The Federal Circuit has anticipated this and sought to reassure litigants that the two doctrines are compatible and intact. *See* EON Corp. IP Holdings LLC v. AT&T Mobility

This second sense of general purpose computer—understood as a *conventional* machine—can serve as a dividing line for patentability, but it is only viable if courts resolve eligibility and indefiniteness in proper context. For at a high enough level of abstraction, the difference between a patentable improvement and the generic computer of the day may appear insubstantial.[31] Only by seeing the invention through the lens of the skilled artisan, in the context of the prior art at the time of filing, will courts be in a position to determine whether computer-implemented claims are tied to a generic computer or to something more. If today's test for eligibility turns on the conventionality of the claims, courts cannot avoid reading the patent in context—taking testimonial and other extrinsic evidence to assist its fact-laden inquiry—because conventionality is by definition historically variable.[32] That is the inevitable result of *Mayo's* foray into novelty issues. Unfortunately, in both eligibility and indefiniteness cases, courts routinely decide these issues in a vacuum, substituting their expertise for evidence of the prior art or the perspective of the skilled artisan.[33] That is a significant reason behind the high

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LLC, 785 F.3d 616, 623 (Fed. Cir. 2015) ("Before moving on, we note that *Alappat* has been superseded by *Bilski*…and *Alice*," though "[n]onetheless, *WMS Gaming* and *Katz* remain correctly decided" and are "consistent with recent Supreme Court precedent."). Wrapped up in this question is the extent to which software patents remain eligible. On the other hand, the Federal Circuit's recent decision in *Enfish* indicates that novel software, too, may improve the functioning of a computer and may not be "abstract" under *Alice*. The Court also seemed to suggest that limiting the claims to the algorithms disclosed in the specification under *Aristocrat* is not only compatible with *Alice* but works in favor of eligibility. *See infra* note 49 and Section IV.D.

[31] *See* Tun-Jen Chiang, *The Levels of Abstraction Problem in Patent Law*, 105 Nw. U. L. Rev. 1097 (2011) (arguing that deciding what level of abstraction at which to interpret a claim presents problems of indeterminacy).

[32] *Cf.* Brief for Petitioner, Gottschalk v. Benson, 490 U.S. 63 (1972) (No. 71-483), 1972 WL 137527, at *25–26 (arguing that a digital computer is inadequate as an apparatus limitation because "the digital computer in the hands of a modern scientist is what the desk calculator was to his father or the slide rule was to his grandfather").

[33] *See* Timothy R. Holbrook & Mark D. Janis, *Patent-Eligible Processes: An Audience Perspective*, 17 Vand. J. Ent. & Tech. L. 349, 362–363, 382 (2015) (observing that the "Supreme Court does not discuss how it makes the

rates at which patents are being held invalid as ineligible and
indefinite under *Alice* and *Aristocrat*.[34]

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assessment of what is 'conventional' and the evidence that may be used in
making this determination" in eligibility cases, and that "there is virtually
nothing to guide and focus the judicial imagination," while criticizing the
approach of deciding these issues on motions to dismiss as one that "entitles
a court to kick the hypothetical person of ordinary skill in the art to the curb
in favor of a discretionary analysis that need not be constrained by the need
to establish qualifying prior art evidence"); Kevin Emerson Collins, *Patent
Law's Functionality Malfunction and the problem of Overbroad, Functional
Software Patents,* 90 WASH. U. L. REV. 1399, 1446 (2013) (criticizing the
Federal Circuit for its application of *Aristocrat's* algorithm requirement in
indefiniteness cases, and arguing that the court cannot continue to "employ"
it "in a rote manner as it does today"); Alexander J. Hadjis & Douglas A.
Behrens, *Are Questions of Fact Being Overlooked in Software Cases?*,
LAW360   Jan.   12,   2015,
https://www.cadwalader.com/uploads/books/a6f71ed8a91dd0a70721a4f685
31d835.pdf (noting that district courts are "often tossing software cases
before meaningful fact discovery has been completed and before conducting
a claim construction hearing"); Brief for Tranxition, Inc. as Amicus Curiae,
Broadband iTV, Inc. v. Hawaiian Telecom, Inc., Fed. Cir. Jan. 28, 2016,
(Nos. 2016-1082, -1083), at *29 (asserting that "the factual inquiries"
concerning novelty, obviousness and indefiniteness are being "improperly
determined 'as a question of law' under Section 101"); Brief for International
Business Machines Corporation as Amicus Curiae, Alice Corporation Pty.
Ltd. v. CLS Bank International, 134 S. Ct. 2347 (2014) (No. 13-298), 2014
WL 343179, at *6 (criticizing courts in eligibility cases for engaging in "an
undisciplined parsing and rewriting of the relevant claims such that courts
end up evaluating a claim of their own making—not what the inventor
actually claimed"). On the other hand, some seem to believe that "district
courts are applying the two-step *Alice* test to patents . . . 'conscientiously and
deliberatively.'" O2 Media, LLC v. Narrative Science Inc., 2016 WL 738598,
at *4 (N.D. Ill. Feb. 25, 2016) (quoting David Swetnam-Burland & Stacy O.
Stitham, *Alice's Adventures in Oz: Revealing the Man Behind the Curtain*, 9
AKRON INTELL. PROP. J. 29, 44 (2015)). No doubt in some cases the courts
are doing their utmost to apply what is widely admitted to be a difficult
eligibility standard. However, to the extent that courts are deciding these
cases in a manner divorced from the perspective of the skilled artisan and
detached from the context of the prior art, this Article argues they are not
properly applying the test for eligibility under *Mayo/Alice*, which turns on the
"conventionality" of the claims. *See infra* Section IV.B.
[34] *See supra* note 15 and accompanying text (noting that patents are being
held invalid under § 101 73% of the time in district courts and 100% of the

In the law of indefiniteness, where an "algorithm" has been held to mark the difference between a general purpose computer that supplies no limiting structure and a special purpose computer that properly limits the claim, only the skilled artisan who determine on which side of this line an invention falls. After all, as one commentator has pointed out, general and special are "relative terms,"[35] and the skilled artisan's perspective is their starting point. Indeed, at a very low level of abstraction, one that often prevails "in practice," there is "no such thing as a general-purpose computer…[a]ll computers are special-purpose."[36]   For that reason computer scientists sometimes deny that there is such a thing as a "general purpose processor" because "the general-purpose processors of today are highly specialized" and "there is no one-size-fits-all processor design"— "there is a large spectrum."[37] Of course, we cannot descend to this low level of abstraction, lest we begin to see

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time before the PTAB); *see also* Allison & Ouellette, *supra* note 4, at 628, 655 (empirical study of indefiniteness cases between 1982 and 2012 finding that means-plus-function claims were "far more likely to succumb to an indefiniteness challenge."); *Id.* at 615, (maintaining that the result is "not purely driven by *Aristocrat*," a decision which appeared only in 2008). They reran their regressions "with all software patents removed from the dataset, and again with an additional restriction to pre-2008 decisions, and in each case, [they] found the same negative and highly significant coefficients." *Id.* at 656–66. Allison & Ouellette therefore find a general likelihood of indefiniteness for means-plus-function claims, unsurprising given the well-known difficulty of construing such claims. *Id.* at 674; *see infra* note 260. Future empirical work should examine the pre- and post-*Aristocrat* era, showing to what degree, if at all, this general trend worsened in the years since *Aristocrat*. Given *Aristocrat's* significance as a doctrinal shift, this seems extremely likely. Regardless of the particular statistics, however, the manner in which many courts are applying *Aristocrat* is fundamentally flawed, as this Article maintains. *See infra* Section III.

[35] Scott T. Luan, *All That is Solid Melts Into Air: The Subject-Matter Eligibility Inquiry in the Age of Cloud Computing*, 31 SANTA CLARA HIGH TECH. L.J. 313, 319 n. 26 (2015).

[36] BARRY CIPRA, WHAT'S HAPPENING IN THE MATHEMATICAL SCIENCES: 1985-1996, VOL. 3, 33–34 (1997) (quoting computer scientist Leonard Adleman, noting that computers may be "tailor[ed]…to fit a whole continuum of purposes").

[37] Chisnall, *supra* note 26, at 48.

every patent as particular and specific enough to pass muster under § 101 and § 112 (each one reciting a sui generis version of computing hardware, as different as snowflakes). But we cannot continue the current practice, which is treating virtually all hardware as if it were merely conventional, without evidence and divorced from context.

Since *Alice*, the trend has been for eligibility to be resolved on the pleadings or via motions to dismiss, rather than at the summary judgment stage. As of January 2016, roughly 59% of eligibility decisions were being rendered at the beginning of litigation, via judgment on the pleadings or a motion to dismiss.[38] This is an extraordinary procedural revolution in patent litigation, comparable, if it becomes entrenched, to the standardization of the so-called "*Markman* hearing,"[39] and in the broader litigation context, to the effect *Celotex* had in establishing summary judgment as a mechanism for disposing of cases before trial.[40] Unlike these developments, however, the elevation of § 101 to a gate-keeping inquiry early in patent litigation is leading to a misapplication of the law.[41]

Because the current test for eligibility under § 101 inquiry as articulated in *Mayo/Alice* has become linked to novelty issues, it is inappropriate for courts to decide eligibility

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[38] *See* Robert R. Sachs, *#Alicestorm: When it Rains, it Pours...*, BILSKIBLOG, FENWICK & WEST, LLP (Jan. 22, 2016), http://www.bilskiblog.com/blog/2016/01/alicestorm-when-it-rains-it-pours.html. Most other cases were resolved on summary judgment, with a handful on JMOL or through FED. R. CIV. P. 52.

[39] For an explanation of the procedural significance of the "*Markman* Hearing," *see, e.g.*, Markman v. Westview Instruments, Inc. *and Its Procedural Shock Wave: The* Markman *Hearing*, 5 J. L. & POL'Y 723 (1997).

[40] *See, e.g.*, Adam N. Steinman, *The Irrepressible Myth of Celotex: Reconsidering Summary Judgment Burdens Twenty Years After the Trilogy*, 63 WASH. & LEE L. REV. 81 (2006).

[41] One writer even suggests that fact-finding on eligibility is required by the Seventh Amendment. *See generally* Jesse D.H. Snyder, *Have We Gone Too Far: Does the Seventh Amendment Compel Fact-Finding Before Reaching a Decision on Patent-Eligible Subject Matter?*,14 CHI.-KENT J. INTELL. PROP. 436 (2015).

at so early a stage in the litigation. While the Supreme Court did not address whether tying § 101 to an analysis of "conventionality" necessarily implicates questions of fact, it is hard to see how courts could *not* require evidence in determining whether claims are "conventional." Similarly, in the §112 indefiniteness context, the Federal Circuit's *Aristocrat* line of cases has essentially precluded the use of all testimonial evidence, even though the relevant inquiry requires courts to determine whether the underlying structure is a general purpose computer and, if so, whether an "algorithm" is disclosed that provides sufficient limiting structure for the claimed function. This inquiry must be undertaken from the perspective of the skilled artisan, but often it is not. Analyses in both these areas of law need to be resituated in proper context.

A word about the current trend involving early resolution of § 101: prior to *Alice*, filing a motion to dismiss to attack a patent's validity directly was almost unthinkable, because the traditional invalidity defenses—anticipation, obviousness, indefiniteness, written description and inequitable conduct[42]— were all recognized as inevitably entangled with claim construction or as raising complex factual issues. Indeed, the fact that there are no extant statistics on the frequency of motions to dismiss involving § 101 or other invalidity issues is an indication of how rare those have been historically. Empirical studies divide invalidity decisions between those rendered at summary judgment or at trial, but give no data on motions to dismiss or judgments on the pleadings, presumably because these were extraordinarily rare.[43]   The motions to dismiss that were generally brought did not assert invalidity but attacked

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[42] To be precise, of course, inequitable conduct attacks not a patent's validity but its *enforceability*. Nevertheless, it belongs among these traditional defenses.

[43] *See, e.g.*, Jay P. Kesan & Gwendolyn G. Ball, *How Are Patent Cases Resolved? An Empirical Examination of the Adjudication and Settlement of Patent Disputes*, 84 WASH. U. L. REV. 237, 276 (2006) (dividing invalidity rulings between those resolved on summary judgment and those resolved at trial).

pleading deficiencies, for example flawed infringement theories or threadbare complaints. Even after the Supreme Court subjected pleadings to the somewhat elevated "plausibility" standard of *Twombly* and *Iqbal*, patent litigation saw relatively few such motions, and courts were liberal in granting plaintiffs leave to amend their complaints with greater specificity.[44] Motions to dismiss under *Twombly/Iqbal* were, from a patent defense perspective, primarily intended to impose some modest costs on plaintiffs while delaying more significant discovery costs for defendants (and perhaps provided opportunity for defense lawyers to bill their clients a bit before the cases ultimately settled).

For many years, perhaps the most effective means of disposing of patent cases for defendants loathe to settle was, short of full-blown litigation, to request *ex parte* reexamination of the patent by the PTO.[45] Reexamination was a forerunner of today's more trial-like post-grant proceedings. Over time, it was increasingly used strategically in order to derail district court litigation. The lengthy duration of reexamination proceedings and the absence of any statutory limit on their pendency, combined with the tendency of district courts to grant stays pending their outcome, meant that *ex parte* reexamination could put a patent case on ice indefinitely.[46] One reason why motions to transfer venue became more popular in patent litigation was the variance in district courts' receptiveness to stay patent cases pending reexam; in the Eastern District of Texas, where judges were much less likely to grant stays, the threat of reexamination

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[44] *See generally* Jonathan L. Moore, *Particularizing Patent Pleading: Pleading Patent Infringement in a Post-*Twombly *World*, 18 TEX. INTELL. PROP. L.J. 451, 478 (2009–2010); Adam Steinmetz, *Pleading Patent Infringement: Applying the Standard Established by* Twombly *and* Iqbal *to the Patent Context*, 13 COLUM. SCI. & TECH. L. REV. 482, 516 (2011–2012).
[45] *See generally* Raymond A. Mercado, *The Use and Abuse of Patent Reexamination: Sham Petitioning Before the USPTO*, 12 COLUM. SCI. & TECH. L. REV. 93 (2011) [hereinafter *Use and Abuse*]; Raymond A. Mercado, *Ensuring the Integrity of Administrative Challenges to Patents: Lessons from Reexamination*, 14 COLUM. SCI. & TECH. L. REV. 558 (2013).
[46] *See Use and Abuse*, *supra* note 45, at 106–108.

was not as potent as in the Northern District of California, where stays were routinely granted.[47] With the passage of the AIA and the creation of several new administrative mechanisms for challenging patents, defendants now have robust alternatives to district court litigation.   Besides limiting the expense of discovery, and imposing costs on plaintiffs who typically cannot turn to their contingency counsel to defend them in post-grant proceedings and are forced to hire counsel on an hourly basis, proceedings before the PTAB are weighted to the advantage of challengers. Post-grant proceedings have therefore proven very popular for defendants in patent litigation. Yet they are still costly, with $23,000 in filing fees for the typical *inter partes* review petition,[48] plus perhaps another $100,000 – $250,000 in attorney's fees that would be involved in preparing that petition, exclusive of the costs of including an expert declaration.

The cost of PTAB proceedings has fueled the trend toward early motions challenging patents on § 101 grounds. The low cost of briefing such *Alice* motions (perhaps $10,000–$20,000 in attorney's fees), the fact that they can be filed so early in the case, and their high rates of success combine to make them more attractive for many defendants as a first-resort than challenging patents before the PTAB. For many observers, this is a welcome development—especially for those opposed to so-called "business method" and software patents which the Supreme Court has been reluctant to hold outright ineligible.[49]

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[47] *See id.* at 108 (comparing the Northern District of California's stated "liberal policy in favor of granting motions to stay" pending the outcome of reexamination proceedings, with the Eastern District of Texas's statement that the district maintains "no policy to routinely grant such motions").

[48] *See* 37 C.F.R. § 42.15 (2016). $23,000 includes a "request fee" of $9,000, together with a $14,000 "post-institution fee," which is refundable if the PTAB decides not to institute the proceeding. *Id.*

[49] *See* Cal. Inst. of Tech. v. Hughes Commc'n Inc., 59 F.Supp.3d 974, 984 (C.D. Cal. 2014) ("*Alice* did not answer the bigger questions, only incrementally clarifying § 101 . . . *Alice* held only that abstract business methods do not become automatically patentable when implemented on a computer. *Alice* failed to answer this: when, if ever, do computer patents survive § 101?").

Indeed, *Alice* seems to have radically undermined the viability of so-called business method patents in spite of the Supreme Court's assurances to the contrary and poses significant obstacles for software patenting as well.[50] Yet, whatever one may think of these long controversial categories of patenting, there are many patents being held ineligible because courts are engaging in a free-wheeling inquiry as to the "conventionality" of the claims, rather than making this determination on the basis of evidence and in proper context.   The supposedly "more care[ful]" and context-dependent determination of *Mayo/Alice* Step Two is being made in a vacuum, like the "quick look test" of Step One.[51] The practice, according to the President of the

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[50] *See* Paone v. Broadcom Corp., 2015 WL 4988279, at *5, *9 (E.D.N.Y. Aug. 19, 2015) ("[S]oftware patents have been called into question following *Alice* . . . . There have been cases decided since *Alice* that can arguably be read to suggest that software patents as an entire category are no longer within the scope of 101."). *But see* Enfish, LLC v. Microsoft Corp., 56 F. Supp. 3d 1167, 1172 (C.D. Cal. 2014) ("*Alice* brought about a surge of decisions finding software patents ineligible. [But] [d]espite this flurry of 101 invalidations, in reality, *Alice* did not significantly increase the scrutiny that courts must apply to software patents. It held only that an ineligible abstract idea does not become patentable simply because the claim recites a generic computer."), *aff'd*, 2016 WL 2756255 (Fed. Cir. May 12, 2016) (declining to "creat[e] a categorical ban on software patents"). "Much of the advancement in computer technology consists of improvements to software that, by their very nature, may not be defined by particular physical features but rather by logical structures and processes. We do not see in *Bilski* or *Alice*, or our cases, an exclusion to patenting this large field of technological progress." *Id*.; *Cal. Inst. of Tech.*, 59 F. Supp. 3d at 984–85 ("Congress has spoken on the patentability of software" and "*Alice* seems to acknowledge that software may be patentable if it improves the functioning of a computer." The "Supreme Court could have resolved *Alice* and provided clarity to patent law by declaring all software patents ineligible," but "the Supreme Court did not do this.").   A PricewaterhouseCoopers study suggested that *Alice* "significantly impacted the ability to obtain and assert software patents," and was the "primary" factor behind the recent drop in the number of new patent lawsuit filings. PricewaterhouseCoopers, 2015 Patent Litigation Study: A Change   in   Patentee   Fortune   (May   2015), https://www.pwc.com/us/en/forensic-services/publications/assets/   2015-pwc-patent-litigation-study.pdf.

[51] *See Enfish*, 56 F. Supp. 3d at 1173 ("Step one is a sort of 'quick look' test, the purpose of which is to identify a risk of preemption and ineligibility. If a

American Intellectual Property LawAssociation (AIPLA), is one that "has disrupted our industry and has taken patent eligibility away from inventions that ought to get the benefit of our patent system."[52]

No doubt there are some eligibility cases appropriate for resolution, without evidence, on a motion to dismiss, or indefiniteness cases where the disclosure is so plainly indefinite that to admit evidence as to the perspective of the skilled artisan would be futile. But that cannot be the rule, not when the test for eligibility necessarily raises myriad factual questions or when indefiniteness has historically been decided from the perspective of the skilled artisan.

In what follows, therefore, this Article first (in Section II) retraces early attempts to grapple with claims tied to the general purpose computer in eligibility doctrine, culminating in the Federal Circuit's controversial *en banc* decision on eligibility in *Alappat*.   In Section III, it turns to the minor revolution in indefiniteness doctrine brought about by the Federal Circuit's opinion in *Aristocrat*, a case that drew its key assumption from *Alappat*. Although *Aristocrat's* "algorithm" requirement makes some sense, especially with a view to forcing software patents to adhere to some discernable limits, the Federal Circuit in a series of decisions has virtually precluded the submission of testimonial evidence and divorced the indefiniteness inquiry from its longstanding origins in the perspective of the skilled artisan. Moreover, the algorithm rule suffers from vagueness and levels of abstraction problems, for which the skilled artisan's perspective can provide the only guidance.   Therefore, Section III points out the doctrinal inconsistencies in the *Aristocrat* cases and urges that the Federal Circuit act *en banc* to resolve them. Finally, (in Section IV) we turn to the upheaval in eligibility doctrine represented by the

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claim's purpose is abstract, the court looks with more care at specific claim elements at step two."), *aff'd*, 2016 WL 2756255 (Fed. Cir. May 12, 2016).
[52] Scott Graham, *Q&A With AIPLA President Denise DeFranco*, THE RECORDER, Nov. 13, 2015.

Supreme Court's recent decisions in *Mayo* and *Alice*. Now that the test for eligibility explicitly overlaps with the issue of novelty and requires courts to determine the "conventionality" of the claims, it argues that the currently widespread practice of deciding eligibility on a motion to dismiss is inappropriate and untethered from the very test set forth in *Mayo/Alice*. Since the *Mayo/Alice* test raises myriad factual issues, Section IV argues that we need an intervention from the Federal Circuit in the procedure of eligibility cases, comparable to the procedural revolution that took place in the wake of *Markman* and led to the creation of *Markman* hearings on claim construction as a standardized practice in patent litigation.[53] As a starting point, the Federal Circuit should hold *en banc* that, as articulated in *Mayo/Alice*, the test for eligibility depends upon subsidiary factual issues ill-suited to a resolution at the motion to dismiss stage and must be determined from the perspective of the skilled artisan. Finally, Section V argues for either *en banc* action or statutory amendments to correct the current deficiencies in eligibility and indefiniteness doctrine.

II.   CONTROVERSIES SURROUNDING THE GENERAL PURPOSE COMPUTER AS "STRUCTURE"

A.   The Road to *Alappat*

Perhaps the best place to begin is with the controversy over whether "a general purpose computer in effect becomes a

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[53] Markman v. Westview Instruments, Inc., 52 F.3d 967, 991–92 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). *Markman* itself did not settle all the procedural issues with respect to the practice of claim construction, but it did force district courts to grapple with these, and the result was "the creation of a separate hearing—the *Markman* hearing—which has become in many instances a 'preliminary trial' during which the court receives argument or testimony regarding claim construction." William F. Lee & Anita K. Krug, *Still Adjusting to* Markman*: A Prescription for the Timing of Claim Construction Hearings*, 13 HARV. J.L. & TECH. 55, 59 (1999). With the right vehicle, an *en banc* Federal Circuit could provide more guidance on these procedural questions with respect to eligibility hearings than it did for claim construction in *Markman*.

special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software."[54] That proposition, enunciated almost in passing in *Alappat*, struck contemporaneous commentators as "a bald assertion."[55] And although *Alappat* has since become the locus classicus for this view, in fact this position had a significant prior history.[56] It was the object of ridicule more than 20 years earlier, in *Benson*.[57] There, the government contended that Benson's claim to a mathematical algorithm, even if limited to an apparatus like the digital computer,[58] "amounts to no more than

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[54] *In re* Alappat, 33 F.3d 1526, 1545 (Fed. Cir. 1994) (en banc).

[55] Jonathan N. Geld, *General Does Not Mean Generic-Shedding Light on* In re Alappat, 4 TEX. INTELL. PROP. L.J. 71, 72 (1995).

[56] Chin argues that the "new machine principle" of *Alappat* is traceable to *In re Bernhart*, a case wherein, as he maintains, the court made a category mistake in attributing novelty the mathematical equations used to program the computer in a patent for software, and therefore erred in holding that new programming creates a new machine. According to Chin, "the attributes of nonobviousness and ordinary skill in the art are inapplicable to the mathematical derivation of equations." Andrew Chin, *Ghost in the "New Machine": How* Alice *Exposed Software Patenting's Category Mistake*, 16 N.C. J.L. & TECH. 623, 636 (2015)

[57] Gottschalk v. Benson, 409 U.S. 63, 67–68, 71–72 (1972).

[58] There had been some dispute as to whether the claims were even tied to a digital computer. The *Benson* court ultimately did not sort out the differences between claim 8 and claim 13 of Benson's patent application, referring in its opinion to "the 'process' claim" as if there were just one claim in the case, even though both claims were at issue, and finding it "so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion." *Benson*, 409 U.S. at 68. However, there was a disagreement between the parties regarding whether claim 8 had more apparatus limitations than claim 13, owing to its reference to a "shift register," a component that "all digital computers necessarily utilize." Brief for Petitioner, Gottschalk v. Benson, 409 U.S. 63 (1972) (No. 71-485), 1972 WL 137527, at *24. *See* Pamela Samuelson, Benson *Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions*, 39 EMORY L.J. 1025, 1053 (1990) (observing that in *Benson*, "the Court, like the Patent Office before it, made no distinction between Claims 8 and 13," and noting that "the Supreme Court's *Benson* decision is not a model of clarity"). In Samuelson's view "[t]his aspect of the Court's ruling in *Benson* seems to be a rejection of the argument that computer program-related inventions are patentable subject matter because they are capable of being performed by machine." *Id*. at 1053 n. 91. Given

another conventional use for a known machine, comparable to the insertion of a new piano roll in an old player piano."[59] Seizing on the inventor's remark that his "claims do not preempt any inherent function of the machine" but in fact "give[] the machine a function that it would not otherwise possess,"[60] the government asserted that a "computer does not acquire a new function . . . every time it is programmed to perform a different set of arithmetical calculations, any more than a player piano acquires a new function each time it plays a new song."[61]

Among patent lawyers, the debate apparently became known colloquially as the "piano roll blues,"[62] clearly a derogatory idiom.[63]   The *Benson* court, while not explicitly addressing this analogy, suggested that tying the algorithm to the computer was not sufficiently limiting to assuage the claim's preemptiveness.[64]   This was the opposite of the conclusion the

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the Court's failure even to account for the existence of two claims, and its reference to a singular claim throughout, I do not read the opinion as addressing this issue. *See infra* note 67.

[59] Brief for Petitioner, Gottschalk v. Benson, 409 U.S. 63 (1972) (No. 71-485), 1972 WL 137527, at *26.

[60] Brief for Respondents, Gottschalk v. Benson, 409 U.S. 63 (1972) (No. 71-485), 1972 WL 137528, at *40 n. 35.

[61] Reply Brief for Petitioner, Gottschalk v. Benson, 409 U.S. 63 (1972) (No. 71-485), 1972 WL 136228, at *5.

[62] *See Old Piano Roll Blues* in PETER GROVES, A DICTIONARY OF INTELLECTUAL PROPERTY LAW (2011) (noting that Chief Justice Archer "[t]rashed" the argument in his *Alappat* dissent).

[63] The target for derision seems to be the argument *for* patentability. *See* Chin, *supra* note 56, at 626–27 (referring to the idiom as a "derisory nickname"). Stern interprets the idiom as an expression of derision for the patentee's argument *for* patentability. *See* Richard H. Stern, Alice v. CLS Bank*: US Business Method and Software Patents Marching Towards Oblivion?*, 36 EUR. INTELL. PROP. REV. 619, 620 (2014) (referring to "piano roll blues" as a "derisive term . . . for the argument for per se patent eligibility of newly programmed computers").

[64] Gottschalk v. Benson, 409 U.S. 63, 71–72 (1972). ("[t]he mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that . . . the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself.").

Court of Customs and Patent Appeals (CCPA) had drawn from the same point, namely that since the only practical use of the algorithm was via the digital computer, this actually weighed *in favor* of patentability.[65] Although the *Benson* court acknowledged that one of the claims at issue was arguably tied to a computer,[66] it held that the claim, "can also be performed without a computer"[67] and in any event did not see the fact that the only practical use of the algorithm would be on a computer as sufficiently limiting the claim's preemptiveness.[68]

The issue arose again in *Johnston*, where the petitioner asked the court to consider "[w]hether the programmed computer is [patentable when] claimed as a new 'machine system'" and "[w]hether programs for existing general purpose digital computers, however claimed, are patentable under present law."[69] Although the Supreme Court dodges these issues and opted to resolve the case on other grounds, the briefing is rife with relevant argument. There the government asserted that

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[65] *In re* Benson, 441 F.2d 682, 688 (C.C.P.A. 1971) (opinion of Rich, J.) ("Realistically, the process of claim 13 has no practical use than the more effective operation and utilization of a machine known as a digital computer. It seems beyond question that the machines—the computers—are in the technological field . . . . How can it be said that a process having no practical value other than enhancing the internal operation of those machines is not likewise in the technological or useful arts?").

[66] *See supra* note 58.

[67] *Benson*, 409 U.S. at 67.

[68] *Benson*, 409 U.S. at 71–72. *See also* Samuelson, *supra* note 58, at 1061 n. 127 (suggesting that the Supreme Court's view that granting Benson's claim would completely preempt use of the algorithm "may explain why the Court did not distinguish between Claims 8 and 13."). In other words, Samuelson seems to think that, even if the court had found one of the claims tied to a computer, it would not have made a difference, since the computer would have provided no further limits on the claim's preemptiveness than a standalone algorithm whose only practical application was on the computer. That may be, but again the *Benson* opinion does not take account of this potential difference, stating that the algorithm "can also be performed without a computer," *Benson*, 409 U.S. at 67, and hence failing to deal with this issue at all.

[69] Brief for the Petitioner, Dann v. Johnston, 425 U.S. 219 (1976) (No. 74-1033), 1975 WL 173464, at *2.

a "new program in an old computer no more turns the computer into a 'new' machine . . . than putting a new piano roll into an old player piano makes it a 'new' piano" because "it is precisely the ability to perform in such varied ways that is the essence of the old machine."[70] Various amici challenged the aptness of that analogy.[71] For example, the American Patent Law Association (predecessor to today's AIPLA) argued that the computer is unique in that it "made available for the first time a machine having a truly changeable 'rule of action.'"[72] In other words, a computer that lacks a program is "a mere storehouse of parts" and "has *no* rule of action or at best only a simple rule of action which makes it capable of interacting with a program which is fed into it."[73] Hence, in its view, the general purpose computer without programming is not really a machine in the same sense as a piano player without a music roll, *i.e.*, it is a machine without a function. In a similar argument, another amicus maintained that whereas the "player piano is merely a reproducing machine with one fixed rule of action," with a "programmed computer . . . the rule of action depends upon how the computer has been programmed, so that the data . . . is processed differently according to the nature of the controls for which the computer has been programmed."[74] The implication would seem to be that each newly programmed computer constitutes a new machine.

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[70] *Id*. at *35.

[71] *See* Brief for Los Angeles and Philadelphia Patent Law Associations as Amicus Curiae, Dann v. Johnston, 425 U.S. 219 (1976) (No. 74-1033), 1975 WL 173464, at *16 ("the analogies to piano rolls, etc. . . . offered by Petitioner are hardly exhaustive and are somewhat misleading."); Brief for California Patent Law Association as Amicus Curiae, Dann v. Johnston, 425 U.S. 219 (1976) (No. 74-1033), 1975 WL 173464, at *12 ("We believe that [the piano player] analogy is inapposite.").

[72] Brief for the American Patent Law Association as Amicus Curiae, Dann v. Johnston, 425 U.S. 219 (1976) (No. 74-1033), 1975 WL 173464, at *19.

[73] *Id*. at *19, n. 14.

[74] Brief for Software Associates, Inc. as Amicus Curiae, Dann v. Johnston, 425 U.S. 219 (1976) (No. 74-1033), 1975 WL 173464, at *11–12.

One company echoed the same concern, maintaining that "the paper music roll does not restructure the player piano" in the way that computer programming restructures and that the "technological reality is that program software causes new circuits to be formed in the *general purpose machine*, thereby changing it to a *special purpose machine* or an *enhanced/extended general purpose machine* having problem-solving capabilities which qualitatively or quantitatively extend beyond the capabilities of the general purpose machine."[75] It qualified the argument that the general purpose computer is a "warehouse of functionally unrelated parts," stating that this is so only in the sense that the "the relationships of the parts are not defined for the solution of any specific problem"—they are "well-defined in the mechanical sense," while "almost endlessly variable in the electrical sense."[76] Another amicus rejected the analogy because "the player piano reproduces without modification the exact sequence of notes specified by the sequence of holes in the piano roll," whereas "the data in a programmed computer is processed and the sequence of processing varies under the control of the 'decision' circuitry by the software."[77] A software association rejected the analogy as "inexcusable since it ignores the unique quality of general-purpose computers": that "without a program they have no function but they can be programmed to connect the elementary circuits . . . into an unlimited variety of new configurations."[78] Computer hardware manufacturers, on the other hand, found the analogy "appropriate," and the "algorithm upon which a computer program operates" to be "the equivalent of the musical composition in the player piano analogy," so that any patent to

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[75] Brief for Universal Software, Inc. as Amicus Curiae, Dann v. Johnston, 425 U.S. 219 (1976) (No. 74-1033), 1975 WL 173464, at *6–7 (citing M.L. MINSKY, COMPUTATION: FINITE AND INFINITE STATE MACHINES 200 (1967)).
[76] *Id.* at *8.
[77] Brief for Applied Data Research, Inc. as Amicus Curiae, Dann v. Johnston, 425 U.S. 219 (1976) (No. 74-1033), 1975 WL 173464, at *12.
[78] Brief for the Association of Data Processing Service Organizations, Software Industry Association (ADAPSO SIA) as Amicus Curiae, Dann v. Johnston, 425 U.S. 219 (1976) (No. 74-1033), 1975 WL 173464, at *25.

a computer programmed by an algorithm would be "necessarily grounded on the algorithm."[79] It is certainly true that each of the amici presented arguments compatible with their own interests.[80]   In any event, the Supreme Court avoided the question of interest to us, concerning the boundary between the general purpose computer and the special purpose computer.[81] That question would be left undecided until *Alappat*, nearly two decades later.[82]

B.   *Alappat*

Alappat has a controversial history. The main claim of the patent at issue, claim 15, was directed to a rasterizer for pixelizing vectors for display on a cathode ray tube. During prosecution, the examiner had issued a rejection for lack of subject matter eligibility under § 101. After the inventors won an appeal to the Board of Patent Appeals and Interferences (BPAI) reversing the examiner's rejection of their claims under § 101 on the issue of eligibility, the examiner took the unusual step of requesting reconsideration of the Board's decision—and an expanded panel. In cases presenting important issues, it was not uncommon, of course, for expanded panels to sit. What was unusual in *Alappat*, however, was for the Commissioner

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[79] Brief for the Computer & Business Equipment Manufacturers Association (CBEMA) as Amicus Curiae, Dann v. Johnston, 425 U.S. 219 (1976) (No. 74-1033), 1975 WL 173464, at *6–7.

[80] Writing for the minority in *Diehr*, Justice Stevens did not fail to observe the unity of argument and interest among the amici in *Johnston*. *See* Diamond v. Diehr, 450 U.S. 175, 217 (1981) (Stevens, Brennan, Marshall & Blackmun, JJ., dissenting) (observing, with regard to the "question whether computer programs should be given patent protection," that the answers given by amici in *Benson*, *Johnston*, *Flook*, and *Diehr* "may be affected by institutional bias," since "the spokesmen for the organized patent bar have uniformly favored patentability and industry representatives have taken positions properly motivated by their economic self-interest").

[81] Dann v. Johnston, 425 U.S. 219, 220 (1976) (deciding the case on obviousness grounds).

[82] For a discussion of the caselaw on eligibility as it pertains to computer-implemented inventions for much of the period between *Johnston* and *Alappat*, see Samuelson, *supra* note 58, at 1062–112.

himself, as well as the deputy and assistant commissioners,[83] to join the expanded panel.[84] Typically, expanded panels would be comprised of additional Administrative Patent Judges (APJ's),[85] including, for example, the Chair and Vice-Chair of the Board. But join the panel they did, handing down a decision affirming the examiner's rejections under § 101.[86]

The Board, in the decision of the expanded panel majority on reconsideration, found that the "means of claim 15 read on any and every means for performing the functions."[87] In

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[83] Although Commissioner Manbeck had been a longtime patent attorney for General Electric Co. and was apparently well-regarded, Deputy Commissioner Comer was publicly criticized at the time of his nomination for having "no significant patent or trademark experience." Edmund L. Andrews, *Nominee for Patent Post Facing Heavy Criticism*, N.Y. TIMES, Nov. 20, 1989 (attributing to then President of Intellectual Property Owners, Inc. Herbert Wamsley the statement that "[p]reviously, all but one commissioner and deputy commissioner were patent attorneys"). Assistant Commissioner Samuels apparently had been the managing editor for the Patent, Trademark & Copyright Journal at the Bureau of National Affairs, Inc. (now Bloomberg BNA) prior to his nomination. *See* PUBLIC PAPERS OF THE PRESIDENTS OF THE UNITED STATES: RONALD REAGAN, 919–20 (1987).

[84] I can find only two other examples of this: *Ex parte* Papst-Motoren, 1 U.S.P.Q.2d 1655 (B.P.A.I. 1986) (involving an expanded panel including the Commissioner and Deputy Commissioner) and *Ex parte* the Successor in Interest of Robert S. McGaughey, 6 U.S.P.Q.2d 1334 (B.P.A.I. 1988) (involving an expanded panel including the Commissioner, Deputy Commissioner, and Assistant Commissioner). The *Papst-Motoren* decision was prompted by an order in a parallel district court case against the Commissioner, wherein the court held that the Board "is to be afforded an opportunity to reconsider its decision in this case." *Papst-Motoren*, 1 U.S.P.Q.2d at *1.

[85] In the *Alappat* era, members of the Board were known as "examiners-in-chief." This designation apparently persisted until 1999. *Compare* 35 U.S.C. § 3 (effective Oct. 28, 1998–Aug. 4., 1999) ("There shall be . . . examiners-in-chief appointed under section 7 of this title.") *with* 35 U.S.C. § 6 (Nov. 29, 1999) ("administrative patent judges shall constitute the Board"). I thank Bruce Stoner, former Chief Judge of the Board of Patent Appeals and Interferences (BPAI), for directing me to the statutory language effectuating this change.

[86] *Ex parte* Alappat, 23 U.S.P.Q.2d 1340, 1992 WL 176684 (B.P.A.I. 1992).

[87] *Id.* at *8.

the Board's view, the *Alappat* claim disclosed no structure other than "conventional structure in the art."[88] Indeed, the Board foreshadowed the issue in *Aristocrat*, pointing out that the indefiniteness statute "requires that the claim particularly point out and define the apparatus, *i.e.*, what is and what is not within the scope of the claim."[89] Although the one issue the Federal Circuit would agree on is that the Board majority had erred on this point, the Board's mistake is understandable. On one hand, the Board erred in failing to live up to the proper procedure for construing means-plus-function claims, according to which the claimed "means" are to be found in the specification. But the Federal Circuit would not articulate this squarely until nearly two years *after* the Board's decision in *Alappat*.[90] In the absence of sufficient guidance, therefore, the Board's understandable position was that none of the structure was expressly recited in the claim itself, and in its view the claim therefore "read on any and every means capable of performing the recited function,"[91] *i.e.*, it was a purely functional claim. The Board refused to "read the structures . . . disclosed in the specification into claim 15."[92]

But there is another sense in which the Board's error is understandable. The Board found it "significant" that claim 15 "reads on a general purpose digital computer 'means' to perform the various steps under program control,"[93] if not directly, then as an equivalent. Each example of specific structure the inventor in *Alappat* argued was read from the specification into the claim (the "ALU, ROM and shift registers") as conventional and widely available hardware; as the Board said, these were "all common elements of stored program digital computers."[94] Although these were undeniably "tangible" pieces of hardware,

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[88] *Id.*

[89] *Id.*

[90] *See In re* Donaldson Co., Inc., 16 F.3d 1189 (Fed. Cir. 1994) (decided 22 months after the Board decision in *Ex Parte Alappat*).

[91] *Ex parte Alappat*, 1992 WL 176684, at *7.

[92] *Id.*

[93] *Id.*

[94] *Id.*

because they were commonly in use they were seen not as evidence of sufficient structure but as a sign that the claim utterly *lacked* structure. "We cannot agree that claim 15 is directed to specific apparatus," the Board majority concluded, "because the means to perform the function are disclosed to be 'conventional structure in the art.'"[95] Thus in one sense, the Board believed that claim 15 claimed no structure (since it refused to read structures disclosed in the specification into the claim, as *Donaldson* would late mandate that it must). But in another sense, the fact that the claimed equivalent might be a general purpose computer was understood as so far from constituting a "specific apparatus" that "[i]n such a case, it is proper to treat the claim as if drawn to a method."[96] On this logic it was natural that the Board should arrive at the conclusion that the "claimed invention is a mathematical algorithm for computing pixel information"[97]—in other words, that the invention was not the application of the algorithm on a particular structure but, as in *Benson*, merely a patent on the algorithm itself, and hence ineligible under § 101. As one dissent in the Federal Circuit appeal observed, "the reconsideration panel . . . recognized that where the structure is illusory, the claim would be to the mathematic function and would fail under § 101."[98]

The Board dissenters (comprised of the original panel prior to reconsideration by the expanded panel) differed from the majority principally in that they construed the "means for" language in the claim to recite the specific structures disclosed in the specification, namely the ALU, the barrel shifters, and the

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[95] *Id*. at *8.

[96] *Id* at *7. That approach is close to the Supreme Court's in *Benson*, which treated the claims as drawn to nothing but the mathematical algorithm. But again, as I have suggested, the difference is that in *Benson* this seems to have been an oversight (though possibly one immaterial to its decision), *see supra* note 58, whereas in *Ex Parte Alappat*, the Board consciously interpreted the notion that the claims were equivalent to a general purpose computer to mean that the claims were *not* drawn to an apparatus.

[97] *Ex parte Alappat*, 1992 WL 176684, at *7.

[98] *In re* Alappat, 33 F.3d 1526, 1560 (Fed. Cir. 1994) (Archer & Nies, JJ., dissenting).

ROMs.[99] Thus they found the claim to be an apparatus claim, one that properly and eligibly applied a mathematical algorithm under § 101. The dissent asserted that "the means claimed are not a sham approach to disguise, as apparent structure, a true mathematical algorithm," and argued that the "essence of the disclosure here is a machine, a rasterizer, and not merely a mathematical algorithm with or by which the rasterizer operates."[100]

Much of the Federal Circuit's opinion in *Alappat* is occupied with consideration of the Commissioner's authority to stack the Board in the case.[101] But what concerns us here is the court's assertion that a general purpose computer *becomes* a special purpose computer once programmed by software. According to the method for means-plus-function claim construction that the court settled five months previously in *Donaldson*, the *Alappat* majority first determined that the claims did indeed recite structure via the specification, namely the ALU, barrel shifters, and ROM highlighted by the Board dissent below. And it concluded that these combine to form a "specific

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[99] *Ex parte Alappat*, 1992 WL 176684 at *12.

[100] *Id*. at *17.

[101] That is probably not the issue that piqued the Federal Circuit's interest initially, however. One commentator reads the *Alappat* decision as "largely a by-product of a running skirmish between the Federal Circuit and Patent and Trademark Office over how paragraph 6 of section 112 should be applied in patent prosecution matters," noting that "[a]fter a running battle for years, the Federal Circuit set *Alappat* and another case, *In re Donaldson*, for argument together *en banc* to resolve the issue." Richard H. Stern, *Solving the Algorithm Conundrum: After 1993 In the Federal Circuit Patent Law Needs a Radical Algorithmectomy*, 22 AIPLA Q.J. 167, 182–83 (1995). This account appears to be correct. The order directing that *Alappat* would be heard *en banc* characterizes it as an "appeal which involves the interpretation of 35 U.S.C. § 112, sixth paragraph" and directs additional briefing on the issues relating to the Commissioner's authority to alter the Board's composition on reconsideration. *In re Alappat*, 980 F.2d 1439, 1439 (Fed. Cir. 1992). Both the majority and dissent in *Alappat* agreed that the Board had erred on the §112 issue. And the *en banc* order was issued the same day as the order setting *Donaldson* to be heard *en banc*. Thus, the court appears to have been animated primarily by the § 112 issue and says nothing about § 101, for which *Alappat* would have the most significance.

machine" rather than a "disembodied mathematical concept."[102] Insofar as that machine was equivalent to a general purpose computer, a proposition the inventor conceded on appeal,[103] the court held that its programming transformed it into a "new machine," citing *In re Prater*, which had stated in dicta that "once a program has been introduced, the general-purpose digital computer becomes a special-purpose digital computer (i.e., a specific electrical circuit with or without electro-mechanical components)."[104]   Proffering *Benson's* explicit statement that the case did "not preclude a patent for any program servicing a computer," the *Alappat* majority concluded that "a computer operating pursuant to software *may* represent patentable subject matter."[105] But in light of the assertion that a computer's programming transforms it into a new machine, it is difficult to see how eligibility would *not* follow.

In dissent, Judge Archer (joined by Judge Nies) pulled no punches and declared that "[w]hat is going on here is a charade."[106] He took the *Alappat* majority to task for holding "that a claim reciting structure necessarily defines an invention within § 101."[107]   While the majority did not quite hold that structure per se leads to eligibility, the dissent does have a point. In holding that the general purpose computer was structure, the majority came close to "elevat[ing]" the "inquiry into specific structure" to the *entire* "inquiry under § 101."[108] But by holding that the general purpose computer is transformed, each time, into a new machine by programming, the majority in effect held that software is *always* eligible under § 101: each time a computer is programmed by new software, a "new and useful . . . machine" under § 101 has been created. Because the algorithm itself is

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[102] *Alappat*, 33 F.3d at 1544.
[103] *Id*. at 1545.
[104] *In re* Prater, 415 F.2d 1393, 1403 n. 29 (C.C.P.A. 1969).
[105] *In re* Alappat, 33 F.3d 1526, 1545 (Fed. Cir. 1994) (citing Gottschalk v. Benson, 409 U.S. 63, 71 (1972)).
[106] *Id*. at 1564.
[107] *Id*. at 1561.
[108] *Id*. at 1562.

obviously unpatentable on its own under *Benson*, the decision in *Alappat* turns on one's view of the "structure" disclosed in the patent—and if, as the inventor admitted, that structure is equivalent to the general purpose computer, the case turns on one's view of whether the application of an algorithm on such a machine is, on its own, sufficiently transformative so that the structure may be said to be a *new* machine under § 101.

Some scholars, agreeing with Judge Archer's dissent, found the approach of the *Alappat* majority "[a]s a philosophical matter . . . troubling."[109] Although Archer's dissent predicted "untold consequences" for the patent system, there does not seem to have been a flood of cases allowing so-called software patents under *Alappat*. In cases addressing eligibility in the period after *Alappat*, courts seem to have been just as likely to find the claims ineligible as not.[110] Of course, this could easily

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[109] Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CAL. L. REV. 1, 10 n. 23 (2001).

[110] *Compare* In re Warmerdam, 33 F.3d 1354, 1358–60 (Fed. Cir. 1994) (affirming rejection of claims as ineligible under § 101 because the claims "describe nothing more than the manipulation of basic mathematical constructs, the paradigmatic 'abstract idea.'"); *In re Trovato*, 42 F.3d 1376 (Fed. Cir. 1994) (affirming rejection of claims as ineligible under § 101 and finding that "Trovato's application" lacked the "apparatus" present in *Alappat*), *with Etak, Inc. v. Zexel USA Corp.*, 1995 WL 462240, at *3–5 (N.D. Cal. 1995) (finding the claims eligible because they "are more than an algorithm" and commenting that "in *Alappat*, there was nothing unique about the hardware supporting the claimed invention, yet the court found that the mathematical calculations performed on this computer created a new machine because of the process itself…[a]ccordingly employing well known hardware constituents and a general purpose computer does not render the patent invalid under 35 U.S.C. § 101.") (citations omitted); Schlafly v. Pub. Key Partners, 1997 WL 542711 at *5 (N.D. Cal. 1997) (finding the claims eligible because they "make use of known structures…to produce a practical invention" and therefore "the claimed invention is not merely a disembodied mathematical concept but rather a specific machine designed to transform and transmit word signals."). Interestingly, *Trovato* (a decision penned by Judge Nies, who had joined Judge Archer in the *Alappat* dissent) was vacated in an order from Judge Archer who, faithfully applying as precedent the decision from which he had dissented, directed the Board to reconsider its decision in light of *Alappat*. *See In re Trovato*, 60 F.3d 807 (Fed. Cir. 1995)

be due to the fact that litigants were not bringing eligibility challenges against software patents after *Alappat*, believing them futile. And where *Alappat* may have made the most difference in sustaining patentability is at the level of initial prosecution, where more applications may have made it through to issuance without having to appeal to the Board. As a matter for future research, it would be interesting to look at Patent and Trademark Office (PTO) decisions on pending patent applications in the periods before and after *Alappat* to see whether there was any decline in the number of § 101 rejections being issued and to see how *Alappat* was being cited by examiners and applicants.

Alappat represents a crucial moment in the evolution of eligibility doctrine. It was seen as opening the door to software patenting, but just as importantly, its famous statement about the "special purpose computer" gave birth to the "algorithm" rule of *Aristocrat,* which represents an attempt through the indefiniteness doctrine to provide some limitations in what was, at the time, an otherwise permissive climate for computer-implemented inventions.

III.   APPLYING *ARISTOCRAT*

A.   Origins of *Aristocrat*

If *Alappat* opened the door for software patenting, *Aristocrat* imposed new limits. The algorithm requirement announced in *Aristocrat* grew out of two cases involving claim construction disputes, *WMS Gaming* and *Harris*,[111] which

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(en banc) (vacating the panel decision and remanding to the Board). Judge Nies complained that the order to reconsider in light of *Alappat* was "unconventional" given that the panel decision extensively discussed *Alappat* and indeed was issued 5 months after *Alappat*. *See Trovato*, 60 F.3d at 808 (Nies and Michel, JJ., dissenting)

[111] WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339 (Fed. Cir. 1999); Harris Corp v. Ericsson, Inc., 417 F.3d 1241 (Fed. Cir. 2005). Judge O'Malley has stated, in passing, that "[t]he necessity of an algorithm has been

themselves had extended *Alappat's* reasoning. The district court in *WMS Gaming* considered a patent for a slot machine, whose structure included a general purpose computer or microprocessor. The court had found that "the structure disclosed in the specification to perform" the "means for assigning limitation" was "'an algorithm executed by a computer.'"[112] On appeal to the Federal Circuit, the accused infringer tried to narrow the scope of this element, arguing that the means was limited to the particular "series of acts"[113] for performing the claimed function disclosed in the specification, and equated this "series of steps comprising the algorithm"[114] with the sort of "programming" which, according to *Alappat*,[115] transforms a general purpose computer into a special purpose computer. That is to say, the accused infringer cited *Alappat* for the proposition that it is the specific "*programming*" that "creates a new machine." One cannot claim to have created a new machine through programming but then claim an invention with a scope *beyond* the specific programming involved therein. Therefore, if software implemented on a computer may be said under *Alappat* to create a new machine, that machine must be limited to the steps involved in that software, rather than "all tables, formulas, or algorithms capable of achieving" the same

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well established at least since *WMS Gaming*, a 1999 case." HTC Corp. v. IPCom GmbH & Co., KG, 667 F.3d 1270, 1282 (Fed. Cir. 2012). That is not correct. As discussed in what follows, the issue in *WMS Gaming* was claim construction, not indefiniteness, and the algorithm there served to limit the claim, but no court had yet held that the algorithm was "necessary" to avoid indefiniteness. Such a holding would not be made for several more years and would not be accepted by the Federal Circuit until *Aristocrat*.

[112] *WMS Gaming*, 184 F.3d at 1348. This was a "finding [that] accurately reflected the parties' stipulation" that the patent-in-suit "discloses a microprocessor, or computer, to control the operation of the slot machine." *Id.* at 1347–48. In fact, the Federal Circuit "fail[ed] to find anything in the [patent-in-suit] that limits the 'means for assigning' limitation to a microprocessor or computer," but abided by the parties' stipulation on appeal. *Id.* at 1347 n. 2.

[113] Brief of Appellant, WMS Gaming, Inc. v. Int'l Game Tech., Nos. 97-1307, 98-1053, 1997 WL 33484879 at *20 (Dec. 30, 1997).

[114] *Id.* at *21.

[115] *In re* Alappat, 33 F.3d 1526, 1545 (Fed. Cir. 1994) (en banc).

result.[116] The Federal Circuit agreed, holding that the district "court erred by failing to limit the claim to the algorithm disclosed in the specification," adding that the "instructions of the software program that carry out the algorithm electrically change the general purpose computer by creating electrical paths within the device. These electrical paths create a special purpose machine for carrying out the particular algorithm."[117] This finding affirmed the "technological reality" of computing asserted by many of the amici in *Benson*.[118] Accordingly, the Federal Circuit held that "[t]he structure of a microprocessor

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[116] Brief of Appellant, WMS Gaming, Inc. v. Int'l Game Tech.*,* Nos. 97-1307, 98-1053, 1997 WL 33484879 at *21 (Dec. 30, 1997).

[117] *WMS Gaming*, 184 F.3d at 1349 & n. 3 ("A microprocessor contains a myriad of interconnected transistors that operate as electronic switches …. The instructions of the software program cause the switches to either open or close …. The opening and closing of the interconnected switches creates electrical paths in the microprocessor that cause it to perform the desired function of the instructions that carry out the algorithm.") (citing Neil Randall, *Dissecting the Heart of Your Computer*, PC MAGAZINE 254–55 (Jun. 9, 1998)). The Randall article cited in Judge Schall's opinion was not cited by the parties and appeared after all briefing was submitted. However, it is a basically accurate description of software's "structural" manifestation. *See* Collins, *supra* note 33, at 1441 ("Software does not violate the materialist worldview: it is the physical structure of software loaded onto a computer that endows software with its behavioral capacities. Software exists as electrons or charges on a hard drive or in a computer's memory; a computer implements a software program only because a particular set of gates in the processor is open or closed.") (citing Robert Plotkin, *Computer Programming and the Automation of Invention: A Case for Software Patent Reform*, 7 UCLA J.L. & TECH. 1, 38–39 (2003)). Chin has accused the *WMS Gaming* court of "revisionism" to the extent that the "*Alappat* majority made no mention of 'electrical paths' being created through appropriate programing."   Andrew Chin, Alappat *Redux: Support for Functional Language in Software Patent Claims*, 66 SMU L. REV. 491, 500 (2013). This much is true, but even Chin agrees with *WMS Gaming* that "such changes in the flow of electrons are cognizable as structure," though he would add a "concrete causation" standard for discerning sufficient structure. *Id*. at 501–02.

[118] *See supra* notes 75–77 and accompanying text.

programmed to carry out an algorithm is limited by the disclosed algorithm."[119]

In *Harris*, the Federal Circuit went a step further, reading *WMS Gaming* to have established an "algorithm rule." But again, the issue in *Harris*, and the import of the "rule" of *WMS Gaming*, was only whether claim scope should be limited to the algorithm disclosed—not yet the step of *Aristocrat*, which involved a patent drawn to a computer-implemented claim that did not disclose an algorithm *at all*. Thus, the *Harris* court explained that "*WMS Gaming* restricts computer-implemented means-plus-function terms to the algorithm disclosed in the specification" and noted that the "computer-implemented means-plus-function term is limited to the corresponding structure disclosed in the specification and equivalents thereof, and *the corresponding structure is the algorithm*."[120] This is the first explicit statement in this line of cases that it is the *algorithm* that serves as structure. Once again, it is a recognition that the general purpose computer, as merely conventional hardware, is somehow structurally deficient or indeterminate, and something more is necessary to provide discernible bounds.

In the wake of *WMS Gaming* and *Harris*, accused infringers reasoned that if means-plus-function claims are limited to the algorithm disclosed in the specification, and if the specification in fact discloses *no* algorithm, then the scope of the claim cannot be ascertained and the claim is indefinite. In the years before *Aristocrat* several district courts had occasion to consider this in the context of indefiniteness challenges.[121]

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[119] *WMS Gaming*, 184 F.3d at 1349.

[120] *Harris*, 417 F.3d at 1253 (emphasis added).

[121] *See, e.g.,* Gobeli Research Ltd. v. Apple Computer, Inc., 384 F.Supp.2d 1016, 1022–23 (E.D.Tex. Aug. 26, 2005) (holding claim indefinite because "there is no description in the specification of any algorithm that performs either function," noting that "Gobeli could have provided figures or flow charts that describe the algorithm" or "could have attached actual code to the patent that would set out the necessary algorithm"); AllVoice Computing PLC v. Nuance Commc'ns, Inc., H-02-4471, slip. op. (S.D. Tex. Oct. 13, 2005) (adopting the Sept. 14, 2005 report of court-appointed expert Professor

These courts were divided about just how much disclosure was required by *WMS Gaming*. Many were reluctant to read into *WMS Gaming* the rule the Federal Circuit later adopted in *Aristocrat*. And those that entertained indefiniteness challenges on this basis often deferred decision for expert testimony.[122] For example in *CIVIX-DDI*, defendants argued for indefiniteness because "no specific algorithm for performing the recited function has been disclosed," but the court "disagree[d] that the

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Paul Janicke, which applied *WMS Gaming* and *Harris* to find several claims indefinite because they lacked algorithmic structure); Touchcom, Inc. v. Dresser, Inc., 427 F. Supp. 2d 730, 735 (E.D. Tex. Dec. 5, 2005) (holding claims invalid for failing to disclose an algorithm since "as software limitations," *WMS Gaming* and *Harris* "require that the structure for performing the function[s] is the algorithm identified in the specification and equivalents"); BillingNetwork Patent, Inc. v. Cerner Physician Practice, Inc., 2006 WL 263601, at *18–19 (M.D. Fl. Feb. 2, 2006) (finding claim definite because the specification "when read with Figures 1 and 3, provide[s] sufficient information indicating the algorithm by which the computer system performs the disclosed function"); Finisar Corp. v. The DirecTV Group, Inc., 416 F. Supp. 2d 512 (E.D. Tex. Feb. 17, 2006); DE Techs., Inc. v. Dell, Inc., 428 F. Supp. 2d 512, 518–19 (W.D. Va. May 10, 2006) (The court granted partial summary judgment of indefiniteness, referring to an "algorithm requirement" and recognizing that, while "DE argues that earlier cases seem to impose more lenient requirements for describing the corresponding structure of a means-plus-function term[,] . . . [m]ost are distinguishable, however, and *WMS Gaming* and *Harris* are the most recent decisions from the Federal Circuit dealing specifically with computer-implemented means-plus-functions. The court is therefore constrained to follow the instruction of the Federal Circuit, requiring an algorithm to be disclosed in the specification as a corresponding structure."); Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech., No. 2:05-CV-00820-BES (LRL), slip. op. (D. Nev. Apr. 20, 2007) (holding the claims indefinite because "Aristocrat's specification does not have any specific algorithm that describes or recites the claimed function."); Grantley Patent Holdings, Ltd. v. Clear Channel Commc'ns, Inc., 2008 WL 5781056, at *3–4 (E.D. Tex. Mar. 7, 2008).

[122] Indeed, the Federal Circuit itself in this period remanded one claim construction case back to the district court in order "to determine what algorithm forms part of the structure" of a certain means limitation, admitting that they were unable "to make that determination based on the record on appeal." Tehrani v. Hamilton Med., Inc., 331 F.3d 1355, 1362 (Fed. Cir. 2003). While the issue is which algorithm corresponds to what means, it is indicative of the difficulty of ascertaining whether there is sufficient algorithmic disclosure for a given means limitation in the first place.

patent must disclose such an algorithm."[123] In *Froessl*, the court observed that "[i]n *WMS Gaming*, there was no dispute that an algorithm … was disclosed in the specification" and "[t]hus the court was not confronted with, and therefore did not resolve, whether the disclosure of the algorithm was necessary" to avoid indefiniteness.[124]   In addressing defendant's indefiniteness challenge, the court in *Froessl* determined that it did "not have sufficient information at this time to determine whether the … specification must disclose an algorithm or software for adding address information in order for [the claim] to be definite," and "[g]iven that the parties dispute whether the software for adding address information is so 'simple' that disclosure is not necessary to enable one of ordinary skill in the art to practice the invention, the court anticipates the parties each will offer expert testimony on that issue."[125] In *TruePosition*, the court credited expert testimony that a "database" structure was sufficiently definite in the absence of an algorithm, because the claimed means was "not so complex as to necessitate the disclosure of software code, steps, formulae or procedures for the simple function of 'storing data.'"[126]

As district courts began to extend the logic of *WMS Gaming* to the indefiniteness context, it was recognized that many older patents might not have been written to comply with a rule requiring an algorithm. Expressing some reluctance to

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[123] CIVIX-DDI, LLC v. Microsoft Corp., 84 F. Supp. 2d 1132, 1160 (D. Colo. 2000).

[124] Froessl v. Hewlett-Packard Co., 2002 WL 34455177, at *4 (N.D. Cal. 2002).

[125] *Id.*, at *5. The court's impulse to defer this determination for expert testimony is consistent with the argument of this article, but unfortunately the court states it in terms which the Federal Circuit has rejected. In particular, *Froessl* confuses the definiteness requirement with enablement. Thus, the issue is not whether the patent had sufficient disclosure to enable the skilled artisan to build and practice the invention but rather to ascertain the metes and bounds of the claim. Unfortunately, the Federal Circuit has read this difference to give it more license to determine indefiniteness in the absence of expert testimony.

[126] TruePosition Inc. v. Andrew Corp., 507 F. Supp. 2d 447, 459 (D. Del. 2007).

subject patents written before that decision to these requirements, the court in *Finisar* "considered whether a disclosure of a microprocessor plus software, without any algorithm other than a repetition of the function[,] might have been sufficient in 1995 when the patent was issued."[127] The court analogized the issue to the law of qualified immunity, which is "based upon the law at the time of [official] action, not the law at the time of trial."[128] After all, the court noted, in claim construction one "examines patents through the eyes of one of ordinary skill in the art *at the time the patent is issued*, not based upon later advances of science."[129] In effect, the court considered whether it might apply the earlier law of indefiniteness (which did *not* require disclosure of an algorithm) by, ostensibly, construing the claims through the eyes of the skilled artisan. Ultimately, the court declined to do so, concluding that "even in 1995 it was clear that patentees should have known that in means-plus-function cases, where the structure linked to the recited function was a computer, the patentee had to disclose not only that there was a computer with software, but also disclose the steps, formula, or equation (the 'algorithm') the software performed," curiously citing *Alappat* and *Freeman* for this proposition.[130] The *Finisar* court's assertion regarding what was "clear" in 1995 is flagrantly wrong, at odds with the situation in which claim-drafters found themselves, in contradiction with what commentators were saying at the time, and unsupported by the cases.

First, it ignores the constraints on claim-drafting created by *Benson*. Scholars have pointed out (and it is easy to see) that *Benson's* skepticism as to the eligibility of patenting algorithms created every incentive for patent holders to *avoid* using

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[127] Finisar Corp. v. The DirecTV Group, Inc., 416 F. Supp. 2d 512, 519 n. 3 (E.D. Tex. Feb. 17, 2006).
[128] *Id*.
[129] *Id*. (emphasis added).
[130] *Id*.

algorithms in their claims, lest they be "red-flagged."[131]   To do otherwise would have invited greater scrutiny.   The *Alappat* decision itself reflected the uncertainty over *Benson*, noting that the "Supreme Court has not set forth…any consistent or clear explanation of what it intended by such terms" as "algorithm."[132] It is true that the patent in *Alappat* claimed a particular algorithm, but no one would have concluded from the *Alappat* decision that computer-implemented claims would have had to describe their function at this level of detail.   The *Alappat* decision was *permissive*: it permitted the claiming of algorithms tied to a computer but said nothing about what level of detail might be required of a computer-implemented claim.   It must not be forgotten that, prior to *Alappat*, the prevailing imperatives were to *avoid* being seen to claim an algorithm.   The disclosure of algorithms was a dangerous business.[133] The *Freeman* case cited by *Finisar* merely states that a claim should be analyzed "to ascertain whether in its entirety it wholly preempts an algorithm,"[134] again an example of the incentive *not* to claim an algorithm, contrary to *Finisar's* suggestion.   *Finisar's* historical speculations are even more questionable in light of the fact that the PTO, until the Federal Circuit's 1994 decision in *Donaldson*,[135] did not even regard itself as required to construe

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[131] *See* Collins, *supra* note 33, at 1468, n. 321 ("The screening that *Benson* mandates to identify the subset of algorithm patents that does not describe patentable subject matter means that the validity of all patents reciting algorithms has been viewed with a greater amount of skepticism.   Patent drafters have thus avoided reciting algorithm limitations whenever possible."); ROBIN FELDMAN, RETHINKING PATENT LAW, 108–09 (2012).

[132] *In re* Alappat, 33 F.3d 1526, 1543 n. 19 (Fed. Cir. 1994) (en banc).

[133] *See*, *e.g.*, Richard H. Stern & Edward P. Heller, III, *In re* Alappat: *The Gordian Knot Retwisted*, 2 U. BALT. INTELL. PROP. L.J. 187, 191 (1994) ("just before the *Alappat* decision the legal standard for claiming algorithms or algorithm-related inventions was that one should put into the claim some kind of apparatus before the use of an algorithm . . . [i]f one did none of these things . . . the claim would be rejected as lacking proper structural limitations").

[134] Application of Freeman, 573 F.2d 1237, 1245 (C.C.P.A. 1978).

[135] *In re* Donaldson Co., Inc., 16 F.3d 1189, 1194–95 (Fed. Cir. 1994) (en banc) ("The fact that the PTO may have failed to adhere to a statutory mandate over an extended period of time does not justify its continuing to do

means-plus-function claims in accordance with § 112 ¶ 6, much less required to evaluate them for definiteness according to a regime resembling one derived from *WMS Gaming*. Notwithstanding its inaccurate characterization of the situation circa 1995, the *Finisar* court's momentary reluctance to require disclosure of a corresponding algorithm highlights a justifiable concern with these departures from established protocols of claim-drafting, one echoed by Judge Newman in a number of subsequent Federal Circuit cases in this area.[136]

   Aristocrat was actually the second of the district court cases involving an indefiniteness challenge on the basis of an absence of algorithmic disclosure to reach the Federal Circuit.[137] The court affirmed the holding of indefiniteness below, explaining its concern that "for a patentee to claim a means for performing a particular function and then to disclose only a general purpose computer as the structure designed to perform that function amounts to *pure functional claiming*."[138] Accordingly, *Aristocrat* held that where a computer-implemented means-plus-function claim does not disclose an algorithm corresponding to the claimed function, the patentee

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so … the PTO may not disregard the structure disclosed in the specification corresponding to [means-plus-function] language when rendering a patentability determination."); *Cf. In re* Avid Identification Sys., 504 Fed. App'x. 885, 893 (Fed. Cir. 2013) (Clevenger, J., dissenting) ("Sometimes [the PTO] honors its *Donaldson* duties, and sometimes it shirks them….").

[136] *See infra*, note 149.

[137] Six months before *Aristocrat*, the Federal Circuit did address indefiniteness on this basis in *Allvoice*, but strangely the court did so entirely without reference to *WMS Gaming* or to *Harris*, though these cases were thoroughly briefed by the parties and were discussed in the expert report that had been adopted by the district court. *See* AllVoice Computing PLC v. Nuance Commc'ns, Inc., 504 F.3d 1236 (Fed. Cir. 2007). The *Allvoice* court held that definiteness "depends on the skill level of a person of ordinary skill in the art," and reversed the court's holding of indefiniteness in part because the record contained expert testimony explaining several ways an algorithm disclosed could be implemented, with no evidence contradicting this assessment. *Id*. at 1245–46.

[138] Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech., 521 F.3d 1328, 1333 (Fed. Cir. 2008) (emphasis added).

has not sufficiently limited the scope of his claim, the "means" cannot be ascertained, and the claim is therefore indefinite. By the same token, if the patent discloses a general purpose computer along *with* an algorithm, under *Aristocrat* the court considers the underlying structure to be no longer "the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm."[139] *Aristocrat* distinguished indefiniteness from enablement, pointing out that the issue was not whether the disclosure was sufficient to enable the skilled artisan to "make and use the device," but rather to "limit[] the scope of the claim to the particular structure disclosed, together with equivalents."[140]

Strangely, *Aristocrat* then sought to introduce a distinction between the "sufficiency" of disclosure on the one hand, and the absence or presence of disclosure on the other. The court seized on a statement in an earlier case according to which "algorithms in the specification need only disclose adequate defining structure to render the bounds of the claim understandable to one of ordinary skill in the art."[141] The court admitted that, as has long been true in the law of indefiniteness, "the sufficiency of the disclosure of algorithmic structure must be judged in light of what one of ordinary skill in the art would understand the disclosure to impart" but then asserted that this longstanding principle had "no application here, because in this case there was no algorithm at all disclosed in the specification," and therefore the "question is thus not whether the algorithm that was disclosed was described with sufficient specificity, but whether an algorithm was disclosed at all."[142] As discussed *infra*, this distinction is misguided and has led the court in subsequent cases to disregard of the perspective of the skilled artisan and exclude testimonial evidence regarding indefiniteness.

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[139] *Id.*
[140] *Id.* at 1336.
[141] *Id.* at 1337.
[142] *Id.*

Before turning to that issue (in Section III.D), however, let us first consider (in Section III.B) some difficulties with the algorithm requirement as such, and then turn (in Section III.C) to some important situations where *Aristocrat* does not apply.

B.   Algorithm: "a Very Dangerous Term"

Asked at oral argument to comment on the algorithm requirement, an Associate Solicitor for the PTO conceded that "'algorithm' is a very dangerous term" in the "court's jurisprudence."[143] While *Aristocrat's* algorithm rule represents a well-meant attempt to provide reasonable limits on the scope of computer-implemented means-plus-function claims, it suffers from two very deep problems: one (discussed in III.B.1) grounded in considerations of fairness to patent owners whose claims were drafted according to an earlier regime and who cannot now cure any flaws in claim-drafting or disclosure that have arisen under *Aristocrat*; the other, more profound problem (discussed in III.B.2), arising from the difficulty in distinguishing structure from function when the structure one is using (the "algorithm," according to *Harris*) is itself essentially *functional*, as algorithms inevitably are. I address each in turn.

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[143] Oral Argument at 15:00–15:30, *In re* Aoyama, 656 F.3d 1293 (Fed. Cir. 2011) (No. 10-1552), *available at* http://www.cafc.uscourts.gov/oral-argument-recordings/search/audio.html?title=&field_case_number_value =10-1552&field_date_value2%5Bvalue%5D%5Bdate%5D=   (Judge Newman: "When you say there's no algorithm, how much detail do you, are you placing in the usage of algorithm? The mathematical formula? The ones and zeros?" Associate Solicitor Scott C. Weidenfeller: "I think 'algorithm' is a very dangerous term in this court, and other court's jurisprudence, and it's very hard… Judge Newman: But you used it several times; tell us how you're using it. Associate Solicitor Scott C. Weidenfeller: And I apologize for that, I'm bound by precedent in that regard.").

1. Retroactivity

The first problem is one of retroactivity.[144] As already indicated,[145] prior to *Aristocrat* there was every incentive to *avoid* claiming an algorithm. After *Benson*, the "message was clear … that if an innovation was ever going to survive a court challenge, it had to avoid being labeled an algorithm or looking too much like math."[146] For that reason, "patent holders looked for ways to characterize their inventions as something other than an algorithm."[147] Indeed, Lemley and Collins follow Feldman in tracing the rise in functional claiming to the very constraints imposed by *Benson*.[148] If confusion arising from *Benson* and other cases regarding the patentability of algorithms caused a trend in claim-drafting that excluded or minimized algorithmic disclosure,[149] it hardly seems fair to subject patents to an

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[144] *See generally* David L. Schwartz, *Retroactivity at the Federal Circuit*, 89 IND. L. J. 1547 (2014) (discussing the impact of retroactive changes in patent law on issued patents).

[145] *See supra* note 132 and accompanying text.

[146] *See* Feldman, *supra* note 132, at 109.

[147] *Id.*, at 111. Later courts have suggested, somewhat pollyanishly, that an algorithm may be disclosed in myriad ways, *e.g.*, "as a mathematical formula." Finisar Corp. v. DirecTV Group, Inc., 523 F.3d 1323, 1340 (Fed. Cir. 2008). But that seeming permissiveness is heedless of the imperatives of claim drafting after *Benson*. It is not permissive to allow patentees to draft claims in a manner that would create other problems (e.g., eligibility questions).

[148] Lemley, *supra* note 1 at 924, n. 85 ("Robin Feldman argues that functional claiming in software results in part from early judicial doubts about the patenting of computer algorithms themselves") (citing Feldman, *supra* note 132, at 109, 111–12); *see also* Collins, *supra* note 33, at 1468, n. 321 ("Robin Feldman draws a direct connection between Benson and the broad, functional claims of contemporary software parts. Software inventors opted not to include any algorithmic specific in their claims, and thus sought sweepingly broad functional claims, precisely to avoid having their claims red-flagged under *Benson*.") (citing Feldman, *supra* note 132, at 109–12).

[149] Indeed, the uncertainty over the limits of patentability of algorithms persists. *See, e.g.*, Digitech Image Tech's, LLC v. Elecs. for Imaging, Inc., 758 F.3d 1344, 1351 (Fed. Cir. 2014) ("Without additional limitations, a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible."). Courts have struggled to interpret *Digitech*, which "seems to set forth a

algorithm test, as *Aristocrat* and its progeny have done. This perception of unfairness lies behind the stinging dissents from Judge Newman, objecting to her colleagues' tendency in post-*Aristocrat* cases to "depart[] from the established protocols of claim drafting."[150]

It would be easy to say that this problem is merely temporary, now that the *Aristocrat* regime is in place, and acknowledge with a certain fatalism that the damage has been done. Yet there is so much uncertainty even today about exactly how to claim inventions involving algorithms that "claim drafters must walk a fine line between insufficient and excessive" algorithmic disclosure.[151] And patents drafted pre-*Aristocrat* (2008) will still be coming before the courts for at least the next decade. While I would not go so far as to adopt

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bright-line rule: if a claim consists of mathematical algorithms that transform data, the claim is not patentable." California Inst. of Tech. v. Hughes Commc'ns Inc., 59 F. Supp. 3d 974, 987 (rejecting "this interpretation of *Digitech*" because it would lead to "the incorrect conclusion that software is not patentable" since the "essence of software is manipulating existing data and generating additional data through algorithms").

[150] Ergo Licensing, LLC v. CareFusion 303, Inc., 673 F.3d 1361, 1365–72 (Fed. Cir. 2012) (Newman, J., dissenting) (criticizing the "court's foray into patent draftsmanship" because "finding standard presentations now to be fatally deficient, adds grievous unreliability to duly granted patents" and because the "invention patented by Ergo displays the established protocol specification content as characterizes many thousands of computer-assisted procedures"). The "court now rules that 'more' was needed, although I cannot discern what more, except for a five-foot shelf of zeros and ones," and indefiniteness is a "purely formalistic" basis for invalidation "on which the expertise of patent examination is normally superior to that of judges." *Id.*; *see also In re* Aoyama, 656 F.3d 1293, 1306 (Fed. Cir. 2011) (Newman, J., dissenting) (criticizing the majority's characterization of the disclosure as merely "high level process flow" rather than sufficient structure, and noting that "[a]ny change in the practice of how computer implemented methods are required to be presented in patent specifications has wide impact").

[151] Collins, *supra* note 33, at 1469. Collins points out that it "is not self-evident, however, that a Goldilocks zone [permitting some claiming of algorithm-related inventions] exists" at all, and therefore rightly argues that a "more precise definition of the type of algorithm that cannot be claimed in the abstract under *Benson* may therefore be needed to create a Goldilocks zone." *Id.* at n. 323.

the suggestion floated in *Finisar* to establish an exception to the algorithm requirement for patents drafted pre-*Aristocrat*, I do believe that in such cases courts must take great care to assess indefiniteness in proper context.

2. Distinguishing Structure from Function

In "*Aristocrat* cases," the issue is whether the algorithmic disclosure does something more than merely restate the function. Collins, one of the few commentators attentive to the logic and implications of *Aristocrat*, has insightfully characterized its holding as requiring that the algorithm serve as "metaphorical structure,"[152] an argument similar to that made in *Harris*.[153] Although I would prefer to say that the structure is not the algorithm but the machine programmed to perform the algorithm,[154] the point is the same. By explaining how the function is performed through algorithmic disclosure, the hope is that the claim will be limited by that specificity and hence prevented from "pure functional claiming."[155] If otherwise, "the patentee has not paid the price" but has won claims written "in functional terms unbounded by any reference to structure in the

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[152] Collins, *supra* note 33, at 1449 (arguing that algorithms may serve as "metaphorical structure of a software invention" and "algorithms can be the software analog for the physical structural properties that define a protectable invention in other arts").

[153] Harris Corp. v. Ericsson, Inc., 417 F.3d 1253 (Fed. Cir. 2005) ("[T]he corresponding structure is the algorithm.").

[154] For example, WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339, 1349 (Fed. Cir. 1999), holds that "the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm." When Collins, *supra* note 33, at 1452, says that "[i]n *WMS Gaming* . . . the Federal Circuit . . . identified algorithms as the corresponding structures for means-plus-functions limitations in software claims," he is not being imprecise—but this statement perhaps reflects his skepticism about *Alappat* and in any event, is in line with his argument that algorithms are "metaphorical structure." The difference between the statement in *WMS Gaming* and the statement in *Harris* reflects different views regarding the "structural" character of the computer on which the algorithm is implemented versus the algorithm itself.

[155] Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech., 521 F.3d 1328, 1333 (Fed. Cir. 2008).

specification."[156] Using this logic, the court in *Function Media* rejected a passage from the specification as sufficient disclosure because it merely "explain[ed] *that* the software automatically transmits, but . . . contain[ed] no explanation of *how* the PGP software performs the transmission function."[157] The Federal Circuit rejects disclosure that does no "more than parrot the recited function," because the specification must "describe a means for achieving a particular outcome, not merely the outcome itself."[158]

The trouble is that the dividing line between *structure* and *function*, between *what* and *how*,[159] is extremely difficult to draw when the proposed structure—the algorithm—is essentially functional itself. It is all well and good to say, as the court did in *Noah*, that more is necessary than "purely functional language which simply restates the function"[160]—but what is the difference between disclosure that merely *describes* the claimed function and disclosure that explains *how* the function is accomplished?

To be sure, there is some difficulty in specifying what counts as an "algorithm" in the first place. Judge Plager, a vocal critic of the Supreme Court's "abstract idea" test, was similarly critical of the term "algorithm" as used in § 101 discourse. As he observed, the "definition of 'algorithm' is not universally

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[156] *Id*. (citing Medical Instrumentation & Diagnostics Corp. v. Elekta AB, 344 F.3d 1205, 1211 (Fed. Cir. 2003)).

[157] Function Media, LLC. v. Google, Inc., 708 F.3d 1310, 1318 (Fed. Cir. 2013).

[158] HTC Corp. v. IPCom GmbH & Co., KG, 667 F.3d 1270, 1280 (Fed. Cir. 2012); *see also* ePlus, Inc. v. Lawson Software, Inc., 700 F.3d 509, 512 (Fed. Cir. 2012) (finding that the specification provides "no explanation as to what structure or algorithm should be used to generate the purchase orders," and referring to step 114 in Fig. 3 as "just a black box that represents the purchase-order-generation function without any mention of a corresponding structure").

[159] *Cf.* Jason Stanley & Timothy Williamson, *Knowing How*, 98 J. PHIL. 411 (2001) (arguing against the distinction between "knowing that something is the case and knowing how to do something").

[160] Noah Sys., Inc. v. Intuit Inc., 675 F.3d 1302, 1317 (Fed. Cir. 2012).

agreed,"[161] a problem that "makes rather dicey the determination of whether the claim as a whole is no more than that."[162]   But disagreements over what is and is not an algorithm generally mask disagreements over the *level of abstraction* at which an algorithm is disclosed. As argued *infra* (in Section III.D), this makes the Federal Circuit's disparate treatment of cases allegedly involving "no algorithm" from those involving "partial" algorithmic disclosure rather artificial. No doubt there will be some cases where there is absolutely *no* disclosure regarding *how* the claimed function is performed. But drawing the line between a mere restatement of the function and an explanation of how it is performed is a difficult task.

Collins has insightfully pointed out that if an "algorithm is a step-by-step procedure for solving a problem but each step of the procedure is a more specific problem in need of solving for which an algorithm can be specified," if, in short, an algorithm is "functional all the way down"—then we are faced with a problem of infinite regress, for it is "always possible to demand greater specificity in the form of an algorithm for performing that function."[163] Peel back a layer of functionality in hopes of some solid core and one will find yet another layer of function beneath the last.[164] We become caught up with the philosophical difficulty as to whether there is ever a description

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[161] *In re* Schrader, 22 F.3d 290, 292 n. 5 (Fed. Cir. 1994) (Plager, J.).

[162] *In re* Warmerdam, 33 F.3d 1354, 1359 (Fed. Cir. 1994) (Plager, J.).

[163] Collins, *supra* note 33, at 1464; *see also* Kip Werking, *The Illogic of the Algorithm Requirement for Software Patent Claims*, IPWATCHDOG (Oct. 12, 2012), http://www.ipwatchdog.com/2012/10/12/the-illogic-of-the-algorithm-requirement-for-software-patent-claims/id=28635/ ("That is the ultimate problem for the algorithm requirement: algorithms are composed of functions. The creators of the algorithm requirement thought of algorithms as distinct from functions, such that algorithms can cure deficiencies in functions. But this is a fallacy. Algorithms and functions are cut from the same cloth—functions—and one does not meaningfully cure the other in the software arts.").

[164] *See* Werking, *supra* note 163 ("If those functions require algorithms, then those algorithms will be composed of further functions, and so on. The algorithms and functions are nested within each other like Russian Matryoshka dolls, turtles all the way down.").

of "how" to do something that could not be made more specific or divided into smaller steps.[165]   Indeed, Chin points out that because computers "involve[] numerous 'abstraction layers,' with each successive, more abstract layer implementing its own set of functions through various algorithms," and "abstraction layers often provide multiple distinct implementations and interpretations of a single function … there is usually no single algorithm that can be said to constitute the 'structure'" of a computer-implemented invention.[166]   For these reasons, judges often have difficulty in drawing the line between an algorithm, and a mere restatement of the function.   In one PTAB preceding, a judge asked, "[c]ounsel, would you call that an algorithm or just a functional description of what it does rather than how it does it?" to which counsel replied, "[a]n algorithm is a functional description of an overall process," comparing an algorithm to "a flow chart, for example," which "is a more

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[165] Collins, *supra* note 33, at 1465 ("If an inventor were to recite any of the steps of a sub-algorithm as steps in a claim, they, too, would be purely functional claim limitations, and they, too, would have to be limited to particular algorithms.")   Collins speculates that patentees who file rather narrow claims would actually be "penalized" under *Aristocrat's* regime because they would be forced to disclose an algorithm at an unusually narrow level of specificity—so applicants would be better off filing broad claims so that the algorithm they disclose would only have to be one level more specific than the claim.   *Id.*   Again, if the thesis of this paper were adopted, I think Collins' fear might be largely avoided, since the requisite specificity of algorithmic disclosure would depend on the conventions of the art in which the invention arises, rather than a formalistic requirement that the algorithm be always one step narrower (or many steps narrower, depending on the judge's tastes) than the stated function.   For his part, Werking describes a related problem: that claims often already do contain a sort of algorithm when they specify that a given "means" *comprises* certain elements and functions. Werking points out that if these claim elements were placed in the specification, they would probably be held as sufficient "structure" under the algorithm requirement, whereas if they are present in the claim through language describing what a given means limitation comprises, they would not.   Hence Werking concludes that the algorithm requirement suffers from arbitrariness.   *See* Werking, *supra* note 163.

[166] Chin, *supra* note 118, at 496–97.

detailed description of the overall function."[167] The problem is obvious from the judge's later question: "Are these really structure, though? They don't look like structure to me. They look like process steps."[168] In that case, the judge may simply have misapprehended the law in this area, according to which "process steps" are one of several possible ways an algorithm may be expressed. Still, the line between "what" and "how" is unclear.

For that reason, the "algorithm" requirement is vulnerable to the so-called "levels of abstraction problem."[169] Consider the criticism in *Aoyama* that the applicant's claims were indefinite because, rather than an algorithm, they merely recited a "high level process flow" and hence did "not describe any structure."[170] Judge Newman in dissent, criticizing the majority's "new and undefined distinction of 'high level process flow,'" cited cases wherein "computer code" was not "included in the patent specification," and pointed out that "source code is [not] required to provide structure to a description of the claim function."[171] Indeed, Newman had raised at oral argument in *Aoyama* the question of exactly what level of detail *would* be required, a question that counsel for the PTO was unable to answer, explicitly blaming the court's jurisprudence in this area.[172] All the court's cases agree that source code is unnecessary.[173] Patentees may disclose an "algorithm in any understandable terms including as a mathematical formula, in

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[167] MotionPoint Corp. v. TransPerfect Glob., Inc., CBM2014-00060, Paper No. 40, at 59 (P.T.A.B.` Apr. 27, 2015).

[168] *Id*. at 61.

[169] *See* Collins, *supra* note 33, at 1464 ("algorithms can be formulated at many levels of abstraction"); Chiang, *supra* note 31.

[170] *In re* Aoyama, 656 F.3d 1293, 1298 (Fed. Cir. 2011) (internal quotations omitted).

[171] *Id*. at 1306 (Newman, J., dissenting).

[172] *See supra* note 144.

[173] *See, e.g.*, Aristocrat Techs. Austl. Pty. Ltd. V. Int'l Game Tech., 521 F.3d 1328, 1338 (The patentee is not "required to produce a listing of source code or a highly detailed description of the algorithm to be used to achieve the claimed functions in order to satisfy 35 U.S.C. § 112[(f)]").

prose . . . or as a flow chart, or in any other manner that provides sufficient structure."[174]   But this seemingly permissive formulation masks the difficulties—and, the panel-dependent disagreements—that arise from trying to determine just what level of abstraction is sufficient.   As one commentator has observed, "[t]here is a continuum between the high-level description of the solution to the problem and the low-level machine code. The only change is the detail of expression."[175] We can agree that the machine code is unnecessary, or else we would require that patents disclose a cumbersome "five foot shelf of zeros and ones."[176] But beyond this, there is no other unity in the Federal Circuit's cases regarding what level of abstraction is sufficient, *i.e.*, how detailed the algorithm must be. Of course there are easier cases, closer to one end of the spectrum.   For example, in *Blackboard*, the patent owner's counsel stated at oral argument that an "access control manager manages access control . . . the name of it pretty much describes what it does," acknowledging that the specification did not limit the performance of its functions either to software or hardware.[177]   Such a case is perhaps so far to one end of the spectrum that a determination readily suggests itself.

Nevertheless, in my view, the proper level of abstraction at which to understand algorithmic disclosure should be determined from the perspective of the skilled artisan—and

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[174] Finisar Corp. v. DirecTV Grp., Inc., 523 F.3d 1323, 1340 (Fed. Cir. 2008).
[175] John Swinson, *Copyright or Patent or Both: An Algorithmic Approach to Computer Software Protection*, 5 HARV. J.L. & TECH. 145, 148 (1991) (cited in Collins, *supra* note 33 at 1464).
[176] *In re* Aoyama, 656 F.3d 1293, 1306 (Fed. Cir. 2011) (Newman, J., dissenting).
[177] Blackboard, Inc. v. Desire2Learn, Inc., 574 F.3d 1371, 1383–84 (Fed. Cir. 2009) (finding that the following sentence from the specification "merely states that the access control manager enables different types of users to interact with the system in a manner that preserves confidentiality (i.e., it works as intended)": "Education support system 100 provides multiple levels of access restrictions to enable different types of users to effectively interact with the system (e.g., access web pages, upload or download files, view grade information) while preserving confidentiality of information.").

hence decided in proper context.[178] Rather than specify from the
outset what the sufficient level of algorithmic disclosure must be
across the board, the approach that makes best sense is one that
is relative to the particular art with which the disclosure is
concerned and that takes as its starting point the perspective of
the skilled artisan at the time of filing. What constitutes a
sufficient level of algorithmic detail cannot be specified in
advance because it depends on the level of abstraction at which
the invention is claimed from the outset and what the skilled
artisan would recognize from its disclosure.

C. When *Aristocrat* Does Not Apply

1. The *Katz* Exception

A question that quickly arises in applying a rule like that of
Aristocrat is: does *every* computer-implemented means-plus-
function claim element require the disclosure of a corresponding
algorithm? What about claim elements that decidedly do *not* fall
at the invention's point of novelty but are well within the scope
of the prior art? Would requiring an algorithm explaining *how*
a function that is already intrinsic to the basic functioning of a
computer serve any meaningful purpose in limiting the scope of
a computer-implemented claim, or would it merely compel a
tiresome prolixity in the specification?[179] The answer depends
on the usual tradeoff in indefiniteness inquiry, between enough
structure "that one can readily ascertain what the claim means
and comply with the particularity requirement" of the statute,

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[178] Typhoon Touch Techs., Inc. v. Dell, Inc., 659 F.3d 1376, 1385 (Fed. Cir.
2011) (Newman, J.) ("The amount of detail required to be included in claims
depends on the particular invention and the prior art . . .. In turn the amount
of detail that must be included in the specification depends on the subject
matter that is described and its role in the invention as a whole, in view of the
existing knowledge in the field of the invention.") (internal quotations
omitted). Given her views in this area, it is no accident that Judge Newman
stressed the contextual nature of the inquiry in *Typhoon*.

[179] There is apparently no page limit on the specification, though filing fees
increase "for each additional 50 sheets" of paper beyond the first 100. *See*
37 C.F.R. § 1.16(s) (2016).

and "the specter of an unending disclosure of what everyone in the field knows."[180]

One pre-*Aristocrat* case grappling with the implications of *WMS Gaming* and *Harris* arrived at a sensible rule addressing this question, though initially in the context of claim construction. In *Pavilion Technologies*, the accused infringer argued that, since the parties agreed that a computer constitutes the hardware structure underlying the "storing means," a corresponding algorithm was required.[181] But the court did not believe that *WMS Gaming* "should be construed so broadly"— because the means elements involved "[s]torage and retrieval" and "[e]very general purpose computer is capable of storing and retrieving," the court concluded "a particular algorithm" was not "necessary to convert the general purpose computer into a machine capable of performing the functions recited in the claims."[182] The *Pavilion* court found it "difficult to imagine why a special-purpose computer would be required" to perform functions inherent in the general purpose computer. In accordance with this, the court crafted a sensible rule: "When a computer-implemented means-plus-function claim limitation performs a function that any general purpose computer can perform using only off-the-shelf software, and no specialized software or algorithm is disclosed in the specification, then the corresponding structure consists of the general purpose computer . . . and nothing more."[183] Virtually the same rule was

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[180] Atmel Corp. v. Info. Storage Devices, Inc., 198 F.3d 1374, 1382 (Fed. Cir. 1999).

[181] Pavilion Techs., Inc. v. Emerson Elec. Co., No. 05-0898, 2006 WL 6210180, at *5 (W.D. Tex. Sept. 5, 2006); *see also* Site Update Solutions, LLC v. Accor North America, Inc., No. 11-3306, 2015 WL 581175, at *7 n. 85 (N.D. Cal. Feb. 11, 2015) (recognizing that *Pavilion* "relate[s] to the *Katz* situation").

[182] *Pavilion Techs*, 2006 WL 6210180, at *8.

[183] *Id.* at *9. *Pavilion* does lapse to some extent into the enablement-based reasoning later rejected in *Aristocrat*. *Compare id.* ("[N]o particular programming is necessary to *enable* the storing means disclosed in the claims.") (emphasis added), *with Aristocrat*, 521 F3d. at 1336 ("Whether the disclosure would enable one of ordinary skill in the art to make and use the

later announced by the Federal Circuit in *Katz*, according to which a patentee need not disclose an algorithm for those means-plus-function claim elements where the function is one that any general purpose computer can perform.

Ironically, however, in *Encyclopaedia Britannica*, a case decided two years before *Katz*, the Federal Circuit actually *rejected* the patentee's argument that "the specification need not disclose any algorithm so long as the computer function being performed is well known."[184] The court held, contrary to *Pavilion*'s reading of *WMS Gaming* and its own later decision in *Katz*, that "it is well settled that the specification must disclose the algorithm . . . regardless of its simplicity."[185] Although a non-precedential decision, *Encyclopaedia Britannica* at least one court deemed it persuasive on this point in the fourteen months before *Katz*.[186] Strangely, although the parties cited *Encyclopaedia Britannica* as part of the trial court briefing in

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invention is not at issue here. Instead the pertinent question in this case is whether Aristocrat's patent discloses structure that is used to perform the claimed function. Enablement of a device requires only the disclosure of sufficient information so that a person of ordinary skill in the art could make and use the device. A section 112[(f)] . . . disclosure, however, serves the very different purpose of limiting the scope of the claim to the particular structure disclosed, together with equivalents."). But *Pavilion*, like *WMS Gaming*, was a claim construction case and did not involve a charge of indefiniteness as in *Aristocrat*.

[184] Encyclopaedia Britannica, Inc. v. Alpine Elecs., Inc., 355 F. App'x 389, 395 (Fed. Cir. 2009).

[185] *Id*.

[186] Inventio AG v. ThyssenKrupp Elevator Ams. Corp., 718 F. Supp. 2d 529, 561 (D. Del. 2010), *rev'd on other grounds,* Inventio AG v. ThyssenKrupp Elevator Ams. Corp., 649 F.3d 1350 (Fed Cir. 2011). Other courts cited *Encyclopaedia Britannica* for its less controversial points, which merely restated *Aristocrat*.

Katz,[187] they did not refer to it on appeal to the Federal Circuit, though it would have been citable authority.[188]

In *Katz*, the Federal Circuit held that where the patentee does not claim "specific functions that would need to be implemented by programming a general purpose computer to convert it into a special purpose computer capable of performing those specified functions," it is "not necessary to disclose more structure than the general purpose processor [or computer] that performs those functions."[189]   According to the court, such claims "do not run afoul of the rule against purely functional claiming, because the functions . . . are coextensive with the structure disclosed, i.e., a general purpose computer," and where the "function[] can be achieved by any general purpose computer without special programming," the patentee need not disclose an algorithm.[190] In a subsequent case, the Federal Circuit characterized the *Katz* exception as "narrow," and explained that when "special programming is required for a general-purpose computer to perform the corresponding claimed function, then the default rule requiring disclosure of an algorithm applies." The *Katz* exception only absolves the patent owner of its need to disclose an algorithm "in the rare

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[187] *See* Defendant's Response to Raktl's Supplemental Claim Construction Brief at *6, *9, *In re* Katz Interactive Call Processing Litigation, 2012 WL 3060868 (C.D. Cal. May 24, 2012) (No. 07-1816), 2011 WL 7078072.

[188] *See* FED. CIR. R. 32.1(c) ("Parties are not prohibited or restricted from citing nonprecedential dispositions issued after January 1, 2007."). Prior FED. CIR. R. 47.6 *did* prohibit such citations, however, and it may have persisted in the minds of the litigators even after it was no longer in effect.

[189] *In re* Katz Interactive Call Processing Patent Litigation, 639 F.3d 1303, 1316 (Fed. Cir. 2011). These claims were not found definite by the Federal Circuit, but because the parties disagreed about the complexity of the term "processing," the court remanded to the district court to construe that term, after which it would be in a position to "determine whether the functions . . . can be performed by a general purpose processor or, instead, constitute specific computer-implemented functions as to which corresponding algorithms must be disclosed." *Id.* There were, however, other claims that were found to be "clearly indefinite" in *Katz*. *Id*. at 1315.

[190] *Id*. at 1316.

circumstances where any general-purpose computer without any special programming can perform the function."[191]

Thus, *Katz* recognizes that the algorithm's "structure" is superfluous when it merely elaborates basic functioning inherent in a general purpose computer, in contrast to computer-implemented claims where the point of novelty is in the function (and not the structure),[192] as is often the case in software

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[191] Ergo Licensing, LLC v. CareFusion 303, Inc., 673 F.3d 1361, 1365 (Fed. Cir. 2012) (holding that the claimed function "controlling the adjusting means" did not fall within the *Katz* exception because it "requires more than merely plugging in a general-purpose computer. Rather, some special programming would be required in order to control the adjusting means.").

[192] *Cf.* Oral Argument at 11:05–13:02, *In re* Aoyama*,* 656 F.3d 1293 (Fed. Cir. 2011) (No. 10-1552), *available at* http://www.cafc.uscourts.gov/oral-argument-recordings/search/audio.html?title=In+re+Aoyama&field_case_number_value=&field_date_value2%5Bvalue%5D%5Bdate%5D=&= Search. (Judge Newman: "I'll tell you what I think is the flaw. As I understood it . . . § 112(6) was put into the statute to facilitate claiming a function. Before that, you couldn't claim the function. The novelty still had to be in the function. And § 112(6) allowed you to do so by referring to the specification for the structure. Now if the novelty, and therefore the invention, is in the structure and, whereas the function—there are some extremely simple steps in the claim itself which, if you look at it without adding all the superstructure from figure 8, reads directly on the prior art— and we see this from time to time. Then I wonder if there isn't a fundamental misunderstanding that needs to be restored as to how § 112(6) works so that inventors and clients aren't led into going down the wrong path. It may very well be that claims with more detail from figure 8 or elsewhere, would avoid what otherwise looks to me like anticipation, if you look like the function, because you say it's limited by the structure in the specification but if in fact the function is old, you can't even get to that stage. From your expression, I gather you don't share that view of § 112(6) but I'm confident that it was once how § 112(6) worked. If it doesn't work that way anymore, perhaps that's an advance?").

claims.[193]   In such cases, the *Aristocrat* rule makes some sense.[194]

But what of computer-implemented claims where there has been some tangible improvement where the point of novelty is in either the hardware itself or in the hardware as well as the function? How does the *Aristocrat* rule apply to such cases? This issue has not yet been addressed by the Federal Circuit but has begun to percolate in a number of district court and PTAB cases. In the next section, I review these cases and argue that it makes no sense to apply *Aristocrat* to such patents.

2. The "Unique Hardware" Exception: *Katz's Mirror Image*

What if the claimed structure is not a general purpose computer but is, with or without an algorithm, *already* a special purpose computer or otherwise an unconventional, unique machine? Does it still make sense to require the disclosure of an algorithm for its claimed functions under *Aristocrat*? Given *Aristocrat's* stated goal of providing discernable limits on the bounds of the claim, in my view it serves no purpose to impose an *additional* layer of specificity where the structure is already limited to a particular machine (rather than the pseudostructure of a conventional computer, as in *Aristocrat*). To do so would be gratuitous because its hardware improvements already render it a "new machine" under § 101 and make the metes and bounds

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[193] *See* JAY DRATLER, JR., INTELLECTUAL PROPERTY LAW: COMMERCIAL, CREATIVE AND INDUSTRIAL PROPERTY § 2A.03[3] at 2A-151 & n. 530 (1991) ("[N]ovelty in mean[s]-plus-function claims often lies in the concatenation of steps or acts, and not in the structure, material or acts disclosed in the specification. In other words, there may be few or no means-plus function claims in which the specification of structure, material or acts involves a point of novelty . . . . This is often, if not invariably, so for software-related means-plus-function claims, in which the point of novelty inheres in the concatenation of abstract, logical program steps, regardless of the means for carrying them out (which, in many cases, is simply a properly programmed general-purpose digital computer not invented by the patent applicant).").
[194] *See supra* Section III.B.

of the claims discernible.   For such a machine, there is no possibility for "pure functional claiming" and no rationale for requiring disclosure of an algorithm because the point of novelty is in the hardware and not the programming.

This principle is a mirror image of the *Katz* exception: just as it would be useless to require an algorithm for a function already coextensive with the inherent functions of a computer, so would it be pointless to require an algorithm that limits the functioning of an *already*-particularized (special-purpose, unique, unconventional) machine.   An algorithm that does not transform (*i.e.*, limit) the general purpose computer serves no purpose, nor does an algorithm that adds a second layer of particularization to claims whose metes and bounds are already discernable.

Although this issue has yet to come before the Federal Circuit, several district courts have addressed it sensibly.   In *Stanacard*, the court held a claim definite because it found that the specification disclosed not "some undefined software implemented on a general purpose computer as the corresponding structure for its functional claim limitations" but rather "a special purpose hardware device or software component"—a "module"— which "[n]umerous courts have previously found . . . is not a general purpose computer" " in the telecommunications field.[195]   In *Key Energy Services*, the court found that "no disclosure of an algorithm is required" because "none of [the] corresponding structures"—the "a modem in conjunction with a cellular phone," a "satellite hookup," a "wireless communication device" and a "data storage medium"—could be characterized as a "general purpose computer or microprocessor."[196]   The court in *Eon*, citing several technical treatises, determined that "an algorithm is unnecessary" because the structure was a "radio receiver rather

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[195] Stanacard, LLC v. Rebtel Networks, AB, 680 F. Supp. 2d 483, 501 (S.D.N.Y. 2010).
[196] Key Energy Servs., Inc. v. C.C. Forbes, LLC, No. 08-0346, 2010 WL 2698507, at *13 (E.D. Tex. July 7, 2010).

than a computer or microprocessor."[197]   In *Goss*, the court rejected defendants' contention that the claimed "control means" required an algorithm because "a controller is a known structure that is a type of special purpose computer," citing a dictionary definition of "controller."[198]   In *Gerber*, the court determined that *Aristocrat* was inapplicable because the structure was not a general purpose computer but a "digitizer or other data input device which supplies a microprocessor . . . or other computer with machine readable data defining at least the peripheral edges of the graphic product."[199]   Likewise, the court in *Levine* held a claim definite and found that "no algorithm is required" because "special-purpose hardware is disclosed, such as the video image signal transmitter or, alternatively, the ultrasonic generator, detector transducer, retroreflector, converter, as well as the image selector circuit/processor."[200]   In *SIPCO*, the court found that the "specification here explicitly identifies components that form the physical structure of a unique 'site controller'" and found that although the patent "does not provide a detailed step-by-step algorithm detailing how the site controller performs the recited function, the patentee need not do this because the site controller is not a general purpose computer."[201]   In *Site Update Solutions*, the patent owner argued "that its proposed structure was a 'special purpose computer' that did not require an additional algorithm."[202]   The court disagreed that the particular patent in that case was a special purpose computer "simply because [it] performed functions similar to those performed by computers

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[197] EON Corp. IP Holdings, LLC v. Sensus USA, Inc., No 09-0116, 2010 WL 3199630, at *3 (E.D. Tex. Aug. 11, 2010).

[198] Goss Int'l. Ams., Inc. v. Graphic Mgmt. Assocs., Inc., 739 F. Supp. 2d 1089, 1100 (N.D. Ill. Sept. 14, 2010).

[199] Gerber Sci. Int'l, Inc. v. Roland DGA Corp., No. 06-2024, 2011 WL 6293125, at *6 (D. Conn. Jan. 14, 2011).

[200] Levine v. Samsung Telecomms. Am., LLC, No. 09-372, 2012 WL 383647, at *19 (E.D. Tex. Feb. 3, 2012).

[201] SIPCO, LLC v. Abb, Inc., No. 11-0048, 2012 WL 3112302, at *30 (E.D. Tex. July 30, 2012) (citing *Levine*, 2012 WL 383647, at *19).

[202] Site Update Solutions, LLC v. Accor North America, Inc., No. 11-3306, 2015 WL 581175, at *6 (N.D. Cal. Feb. 11, 2015).

that courts have identified as 'special purpose computers.'" In
the court's view, "a computer that . . . does not perform the
claimed function set forth in the patent without additional
programming is not a special computer."[203] To so qualify, the
structure would have to be capable of performing that function
without such programming. Nevertheless, citing *Goss*, the court
acknowledged that "there are circumstances in which a structure
can become a special purpose computer without any
algorithm."[204]   Though the nature of the particular claims in
each of the above cases varies significantly, no court faced with
this issue to date has disagreed that the algorithm rule should not
apply in the case of special purpose hardware, though *Site
Update Solutions* held that the particular patent in suit did not
qualify as such.

Similar cases are beginning to make their way to the
PTAB. In *MotionPoint*, the patent owner made the alternative
argument that the definiteness requirement may be satisfied by
specific structure,[205] in particular its "translation manager, a
readily identifiable 'special-purpose hardware of software
component.'"[206] At oral argument, two of the PTAB judges
questioned counsel on this point. Judge Gerstenbleth asked,
"[i]s there anything to the argument that we don't have to look

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[203] *Id.*

[204] *Id.* (citing Goss Int'l Ams., Inc. v. Graphic Mgmt. Assocs., Inc., 739 F.
Supp. 2d 1089, 1100 (N.D. Ill. 2010)).

[205] MotionPoint Corp. v. TransPerfect Glob., Inc., CBM2014-00060, Paper
No. 22, at 31–32, 2014 WL 5429972 (P.T.A.B. Oct. 27, 2014) (citing
Stanacard, LLC v. Rebtel Networks, AB, 680 F. Supp. 2d 483, 501 (S.D.N.Y.
2010); *SIPCO*, 2012 WL 3112302, at *28–31; *Levine*, 2012 WL 383647, at
*19). These arguments appeared verbatim two months earlier in a pair of
PTAB briefs filed by the same firm in two separate proceedings, each raising
an indefiniteness issue relating to algorithmic disclosure. But these were
settled prior to any decision on the merits. *See* Ebay Enter., Inc. v. Lawrence
B. Lockwood, CBM2014-00025, Paper No. 38, at 6–7, 2014 WL 4254626
(PTAB Aug. 29, 2014); Ebay Enter., Inc. v. Lawrence B. Lockwood,
CBM2014-00026, Paper No. 36, at 7–8, 2014 WL 4254626 (PTAB Aug. 29,
2014).

[206] *MotionPoint*, Paper No. 22, at 35–36 (quoting *Stanacard*, 680 F. Supp. 2d
at 501).

at the algorithm because there's a specific structure disclosed?"[207] Petitioner's counsel suggested that "it kind of gets into a circular loop," implying that a "general purpose server that's modified [e.g., by programming] to become a translation manager makes it a special computer"—that does not need an algorithm.[208] What petitioner's counsel's point suggests, perhaps without his realizing it, is that there is a difference between special purpose hardware that is in fact a general purpose computer rendered "special" *solely through its programming* – and therefore squarely within the *Aristocrat* rule – and special purpose hardware that is "special" from the very beginning, *e.g.*, through some unique hardware architecture or improvement.[209] Petitioner's counsel is right that we would be caught up in circular reasoning if we found that where a general purpose computer were transformed into a special purpose machine through programming the resulting "unique" machine need not disclose an algorithm for its programming. If that were the case, obviously *Aristocrat* would undermine its own objective. The same distinction was made in *Site Update Solutions*.[210]

Counsel for the patent owner in *MotionPoint* picked up on Judge's Gerstenbleth point, citing *Atmel*[211] (a pre-*Aristocrat* case decided just 5 months after *WMS Gaming*) for the proposition that "[t]here is no need to go and look further for algorithms as long as there's a physical component there."[212] (No doubt counsel wanted to cite Federal Circuit authority, given that the district court cases addressing this issue are not

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[207] *MotionPoint,* Paper No. 40, at 26.

[208] *Id*. Opposing counsel also denied that "the translation manager hardware is something special," arguing that "they readily put in their specification it could be virtually any software, use any hardware you want and then configure it to do these things . . . by software." *Id*.

[209] *See supra* notes 20–22 and accompanying text.

[210] Site Update Solutions, LLC v. Accor N. Am., Inc., No. 11-3306, 2015 WL 581175, at *6 (N.D. Cal. Feb. 11, 2015).

[211] Atmel Corp. v. Info. Storage Devices, Inc., 198 F.3d 1374 (Fed. Cir. 1999).

[212] *MotionPoint,* Paper No. 40, at 56–57 (P.T.A.B. Apr. 27, 2015).

binding on the PTAB.) Judge Giannetti pursued this, asking if *Atmel* applies "even if there's a general purpose computer identified?"[213] Patent owner's counsel retreated somewhat by framing the case in terms of the *Katz* exception, suggesting that the function performed by the "translation manager" did not need a corresponding algorithm because the structure is a "server that receives."[214] This position was a retreat from the position articulated in the patent owner's brief. There, patent owner maintained that the translation manager was special purpose hardware, *not* that the corresponding function was something that could be performed by *any* server. Perhaps, in the heat of argument, counsel confused those two positions, or this was a calculated shift in argument made after briefing, in light of the fact that the *Katz* exception was established in Federal Circuit authority binding on the PTAB, whereas the "unique hardware" exception to *Aristocrat* is not. In any event, *MotionPoint* was decided on written description grounds, and the Board did not reach the issue of indefiniteness.[215]

An issue underlying the currently percolating "unique hardware" exception is the ability of courts to *distinguish* between structure that is merely a general purpose computer and structure that is something more. As this Article has argued throughout, that must be done *contextually*, through the eyes of the skilled artisan at the time of filing and in light of the state of the prior art. This approach requires the court to evaluate testimonial or other extrinsic evidence. For example in *EON*, the court did not evaluate the patent's disclosure in a vacuum, but did so through the eyes of one ordinarily skilled in the art. It cited several technical treatises relevant to the patent's particular art in support of its reading of the specification and its conclusion that the claimed function referred to "a radio receiver"—*i.e.*, to already definite structure—"rather than a

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[213] *Id.*
[214] *Id.* at 57–58.
[215] *MotionPoint*, Paper No. 41 (P.T.A.B. Jul. 7, 2015).

computer or microprocessor."[216] Such a contextual approach is all the more important, given the lack of clarity about what constitutes a general purpose computer. Indeed, in *SIPCO*, the district court complained that the "the Federal Circuit has provided little guidance for determining when a recited structure is merely 'a general purpose computer' in need of an algorithm," while reminding us that the "ultimate inquiry … is whether a person having ordinary skill in the art would be able to identify sufficient structure to define the metes and bounds of the claim term."[217]

Unfortunately, the Federal Circuit has made it unduly difficult to present expert testimony in *Aristocrat* cases.

D.   The Inadmissibility of Expert Testimony in *Aristocrat* Cases

1. *Aristocrat's and Noah's* Conflict with Precedent

The Federal Circuit is generally resistant to expert testimony in *Aristocrat* cases.[218] This tendency arises in part from a distinction drawn in *Aristocrat*, wherein the court conceded that while "the sufficiency of the disclosure of algorithmic structure must be judged in light of what one of ordinary skill in the art would understand the disclosure to impart," this "principle…has no application here, because in

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[216] EON Corp. IP Holdings, LLC v. Sensus USA, Inc., No 09-0116, 2010 WL 3199630, at *3 (E.D. Tex. Aug. 11, 2010).

[217] SIPCO, LLC v. Abb, Inc., No. 11-0048, 2012 WL 3112302, at *29 (E.D. Tex. July 30, 2012).

[218] An exception is Rembrandt Data Techs., LP v. AOL, LLC, 641 F.3d 1331, 1342–43 (Fed. Cir. 2011), where the court countenanced the use of expert testimony to determine "whether an algorithm" corresponding to a means-plus-function claim "was disclosed" in the patent, but characterized this as a question of "sufficient structure", stating that "[b]ased on the expert testimony, there are genuine disputes of material fact regarding whether the specification discloses algorithms for 'buffer means' and 'combining means.'" Perhaps unsurprisingly, *Rembrandt* was decided prior to *Noah*.

this case there was no algorithm at all disclosed in the application."[219] This statement has been read to preclude the use of expert testimony in such cases. But it conflicts with Federal Circuit precedent, as discussed below.   More importantly, it makes little sense where the underlying technology is complex, as is often the case in *Aristocrat* cases. Expert testimony is especially desirable given the nature of algorithms.   Disagreements abound regarding whether disclosure imparts a mere restatement of the function or specific steps describing how to carry it out.[220] And since an algorithm is itself essentially functional[221]—a problem which the Federal Circuit has not yet acknowledged—these disagreements are likely to persist. The question involved in this determination is always the proper level of abstraction at which to understand the purported algorithmic disclosure. In most cases, there should be evidence as to how the skilled artisan would make this determination, or else the court is substituting its own judgment when deciding how to read the disclosure. Moreover, if expert testimony were barred in this context, there could never be testimony regarding whether a claim's underlying structure were "unique" and hence the "unique hardware" exception being developed in district courts would be practically eviscerated.[222]

The Federal Circuit made matters worse in *Noah*, where it affirmed the district court's refusal to admit expert testimony. Confronted with disclosure of a so-called "partial algorithm," the court concluded that the case fell into its "no algorithm" line of cases and hence the court need not consider any "argument and evidence regarding what one skilled in the art would understand from the specification before determining whether the claim was indefinite."[223]   In its prohibition on expert testimony, *Noah* parrots the two-step approach of earlier cases

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[219] Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech., 521 F.3d 1328, 1337 (Fed. Cir. 2008).
[220] *See supra* Section III.B.2.
[221] *See supra notes* 160–65 and accompanying text.
[222] *See supra* Section III.C.2.
[223] Noah Systems, Inc. v. Intuit, Inc., 675 F.3d 1302, 1318 (Fed. Cir. 2012).

which ask "first whether structure is described in [the] specification [at all], and, if so, whether one skilled in the art would identify the structure from that description."[224]   But nowhere in the court's earlier cases, apart from *Aristocrat* itself, is there a suggestion that the first step of this inquiry (determining whether the specification discloses corresponding structure at all) should be divorced from the perspective of the skilled artisan.   Recognizing technical structure is a task for the skilled artisan, and all the more so when the structure is algorithmic.

Even if one found it defensible to determine whether the specification discloses structure without taking evidence of the skilled artisan's perspective, extending this principle to "partial algorithm" cases amounts to a per se exclusion of expert testimony. *Noah's* holding allows expert evidence only once the court finds an algorithm already exists—at which point, of course, the relevance of that evidence to indefiniteness is usually moot.[225]   Rare is the case where an algorithm, of some sort, is found but then held to be insufficient.   That question of

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[224] *Id*. at 1313 (quotations omitted). In *Media Rights Techs., Inc. v. Capital One Financial Corp.*, 800 F.3d 1366 (Fed. Cir. 2015), Judge O'Malley, the author of the *Noah* opinion, relied on unrebutted expert testimony to support her conclusion that disclosed source code did not explain how to perform two of the claimed functions. Her willingness to credit expert testimony in these circumstances is hard to square with her decision in *Noah*. By *Noah*'s "partial algorithm" rule, the court seemingly should not have been admitted any testimony since it could not find an algorithm in the first place. Or perhaps *Noah* only bars expert testimony that supports a more robust reading of the patent's disclosure. Perhaps the parties simply never challenged the propriety of expert testimony in the court below or on appeal. Still, *Media Rights* goes out of its way to note the patent owner's concession at oral argument that "the Court in this case 'needs expert witness testimony to determine what that source code discloses at an algorithmic level.'" *Id*. at 1374. That statement alone demonstrates that the bar to expert testimony created by *Aristocrat* and *Noah* makes little sense. The Federal Circuit is not even adhering to it in all cases.

[225] Of course, expert testimony could inform the proper *interpretation* of the algorithm for purposes of claim construction, but on the all-or-nothing indefiniteness inquiry, it will have no bearing.

sufficiency is a 'levels of abstraction' problem properly decided through the eyes of the skilled artisan. *Noah* leads to the exclusion of evidence precisely in the cases where it would have the most impact.   This exclusion runs contrary to the longstanding principle that "definiteness is to be evaluated from the perspective of someone skilled in the relevant art."[226] And it conflicts with *Aristocrat*, which at least paid lip service to the notion that "the sufficiency of the disclosure of algorithmic structure must be judged in light of what one of ordinary skill in the art would understand the disclosure to impart."[227] But *Noah* treats a "partial algorithm," *i.e.*, an *insufficient* algorithm, no differently from the total absence of structure, in contrast to *Aristocrat's* distinction between "the sufficiency of the disclosure" and "whether an algorithm was disclosed at all."[228] Surely the presence of an apparently partial algorithm raises questions as to its sufficiency. The Supreme Court has recently pointed out that "[i]n some cases" a "court will need to look beyond the patent's intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period."[229] Obviously, this statement is as true of the algorithms supporting computer-implemented claims as of the claim language itself. Denying this seemingly commonsense conclusion, *Noah* instead bars expert testimony by importing cases properly analyzed under a sufficient/insufficient rubric and creates a new category—a "partial" algorithm—that it situates within the analysis of when an algorithm is

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[226] Nautilus, Inc. v. Biosig Instruments, Inc., 134 S. Ct. 2120, 2128 (2014) (citing General Elec. Co. v. Wabash Appliance Corp., 304 U.S. 364, 371 (1938).   Notably, *General Elec. Co.* involved the indefiniteness of a *functional* claim, further indication of how far *Noah* and *Aristocrat* have gone astray in excluding expert testimony. *See also Nautilus*, 134 S. Ct. at 2130 ("the definiteness inquiry trains on the understanding of a skilled artisan at the time of the patent application, not that of a court viewing matters *post hoc*.").

[227] Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech., 521 F.3d 1328, 1337 (Fed. Cir. 2008).

[228] *Id*. (emphasis added).

[229] Teva Pharm. USA, Inc. v. Sandoz, Inc., 135 S. Ct. 831, 841 (2015).

present/absent. In other words, if the assumption is that expert testimony is permissible where there is structure but impermissible where there is not, then treating "partial" algorithms as if they do not count as structural in the first place effectively bars expert testimony; there can never be evidence about their "sufficiency" because they have already been determined to be insufficient.

As authority, *Noah* cites *Default Proof* for the proposition that "the testimony of one of ordinary skill in the art cannot supplant the total absence of structure from the specification."[230] But *Default Proof* did not hold that expert testimony cannot be considered, as *Noah* does. To the contrary, *Default Proof* explicitly stated it would have been "improper[]" to "discount" the expert testimony provided. It held the district court properly considered that testimony "in determining whether a person of ordinary skill in the relevant art would understand that a corresponding structure … is disclosed in the specification" and found "no error in the [district] court's methodology."[231] *Default Proof* merely distinguished between the act of considering expert testimony in the first place, and choosing "not to rely on those portions of [the] testimony that were either unsupported or contradicted by the express language of the written description,"[232] *i.e.*, choosing not to *credit* that testimony.

Noah also cites *Biomedino* for the "prohibition against using expert testimony in this manner,"[233] *i.e.*, to supplant the total absence of structure. But *Biomedino* does not support *Noah*. In fact, *Biomedino* stands for the opposite proposition, as may be seen from a consideration of *Atmel*, on which *Biomedino* relies. Some confusion has arisen, unsurprisingly, on the issue

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[230] *Noah*, 675 F.3d at 1312 (citing Default Proof Credit Card Sys., Inc. v. Home Depot U.S.A., Inc., 412 F.3d 1291, 1302 (Fed. Cir. 2005)).
[231] *Default Proof*, 412 F.3d at 1300 n. 2.
[232] *Id.*
[233] *Noah,* 675 F.3d at 1312 (citing Biomedino, LLC v. Waters Techs. Corp., 490 F.3d 946, 950 –53) (Fed. Cir. 2007)).

of whether and when courts may hear expert testimony, [234] and commentators have misread these earlier cases, perhaps encouraged by the confusion in the later caselaw.[235] As the *Biomedino* court observed, what was at issue in *Atmel* was whether the title of an article referred to in the specification "was sufficient to indicate to one skilled in the art the precise structure of the means recited in the specification."[236] There the "[e]xpert testimony was used to show what the title of the article would convey to one skilled in the art," namely the "precise structure of the means recited in the specification."[237] But in *Atmel* the only "structure" that was disclosed was the statement in the specification that "[k]nown circuit techniques are used to implement high-voltage circuit 34,"[238] followed by the title of a technical article. As to this statement, expert testimony was used to determine whether the title of the article was "sufficient to indicate one skilled in the art the precise structure of the means recited in the specification."[239] Therefore *Biomedino* is correct that the "expert's testimony did not create or infer the structure"[240] in *Atmel*. But the purported structure being assessed in *Atmel* was a mere reference to "known circuit techniques."[241] It was only on the strength of expert testimony that the court determined it was "the title of the article itself

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[234] *See* Elise S. Edlin, *Computer Claim Disarray: Untangling the Means-Plus-Function Doctrine to Eliminate Impermissible Functional Claiming in Software Patents*, 28 BERKELEY TECH. L.J. 417, 435 (2013) ("When analyzing claims using the *Atmel* procedure, it can be unclear at what point to consider the knowledge of a POSITA.")

[235]*Id.* at 436 ("Outside knowledge of a POSITA is only used 'in relation to structure that is disclosed in the specification' once it has been determined that structure is disclosed.") (citing Atmel Corp. v. Info. Storage Devices, Inc., 198 F.3d 1374, 1382 (Fed. Cir. 1999)). That statement is not supported by *Atmel*, as the present discussion demonstrates. In her defense, as Edlin rightly notes, "the doctrine outlining this area of law is incredibly complex." *Id*. at 437.

[236] *Biomedino*, 490 F.3d at 952.

[237] *Id.* (quoting *Atmel*, 198 F.3d at 1382).

[238] *Atmel*, 198 F.3d at 1382.

[239] *Id*.

[240] *Biomedino*, 490 F.3d at 952.

[241] *Id.*

which described the structure for a 'known circuit technique.'"[242] In this sense, *Atmel* resembles *Katz* in that it included a reference to "known circuit techniques" (much as *Katz* involved the issue of known computer functions) and expert testimony was used to determine if the title of a technical article was enough to suggest those known techniques to the skilled artisan.

Biomedino cites *Atmel's* two-step indefiniteness analysis as one that "asks first whether structure *is* described in the specification, and, if so, whether one skilled in the art would identify structure from the description."[243] Out of context, this could be read as a statement that the first step—the determination whether structure is described in the specification at all—can be made in a way detached from the perspective of the skilled artisan, which would only enter the inquiry in the presence of structure. But this very argument was rejected in *Atmel*. There, the appellee argued that the district court's failure to apply the "'one skilled in the art analysis'" was "harmless" error in light of the alleged "total absence of structure in the specification."[244] The Federal Circuit rejected that argument, noting that even though expert testimony cannot substitute for sufficient structure, "interpretation of what is disclosed must be made in light of the knowledge of one skilled in the art."[245] *Atmel* rejected the distinction between the presence of structure versus the sufficiency of structure, for purposes of applying the perspective of the skilled artisan. For that reason alone, *Aristocrat* and *Noah* are both inconsistent with *Atmel*.

Moreover, it is important to note that the issue in *Atmel* was whether structure could be *incorporated by reference*, *i.e.*, whether structure disclosed in an article referred to in the specification could be incorporated therein by mere reference. In context, the language from the *Atmel* opinion suggesting a

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[242] *Id.*
[243] *Id.* (quoting *Atmel*, 198 F.3d at 1382) (emphasis original).
[244] *Atmel*, 198 F.3d at 1378.
[245] *Id.* at 1380.

two-step inquiry cannot possibly be read as an attempt to exclude that skilled artisan's perspective from the initial step of the indefiniteness inquiry. In fact, the entire *Atmel* opinion pushes in the opposite direction: even though defendants were correct that "knowledge available" to the skilled artisan "cannot substitute for adequate disclosure of structure in the specification," *Atmel* held that the district court erred because it "should have determined whether sufficient structure was disclosed in the specification based on the understanding of one skilled in the art."[246] Indeed, *Atmel* approvingly cited precedent holding that "claim construction" in general "is firmly anchored in reality by the understanding of those of ordinary skill in the art" and concluded that the "closely related issue concerning whether sufficient structure has in fact been disclosed … should be analyzed under the same standard."[247] Even if one were to fix on *Atmel's* use of the word "sufficient" here as suggesting the same distinction as *Aristocrat* did—between sufficiency/insufficiency versus the presence/absence of structure—the fact is that *Atmel* rejected that distinction. It provides no support for divorcing the skilled artisan from the first step of an indefiniteness analysis.

As for *Biomedino*, it completely undercuts this line of argument, stating that "[t]he inquiry is whether one of skill in the art would understand the specification itself to disclose a structure,"[248] *i.e., whether a structure is described in the specification at all*. *Biomedino* expressly requires the perspective of the skilled artisan at this *first step of the analysis*. Therefore, *Biomedino* both undermines *Noah* and comes to the opposite conclusion of *Aristocrat*, decided nine months later. *Noah* and *Aristocrat* conflict with *Atmel* and *Biomedino* on this point.

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[246] *Id.* at 1378.

[247] *Id.* at 1379 (quoting K-2 Corp. v. Saloman S.A., 191 F.3d 1356, 1365 (Fed. Cir. 1999).

[248] Biomedino, LLC v. Waters Techs. Corp., 490 F.3d 946, 953 (Fed. Cir. 2007).

Therefore, it is highly misleading to suggest as *Noah* does on the basis of *Default Proof*, *Biomedino*, or *Atmel* that a patentee must come forward with extensive disclosure before the court need adopt the perspective of the skilled artisan. The "one skilled in the art" analysis applies from the very beginning. To assume from the outset that a patent's disclosure offers no structure, and so to deny expert testimony on that basis, takes into the court's hands an inquiry that should be guided by the skilled artisan's perspective from the very beginning. Besides, the distinction between the presence/absence of structure and the sufficiency/insufficiency of structure that *Aristocrat* attempts to draw from *Atmel*, and that *Noah* perpetuates, is extremely difficult to apply. The line between disclosure masquerading as structure and genuinely structural disclosure that may or may not be sufficient to render a claim definite is too fine a distinction for courts to draw without guidance from the skilled artisan. The conflict in *Aristocrat* and *Noah*, drawn from misreading of earlier cases, needs to be addressed by the Federal Circuit *en banc*.

2. *Elcommerce.com's* Conflict with *Noah*

In *Elcommerce.com*, Judge Newman attempted to scale back these holdings, writing an opinion that vacated the district court's grant of summary judgment because it improperly decided the issue of indefiniteness without considering expert testimony. She asserted that "there is no Federal Circuit or other prohibition on such expertise,"—in spite of the fact that *Noah* would seem to stand for such a prohibition—though she conceded that "[w]e do not of course hold that expert testimony will always be needed for every situation."[249] She pointed out that the "usage 'algorithm' has indeed become patent jargon, but

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[249] Elcommerce.com, Inc., v. SAP AG, 745 F.3d 490, 506 (Fed. Cir. 2014). In fact, as the *Elcommerce.com* dissent complained, neither the patent owner nor the defendant submitted evidence on the issue of indefiniteness, although Elcommerce.com argued to the district court, apparently placing the burden on defendants, that the court would have to hear expert testimony to decide the issue properly. *Id*. at 503, 508.

it does not convert the established description requirements into the need for mathematical equations or software programs" and did not believe the "court should perform the analysis, exercising our own expertise, in the absence of evidence and expert guidance."[250]

Judge Wallach dissented, pointing out the conflict with *Noah* and predicting that the "pernicious result of the majority's holding will be to deter district courts from performing that routine analysis [determining corresponding structure], and to encourage boundless functional claiming."[251] Predictably, the appellees filed a petition for rehearing, arguing that the majority's decision "defied prior precedent"[252] and the court (presumably Judge Wallach) called for a response from appellants. The appeal was terminated shortly thereafter, and the rehearing petition was never acted upon.[253] The patent owner's claims were rejected in a parallel *inter partes* reexamination proceeding, which apparently was never appealed, and both sides moved to dismiss the district court appeal that was lingering on petition for rehearing. The Federal

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[250] *Id*. at 505 n. 5.

[251] *Id.* at 507–12 (Wallach, J., dissenting).

[252] Petition for Rehearing at 2, Elcommerce.com, Inc., v. SAP AG, 745 F.3d 490 (Fed. Cir. 2014) (No. 11-1369).

[253] Developments in a parallel *inter partes* reexamination led to a curious result in *Elcommerce.com*: the claims of the patent were rejected as obvious in Reexamination No. 95/000,557 while the appeal from the district was on petition for rehearing at the Federal Circuit. For whatever reason, it was decided not to appeal the result in the reexam. Yet, if there had been any doubt as to the definiteness of the claim, the result in the reexam should have served as evidence. Just as "a claim cannot be both indefinite and anticipated" because an anticipation analysis requires the claim to be construed, and a claim that is indefinite "by definition, cannot be construed," Enzo Biochem, Inc v. Applera Corp., 599 F.3d 1325, 1332 (Fed. Cir. 2010), neither can a claim be both obvious and indefinite. Thus, the result in the *inter partes* reexam, even if it had ultimately been overturned on appeal, should have served as some evidence in the district court that the claim was definite.

Circuit *en banc* not only granted the parties' motion to terminate the appeal but vacated the panel decision itself.[254]

For the little more than three months *Elcommerce.com* was good law, it prompted a number of district courts to reject indefiniteness challenges for failure to present accompanying evidence "such as through an expert declaration or expert testimony."[255]   At the Federal Circuit itself, during oral argument in *Compression Technology*, Judge Prost asked counsel for defendants why *Elcommerce.com* didn't apply; counsel took the position that *Elcommerce.com* did not overrule the panel decision in *Noah*: "[w]here you're talking about an algorithm, [and] that algorithm only relates to part of the claimed functionality, it's as if there's no corresponding structure at all, and expert testimony is not required."[256]   Yet even after *Elcommerce.com* was vacated, some courts have continued to cite the decision for the proposition that expert testimony will

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[254] Elcommerce.com, Inc. v. SAP AG, 564 F. App'x 599 (Fed. Cir. 2014).

[255] Mobile Telecomms. Techs., LLC v. Sprint Nextel Corp., 2014 WL 10726788, at *29 (E.D. Tex. May 2, 2014) ("Defendants have *therefore* failed to meet their burden of proving indefiniteness by clear and convincing evidence.") (emphasis added); Robertson Transformer Co. v. General Electric Co., 2014 WL 1670522, at *11 (N.D. Ill. Apr. 28, 2014) ("Defendants have not controverted this statement or otherwise proffered any evidence about whether a skilled artisan would know and understand from the specification's disclosure … what structure corresponds to the function performed by the 'control means' recited in Claim 1."). More recently, Magistrate Judge Payne, the writer of the original *Mobile Telecommunications* decision, has since retreated from the *Elcommerce.com* emphasis on expert testimony. *See* Mobile Telecomms. Techs., LLC v. LG Elecs. Mobilecomm USA*, Inc.*, 2015 WL 2250418, at *3 (E.D. Tex. May 13, 2015) ("Plaintiff has cited no authority to support its argument that a vacated decision can be cited and relied upon for legal propositions contained therein.").

[256] Compression Tech. Solutions, LLC v. EMC Corp., No. 2013-1513, Oral Arg. 24:45–26:10 (Fed. Cir. Mar. 4, 2014). *Compression* was argued just eight days after the panel decision in *Elcommerce.com* and shortly thereafter affirmed without opinion. Compression Tech. Solutions, LLC v. EMC Corp., 557 F. App'x 1001 (Fed. Cir. 2014) (summary affirmance).

often be necessary[257] and rely on expert testimony in determining whether plaintiffs' proposed algorithms are sufficient.[258]

In sum, the exclusion of expert testimony from *Aristocrat* cases must be overruled as both inconsistent with the problems arising from requiring algorithms as structure[259] and contrary to longstanding principles requiring that definiteness be ascertained from the perspective of the skilled artisan.[260]

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[257] StrikeForce Techs. Inc. v. PhoneFactor Inc., 2015 WL 5708577 (D. Del. Sep. 29, 2015); Hand Held Prods., Inc. v. Amazon.com, Inc., 2014 WL 2873902 (D. Del. Jun. 24, 2014). Another court agreed that a plaintiff was "permitted to rely on the case as persuasive authority" because "the reasons for vacating the opinion were not related to the reasoning of the opinion." SmartData, S.A. v. Amazon.com, Inc., 2015 WL 6955000, at *2 (N.D. Cal. Nov. 10, 2015).

[258] *Hand Held*, 2014 WL 2873902, at *17, *22, *27 (noting that defendant "Amazon provides no expert testimony in support of its indefiniteness argument, relying instead on attorney argument," "Amazon has presented no expert testimony discrediting that disclosure [Figure 2] as a sufficient algorithm," and "Amazon presents no expert evidence to support [its] contention" that a claim term was "indefinite for failing to disclose an algorithm"). Notably, the mere submission or absence of expert testimony does not guarantee a favorable result. For example, as to one term in *Hand Held*, plaintiff presented testimony whereas Amazon did not, yet the court nonetheless found that "[d]espite disclosing some of the required structure of the 'image capture means,' this term is nevertheless indefinite." *Id*., at *22–23.

[259] While Collins does not explicitly endorse the thesis that the level of abstraction at which the disclosure should be read must be determined from the perspective of the skilled artisan, he questions the "institutional competence" of the Federal Circuit to craft reasonable rules in this area on its own. He is unsure whether the "adversarial litigation process" is the best vehicle for best informing the court, but he does see a need to "create a taxonomy of a variety of levels of abstraction at which the functional properties of a software program can be formulated," an "undertaking" that would "initially require consultation with computer scientists." Collins, *supra* note 33, at 1466. In my view, the need for such consultation is further indication that the proposal of this Article should be adopted.

[260] Nautilus, Inc. v. Biosig Instruments, Inc., 134 S. Ct. 2120, 2130 (2014) ("[T]he definiteness inquiry trains on the understanding of a skilled artisan at the time of the patent application, not that of a court viewing matters *post hoc*.").

Aristocrat's distinction between the absence/presence and the sufficiency/insufficiency of structure is untenable.[261] *Noah's* relegation of "partial" algorithm cases to a category where expert testimony is improper works to bar consideration such evidence from precisely the cases where it would be most helpful: the cases where a patent's disclosure is neither plainly inadequate nor clearly robust. On the question of expert testimony, *Aristocrat* and *Noah* conflict with *Atmel*, *Biomedino* as well as more recent Supreme Court decisions in *Nautilus* and *Teva*. The Federal Circuit must address this *en banc*.

IV.   APPLYING *ALICE*

A.   The Order of § 101 Inquiry

The manner in which eligibility is decided is related, to some extent, on whether one views § 101 as a hurdle of first or last resort[262] or whether one takes a more "centrist" position.[263] Those who favor the use of § 101 as a threshold inquiry tend to advocate an eligibility determination at the earliest possible moment in litigation, for example on a motion to dismiss. Judge Mayer has been a consistent advocate of this "liberal" approach to § 101.[264] Those who view § 101 as a last resort, such as Judge

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[261] Unfortunately, the court continues to repeat this flawed doctrine. *See* EON Corp. IP Holdings LLC v. AT&T Mobility LLC, 785 F.3d 616, 624 (Fed. Cir. 2015).

[262] *See* David Swetnam-Burland & Stacy O Stitham, *Patent Law 101: The Threshold Test as a Threshing Machine*, 21 TEX. INTELL. PROP. L.J. 135 (2013) (contrasting those reluctant to invoke § 101 because of the difficulty in articulating a workable test with those who believe § 101 should be addressed as a threshold matter before other validity issues because it would dispose of unmeritorious patent suits at an earlier stage of litigation).

[263] *See* Holbrook & Janis, *supra* note 33, at 353 (describing a "nuanced, centrist approach" to "implementing the abstract ideas exception to eligibility").

[264] *See, e.g.*, Ultramercial, Inc. v. Hulu, LLC, 772 F.3d 709, 717 (Fed. Cir. 2014) (Mayer, J., concurring) ("[W]hether claims meet the demands of 35

Plager, would rarely, if ever, invoke § 101, preferring to leave to §§ 102, 103, and 112 the work of weeding out invalid patents.[265] "Moderates" like Holbrook and Janis would that formal require claim construction always precede a § 101 analysis, a proposal that would put an end to the current trend toward resolving § 101 cases on motions to dismiss.[266]

While this Articles sympathizes with the centrist position of Holbrook and Janis, the proposal articulated throughout is compatible with "liberal" and "conservative" approaches as well. Deciding eligibility in proper context does not prevent the courts from using § 101 as the patentability test of first resort or as the last. Rather, it modifies the more-or-less untethered manner the inquiry is being conducted in such a way as to require evidence, at least in most cases. It shifts the § 101 analysis away from a vacuous overemphasis on the claims in

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U.S.C. § 101 is a threshold question, one that must be addressed at the outset of litigation."); Myspace, Inc. v. GraphOn Corp., 672 F.3d 1250, 1264 (Fed. Cir. 2012) (Mayer, J., dissenting) ("The issue of whether a claimed method meets the subject matter eligibility requirements contained in 35 U.S.C. § 101 is an 'antecedent question that must be addressed before this court can consider whether particular claims are invalid as obvious or anticipated."); *see also In re* Alappat, 33 F.3d 1526, 1553 (Fed. Cir. 1994) (Archer & Nies, JJ., dissenting) ("Section 101 must be satisfied before any of the other provisions apply.").

[265] *See Myspace*, 672 F.3d at 1260 (Plager, J.) ("Rather than taking the path the dissent [by Judge Mayer] urges, courts could avoid the swamp of verbiage that is § 101 by exercising their inherent power to control the processes of litigation … and insist that litigants initially address the patent invalidity issues in terms of the conditions of patentability defenses as the statute provides, specifically §§ 102, 103, and 112. If that were done in the typical patent case, litigation over the question of validity of the patent would be concluded under these provisions, and it would be unnecessary to enter the murky morass that is § 101 jurisprudence. This would make patent litigation more efficient, conserve judicial resources and bring a degree of certainty to the interests of both patentees and their competitors in the marketplace.").

[266] Holbrook & Janis, *supra* note 33, at 376 ("The eligibility analysis would be better served by a requirement that it be preceded by a claim construction.").

isolation, as a close reading of *Mayo* requires.[267] In practice, it should slow the current trend of motions to dismiss, perhaps deferring the § 101 inquiry to the summary judgment stage, or to a unique hearing designed solely to address the issue of eligibility (a possibility suggested in Section IV.C), without tying the hands of district courts with a rule that claim construction is required per se.[268] As such, it would rein in the

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[267] The Federal Circuit has stressed that the "claims" are the focal point for eligibility analysis, without grappling with *Mayo's* dependence on the broader context of the claims. *See, e.g.*, Accenture Glob. Servs., GmbH v. Guidewire Software, Inc., 728 F.3d 1336, 1345 (Fed. Cir. 2013) (stating that "the important inquiry for a §101 analysis is to look to the claim" and that the "claims of a patent define the invention"). Even aside from the implications of *Mayo* and eligibility doctrine, there is already a rigorous academic debate about the centrality of the claim within the law of claim construction. *See generally* Oscar Liivak, *Rescuing the Invention from the Cult of the Claim*, 42 SETON HALL L. REV. 1 (2012). To the extent that claims need to be read in context—not only of the specification and prosecution history but of the prior art from which the invention arose—this Article is sympathetic with those who argue for the need to move away from an overemphasis on reading the claim in a vacuum.

[268] There may, however, be some claims for which Holbrook's and Janis's proposal is the only sensible one. For means-plus-function claims, however, the two-step § 101 analysis simply cannot be conducted prior to claim construction because such claims have no meaning divorced from the patent's disclosure. The structure of means-plus-function claims is not located in the claims but in the specification. For that reason, there is no way to perform a "quick look" at means-plus-function claims to "identify a risk of preemption and ineligibility," and the bounds of the claim cannot be determined without looking carefully at the specification and determining the claimed "means." Enfish, LLC v. Microsoft Corp., 56 F. Supp. 3d 1167, 1173 (C.D. Cal. 2014). The notoriously complex exercise of construing means-plus-function claims is unavoidable. *See, e.g.*, Kimberly A. Moore, Markman *Eight Years Later: Is Claim Construction More Predictable?*, 9 LEWIS & CLARK L. REV. 231, 242 (2005) (referring the claim construction of "means-plus-function claim terms" as "even more difficult" than claim construction generally); Eva M. Ogielska, Note, *IMS Technology, Inc. v. Haas Automation, Inc. & Kemco Sales, Inc. v. Control Papers Co.*, 16 BERKELEY TECH. L.J. 71 (2001) ("The difficulties of claim interpretation are particularly apparent in the judicial construction of means-plus-function claims."); Lawrence Kass, Comment, *Computer Software Patentability and the Role of Means-Plus-Function Format in Computer Software Claims*, 15 PACE L. REV. 787, 850 (1995) (construing means-plus-function claims "has bred confusion and

inclinations of district courts with an approach that is just as compatible with the centrist proposal of Holbrook and Janis as with the more conservative suggestion of Judge Plager.

As I will suggest in this section, this approach is required by the test for eligibility set forth in *Mayo*/*Alice*.

B.   *Mayo's*/*Alice's* **Dependence on Context**

As is well-known, *Mayo/Alice* have together articulated a two-step test for eligibility. First, a court determines whether the claims are directed to a patent ineligible concept, *i.e.*, a law of nature, natural phenomenon, or (in the *Alice* context) an abstract idea.[269] If so, the court undertakes a "search for an 'inventive concept,'" in which it looks for "an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'"[270] However, this ostensibly two-step inquiry typically boils down to a single step (Step Two, the search for the inventive concept). Step One, determining whether an invention claims an abstract idea, has been enormously difficult, since "all inventions, at some level … apply … abstract ideas."[271] As Chiang presciently argued,

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controversy, particularly with regard to computer program and mathematical algorithm inventions"); Dawn Equip. Co. v. Kentucky Farms Inc., 140 F.3d 1009, 1018 (Fed. Cir. 1998) (Plager, J. concurring) (referring to the application of the doctrine of equivalents to means-plus-function claims as a "confusing" area of law); John F. Triggs, *Functional Claiming: § 112 ¶ 6 Still Difficult After All These Years*, LANDSLIDE (Jan. –Feb. 2011).
[269] *See* Alice Corp. Pty. Ltd. v. CLS Bank Int'l., 134 S. Ct. 2347, 2355 (2014) (citing Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1296–97 (2012)).
[270] *Id*. (quoting *Mayo*, 132 S.Ct. at 1294).
[271] *Mayo*, 132 S.Ct. at 1293. One of the very few cases to hold that a patent was not directed to an abstract idea at step one held that "[o]pening and closing—moving—a movable barrier in response to signals as to that barrier's status is not an abstract idea," nor was "[m]onitoring the status of an open or closed movable barrier when the inquiring party is not in visual proximity" thereof an abstract idea. In the court's view, "[a]n idea is abstract if it has 'no particular concrete or tangible form.'" Chamberlain Group, Inc.

patent law suffers from a levels of abstraction problem[272] that makes it extremely difficult to specify what an invention "is," for the answer to that question depends on the level of abstractness with which one approaches a claim. That problem is relevant both to discerning whether the claim is merely to an abstract idea at Step One, and whether the claims recite an inventive concept with sufficient specificity at Step Two[273] (much as, in the indefiniteness context, it is difficult to determine whether claims recite a sufficiently specific algorithm).[274]

Thus litigants complain that courts are involved in "an undisciplined parsing and rewriting of the relevant claims such that courts end up evaluating a claim of their own making – not what the inventor actually claimed."[275] Pointing to this very problem, Judge Reyna recently asked whether, under *Mayo/Alice*, "isn't everything abstract?" and whether "isn't [it] a problem that we have in the application of section 101, this 'boiling down,' that eventually you can boil down everything to

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v. Linear LLC, 114 F. Supp. 3d 614, 626 (N.D. Ill. 2015) (quoting Ultramercial, Inc. v. Hulu, LLC, 772 F.3d 709, 715 (Fed. Cir. 2014). It concluded that the claims had a "clear concrete and tangible form in that they are directed to monitoring and opening and closing a movable barrier—a particular tangible form, e.g., a garage door, gate, door, or window." *Id. But see* Joao Control & Monitoring Sys., LLC v. Telular Corp., 2016 WL 1161287, at *9 (N.D. Ill. 2016) (noting that the patent in *Chamberlain* "was limited to a system for remotely controlling one specific type of equipment— a movable barrier" and "was decided before the Federal Circuit's decision in *Vehicle Intelligence and Safety*").

[272] *See* Chiang, *supra* note 31.

[273] *See, e.g.*, Source Search Techs., LLC v. Kayak Software Corp., 111 F. Supp. 3d 603, 617 (D. N.J. 2015) ("*DDR Holdings* tells us that when a patent holder seeking to establish § 101 eligibility for an otherwise abstract idea points to a particular element of a patent's claims as solving a computer-centric problem, the claims must specify how that solution works. *That specificity removes the claims from the abstract realm.*").

[274] *See supra* Section III.B.2.

[275] Brief of Amicus Curiae International Business Machines Corporation in Support of Neither Party, No. 13-298, 2014 WL 343179, at *6, Alice Corp. Pty. Ltd. v. CLS Bank. Int'l, 134 S. Ct. 2347 (2014).

an abstract" idea?[276]   In short, as Judge Reyna asked, "[i]sn't it [*i.e.*, the issue of abstractness] a question of how you articulate the idea?"[277]   Because the Supreme Court has given no criteria for determining whether an idea is abstract,[278] which is to say that the court did not specify at what *level* of abstraction a claim becomes *too* abstract, district courts have had difficulty finding a claim that did *not* recite an "abstract idea."   Indeed, as was recognized at least as early as the dissent in *Bilski*, it is extremely difficult to say what an "abstract idea" is.[279]   Recently Judge Plager, after getting counsel to concede that the Supreme Court

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[276] *See* Oral Argument at 13:35–13:42, 19:35–19:51, Amdocs (Israel) Limited v. Openet Telecom, Inc., (Fed. Cir. Oct. 8, 2015) (No. 2015-1180) (Reyna, J.), *available at* http://www.cafc.uscourts.gov/oral-argument-recordings?title=Amdocs+%28Israel%29+Limited+v.+Openet+Telecom%2 C+Inc.&field_case_number_value=&field_date_value2%5Bvalue%5D%5B date%5D= [hereinafter *Openet Telecom Oral Argument*].   Indeed, the Federal Circuit rejected the argument that "the addition of merely novel or non-routine components to the claimed idea necessarily turns an abstraction into something concrete."   *Ultramercial*, 772 F.3d at 715 (Fed. Cir. 2014) (noting that "any novelty in implementation of the idea is a factor to be considered only in the second step of the *Alice* analysis").

[277] *Openet Telecom Oral Argument* at 35:30–35:37.

[278] Alice Corp. Pty. Ltd. v. CLS Bank Int'l., 134 S. Ct. 2347, 2357 (2014) ("[W]e need not labor to delimit the precise contours of the 'abstract ideas' category in this case.").

[279] Bilski v. Kappos, 561 U.S. 593, 613, 621 (2010)*,* (Stevens, J., joined by Ginsburg, Breyer & Sotomayor, JJ., concurring in judgment) ("I would take a different approach … [than] tinkering with the bounds of the category of unpatentable, abstract ideas …. The Court, in sum, never provides a satisfying account of what constitutes an unpatentable abstract idea."); *see also* McRO, Inc. v. Namco Bandai Games America, Inc., No. CV 12-10327-GW, 2014 WL 4749601, at *5 (C.D. Cal. Sep. 22, 2014) ("[T]he two-step test may be more like a one-step test evocative of Justice Stewart's most famous phrase … 'I shall not today attempt further to define the kinds of material I understand to be embraced within that shorthand description; and perhaps I could never succeed in intelligibly doing so.   But I know it when I see it ….'") (quoting Jacobellis v. State of Ohio, 378 U.S. 184, 197 (1964) (Stewart, J., concurring)); CLS Bank Int'l. V. Alice Corp. Pty. Ltd., 717 F.3d 1269, 1277 (Fed. Cir. 2013) (Lourie, Dyk, Prost, Reyna, & Wallach, JJ., plurality opinion) ("[D]eciding whether or not a particular claim is abstract can feel subjective and unsystematic, and the debate often trends toward the metaphysical, littered with unhelpful analogies and generalizations.").

had been "struggling" with the abstract idea standard, predicted the court would "continue to struggle with it because the idea of an abstract idea is abstract—that's our problem, right?"[280] Indeed, Judge Plager now routinely asks counsel at oral argument to define the phrase "abstract idea" in § 101 appeals on which he sits.

This problem, of course, has left district courts in a difficult position. One judge, rather disenchanted with the Supreme Court's statement that it "need not labor to delimit the precise contours of the abstract ideas category," stated that because "[r]est and relaxation prevailed in *Alice*," its test "for identifying an abstract idea appears to be of limited utility."[281] Another observed that "step one of the *Alice/Mayo* test is not always a simple undertaking" and noted that even the Federal Circuit has "blurr[ed] steps one and two."[282] Another remarked that even the "cotton gin" could be claimed "in a way that renders it abstract."[283]   Hence, even the most meritorious inventions seem to fail *Mayo/Alice* step one, a plight that is certainly the result of the absence of guidance in *Alice* and may well arise from a theoretical difficulty in the notion of an "abstract idea" itself. Although patent owners try to formulate step one arguments, these typically fail because, at bottom, they offer interpretations of the claims *at a different level of abstraction* than the courts. To some extent, this is driven by the repeated emphasis on the claims in opinions by the Federal Circuit, which has encouraged courts to read claims in the absence of context from the specification,[284] as well as divorced

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[280] *Openet Telecom Oral Argument* at 39:00–39:20.

[281] *McRo*, 2014 WL 4749601, at *5.

[282] *See* Timeplay, Inc. v. Audience Entm't LLC, No. 15-05202, 2015 WL 9695321 at *4 (C.D. Cal. Nov. 10, 2015) (citing DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245, 1258–59 (Fed. Cir. 2014)).

[283] Ameranth, Inc. v. Genesis Gaming Solutions, Inc., No. 11-00189, 2014 WL 7012391, at *6 (C.D. Cal. Nov. 12, 2014).

[284] *See*, *e.g.*, Accenture Global Servs., GmbH v. Guidewire Software, Inc., 728 F.3d 1336, 1345 (Fed. Cir. 2013) ("[T]he important inquiry for a § 101 analysis is to look to the claim" and that the "claims of a patent define the invention."); Bancorp Services, LLC v. Sun Life Assur. Co. of Can. (U.S.),

them from the perspective of the skilled artisan or the state of the prior art at the time of filing to say nothing of the context of the prior art at the time of filing. With the sole exception of *Enfish* (discussed *infra* Section IV.D) at the Federal Circuit, the real contestation in § 101 cases has been at step two.

In searching for an inventive concept in *Mayo*, the court interpreted the claim to disclose "well-understood, routine, conventional activity previously engaged in by scientists who work in the field."[285]   And, reviving the previously discarded 'point of novelty" analysis of *Flook*,[286] the court concluded that adding "conventional or obvious" activity does not constitute an inventive concept sufficient to rescue the claim from ineligibility. In effect, the court set forth a mode of assessing eligibility that engages in a novelty analysis.[287]   Indeed, *Mayo* explicitly "recognize[d] that, in evaluating the significance" of the claims, "the § 101 patent-eligibility inquiry and, say, the § 102 novelty inquiry might sometimes overlap."[288]   *Alice* followed the same approach, finding that the claims did no more than "require a generic computer to perform generic computer functions," repeating *Mayo's* language that these were "well-

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687 F.3d 1266, 1279 (Fed. Cir. 2012) ("When the insignificant computer-based limitations are set aside from those claims that contain such limitations, the question under § 101 reduces to an analysis of what additional features remain in the claims.") (citing Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1297 (2012)).

[285] *Mayo*, 132 S. Ct. at 1298.

[286] *Id.* (citing Parker v. Flook, 437 U.S. 584, 590 (1978)). *See* Bernard Chao, *Moderating* Mayo, 107 Nw. U. L. Rev. 423 (2012) (reading *Mayo* as reviving *Flook's* point of novelty analysis, previously discarded in *Diehr*).

[287] *See, e.g.*, Holbrook & Janis, *supra* note 33, at 379 ("It seems apparent from the passages in *Mayo* and *Alice* that the 'inventive concept' inquiry permits courts to undertake a quasi-Section 102 and 103 analysis for patentability over the prior art, without the need to qualify any single piece of evidence as prior art or consult the immense jurisprudence of Sections 102 or 103.").

[288] *Mayo*, 132 S. Ct. at 1304.

understood, routine, conventional activit[ies]" and stating that they were "previously known to the industry,"[289] i.e., non-novel.

At the time of *Mayo*, some commentators did not see its return to a point of novelty approach as especially threatening.[290] This view, in part, was premised on the assumption that, as "*Mayo* recognizes, this approach requires that courts view evidence of prior art as part of the patentable subject analysis."[291] However, this approach is just the opposite of what courts currently do—judges are *disregarding* evidence regarding the prior art, deciding eligibility in a vacuum. Had *Mayo*'s approach been followed more carefully, the present chaos in eligibility doctrine might not have occurred.

Yet the current disarray also resulted from *Mayo's* vagueness as to the details of how a proper eligibility analysis should be conducted. *Mayo* mandates analysis of the "conventionality," *i.e.*, novelty of the claims, without elaborating just *how* that analysis is to be carried out: must courts not hear extrinsic evidence about the prior art vis-à-vis the claims? Would such a requirement not make resolution of eligibility inappropriate on a motion to dismiss in most cases, and perhaps per se? Would it not generally be useful to construe the claims prior to an eligibility determination, perhaps under a per se rule as Holbrook and Janis suggest?

In light of *Mayo's* procedural indeterminacy, we need guidance from the Federal Circuit that would specify the proper rules and procedures leading up to, and during, an eligibility determination, perhaps guidance that would establish a special hearing solely directed to eligibility at the appropriate time in a case, akin to the way *Markman* hearings became the established

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[289] Alice Corp. Pty. Ltd. v. CLS Bank Int'l., 134 S. Ct. 2347, 2359 (2014) (citing *Mayo*, 132 S. Ct., at 1294).

[290] *See, e.g.*, Chao, *supra* note 286, at 432 ("The fear is that *Mayo* has opened a Pandora's Box of patentable subject matter defenses. I believe these fears are unwarranted.").

[291] *Id*. at 435.

and standardized stage for addressing claim construction—a "*Mayo* hearing" so to speak.

C.   Determining   Conventionality   at   a '*Mayo/Alice* Hearing' on Eligibility

Whether a hearing on eligibility should occur after claim construction is complicated by the fact that in *Alice* the § 101 determination was made prior to any formal claim construction.[292] Therefore the per se rule called for by Holbrook and Janis would be somewhat difficult to reconcile with *Alice*. However, the Federal Circuit could certainly mandate claim construction in most cases.

My own suggestion is that in most cases, extrinsic evidence as to the state of the prior art and expert testimony regarding the conventionality or unconventionality of the claims should be required prior to a determination on eligibility. This *contextual* approach to eligibility analysis would normally defer the determination until the summary judgment phase, although expert testimony may be entertained even on a motion to dismiss.[293] A few district courts are at least entertaining expert testimony even at that early stage, although it is unclear that they are giving due consideration to the depth of the "conventionality" inquiry required by *Mayo*.[294]

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[292] CLS Bank Int'l. v. Alice Corp. Pty. Ltd., 717 F.3d 1269 (Fed. Cir. 2013).
[293] *See* Fed. R. Civ. P. 12(d) ("If, on a motion under 12(b)(6) or 12(c), matters outside the pleadings are presented to and not excluded by the court, the motion must be treated as one for summary judgment under Rule 56."). In practice, courts do not always expressly convert the motion to one for summary judgment.
[294] *See, e.g.*, *McRO, Inc. v. Namco Bandai Games America, Inc.*, 2014 WL 4749601, at *10 (C.D. Cal. Sep. 22, 2014) (considering plaintiff's expert declaration; granting motion for judgment on pleadings under § 101); Mkt. Track, LLC v. Efficient Collaborative Retail Mktg., LLC, 2015 WL 3637740, at *9–10 (N.D. Ill. Jun. 12, 2015) (considering expert report; granting motion on the pleadings under § 101); Blue Spike, LLC v. Google, Inc., 2015 WL 5260506, at *5–6 (N.D. Cal. Sep. 8, 2015) (considering plaintiff's expert;

Indeed, Judge Reyna recently floated this suggestion at oral argument in *Apple v. Ameranth*, asking: "To what extent is it required, would you say, to offer or to submit extrinsic evidence addressing whether these claims are well-known in the art? ... If you have a specification that says that elements of the claim are well-known or conventional, is that enough? Shouldn't there be some sort of offering of evidence to show that?"[295] When counsel suggested that statements within the patent itself (intrinsic evidence) regarding the conventionality of the claims would be sufficient to find ineligibility, Judge Reyna pointed to *Ariosa*,[296] where "[w]e found that the application steps were well-known and conventional but there was evidence in the record that indicated that, outside of just something that

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granting motion for judgment on pleadings under § 101); Parus Holdings, Inc. v. Bank, 2015 WL 5886179, at *10 n. 29 (D. Del. Oct. 8, 2015) (acknowledging plaintiff's expert declaration; granting motion to dismiss under § 101); Orostream LLC v. ABS-CBN Int'l, 2015 WL 5836949, at *4 (E.D. Tex. Oct. 1, 2015) (converting motion to dismiss "to a motion for summary judgment" because "the parties have submitted and the Court has considered, matters outside of the pleadings," referring to plaintiff's expert declaration as "conclusory" with "little specific support"; granting motion under § 101); eDekka LLC v. 3Balls.com, Inc., 2015 WL 5579840, at *1, *4 (E.D. Tex. Sep. 21, 2015) (converting motion to dismiss "to a motion for summary judgment" because "the parties have submitted and the Court has considered, matters outside of the pleadings," referring to plaintiff's "two expert declarations" as "extremely conclusory" and providing "little support"; granting motion under § 101); Voxathon, LLC v. Alpine Elecs. of America, Inc., 2016 WL 260350, at *2, *4 (E.D. Tex. Jan. 21, 2016) (reciting summary judgment standard without expressly discussing whether motion to dismiss was converted; acknowledging plaintiff's declaration but finding it "inadequate"; granting motion under § 101).

[295] *See* Oral Argument at 09:00–09:46, Apple Inc. v. Ameranth, Inc., (Fed. Cir. Apr. 8, 2016) (Nos. 2015-1703) (Reyna, J.), *available at* http://www.cafc.uscourts.gov/oral-argument-recordings/search/audio.html?title=&field_case_number_value=2015-1703&field_date_value2%5Bvalue%5D%5Bdate%5D=

[296] Ariosa Diagnostics, Inc. v. Sequenom, Inc., 788 F.3d 1371, 1375 (Fed. Cir. 2015) (affirming finding of ineligibility because "the district court determined" the claimed steps were "conventional activity in 1997, when the application for the '540 patent was filed").

the patentee says in the specification,"[297] namely (1) the testimony of defendant's expert at deposition, (2) a declaration filed by one of the inventors during prosecution, and (3) several statements from the patentee during prosecution.[298] Evidence from the prosecution history and an expert witness under deposition certainly provide greater context than a bare reading of the claims.

As the Federal Circuit recognized in its now-vacated opinion in *Ultramercial*,[299] "[a]lmost by definition, analyzing whether something was 'conventional' or 'routine' involves

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[297] *See* Oral Argument at 10:14–10:29, Apple Inc. v. Ameranth, Inc., (Fed. Cir. Apr. 8, 2016) (Nos. 2015-1703) (Reyna, J.), *available at* http://www.cafc.uscourts.gov/oral-argument-recordings/search/audio.html?title=&field_case_number_value=2015-1703&field_date_value2%5Bvalue%5D%5Bdate%5D=. One district court went in the opposite direction from Judge Reyna's suggestion, finding that statements in the specification overrode testimonial evidence from plaintiff's expert. *See* Mkt. Track, LLC v. Efficient Collaborative Retail Mktg., LLC, 2015 WL 3637740, at *9–10 (N.D. Ill. Jun. 12, 2015) (finding that when the specification "expressly disavows any requirement for specific programming or architecture," for example through statements that the "system…is merely one example of a system in accordance with the present invention" or that "[m]any different configurations of such a system are possible," and such statements "directly contradict[]" expert testimony "that a particular architecture is required" and indicate that "on the face of the patent itself, the invention could be implemented on a single general purpose computer," the claims are ineligible because even if particular requirements "apply to the preferred embodiment," the important issue is "whether the patent *claims* disclose the requirement of that particular architecture.").

[298] *Ariosa*, 788 F.3d at 1377–78.

[299] Ultramercial, Inc v. Hulu, LLC, 722 F.3d 1335 (Fed. Cir. 2013), *vacated sub nom.* WildTangent, Inc., v. Ultramercial, LLC, 134 S. Ct. 2870 (2014). In spite of the fact that *Ultramercial* lacks precedential effect, some district courts continue to rely on its reasoning regarding fact issues. *See, e.g.*, Cave Consulting Group, Inc. v. Truven Health Analytics Inc., 2016 WL 283478, at *3 (N.D. Cal. Jan. 25, 2016) (citing *Ultramercial* and denying defendant's motion on the pleadings, finding that "claim construction will aid the Court's Section 101 analysis in a number of respects, including with regard to determining the scope of preemption and whether the claims contain an inventive concept.").

analyzing facts."[300]   And indeed, to the extent that eligibility "overlaps" with a novelty analysis, it has long been understood that novelty is question of fact.[301]   Just how novel the claims must be in the context of an eligibility analysis—whether a patent owner must show novelty over every reference brought forth, as in anticipation, or whether he merely needs to show that the claimed subject matter was not *widely* known and hence "conventional"—is still an open question.[302]   Eligibility is a question of law[303] where, like claim construction, "subsidiary

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[300] *Ultramercial*, 722 F.3d at 1339. The court also speculated that "factual issues may underlie determining whether the patent embraces a scientific principle or abstract idea" and "any inquiry into the scope of preemption—how much of the field is 'tied up' by the claim—by definition will involve historic facts." District courts have agreed that fact issues are relevant to the conventionality of the claim as well as to the scope of preemption. *See, e.g.*, IBM Corp. v. The Priceline Group Inc., 2016 WL 626495, at *19 (D. Del. Feb. 16, 2016).

[301] *See, e.g.*, *In re* Rambus, Inc., 753 F.3d 1253, 1256 (Fed. Cir. 2014).

[302] *See* Oral Argument at 21:23–22:24, TLI Commc'ns LLC v. AV Automotive, LLC, (Fed. Cir. Apr. 7, 2016) (No. 15-1372), *available at* http://www.cafc.uscourts.gov/oral-argument-recordings/search/audio.html?title=&field_case_number_value=15-1372&field_date_value2%5Bvalue%5D%5Bdate%5D=   (Judge   Schall: "What you would be saying is, you're saying, where the law *now* is, based on the Supreme Court post-*Diehr*, and our court, is that if something that is in the patent is obvious or anticipated, it's not an inventive concept?" Mark Lemley: "I think that's right your Honor, and the only…" Judge Dyk: "No, that can't be right, that's not, that's not what the Supreme Court is telling us, is it? I mean it seems to me that what, you're dealing with anticipation and obviousness, you may be dealing with a single reference or two references, whereas the theory of *Alice* is that something is well-known, a well-known concept, which isn't shown by finding a single reference." Mark Lemley: "So I think that's a fair amendment, your Honor, and I guess I would also say that there may be circumstances in which a particular combination of well-known technology could itself be inventive, an inventive concept."); *see also* Jacob S. Sherkow, *And How:* Mayo v. Prometheus *and the Method of Invention*, 122 YALE L.J. ONLINE 351, 356–57 (2013) (pointing out the "'[r]outine' and 'convention' are issues of practice, not necessarily publication," suggesting that "prior art seems ill-equipped to prove 'routine' or 'convention'" and that these issues may "often be better left to witnesses than documentary testimony").

[303] *See In re* Comiskey, 554 F.3d 967, 957 (Fed. Cir. 2009) (eligibility under § 101 a question of law).

factfinding is sometimes necessary."[304] Indeed, given *Mayo*'s emphasis on "conventionality," factfinding is virtually always necessary.

My view is that eligibility, as currently formulated under *Mayo*, more closely resembles an obviousness determination—though ultimately a question of law, it is "based on underlying determinations of fact,"[305] most notably relating to the "conventionality" of the claims at *Mayo/Alice* Step Two.[306] Litigators are beginning to question the detachment of district court eligibility decisions from many of the underlying factual issues highlighted in *Ultramercial*.[307]

One district court's decision is exemplary in its attention to the contextual nature of § 101 analysis. In *Ameritox*, the court noted that when a defendant asks it "to infer that the combination of elements is conventional, it must supply *some* evidence to convince the trier of fact to accept its version of events."[308] *Ameritox* warned of the risk of "hindsight bias" in eligibility determinations, noting that it now has "as much relevance to a § 101 challenge" as it has traditionally had in the obviousness context—particularly "where § 101 is effectively being used as a de facto § 103 challenge."[309] The court considered itself "well

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[304] Teva Pharmaceuticals USA, Inc. v. Sandoz, Inc., 135 S. Ct. 831, 838 (2015).

[305] Monarch Knitting Machinery Corp. v. Sulzer Morat GmbH, 139 F.3d 877 (Fed. Cir. 1998).

[306] Sherkow has pointed out that the *Mayo*'s formulation of eligibility overlaps with the substance of obviousness as well. *See* Sherkow, *supra* note 303, at 354–55.

[307] *See* Alexander J. Hadjis & Douglas A. Behrens, *Are Questions of Fact Being Overlooked in Software Cases?*, LAW360 (Jan. 12, 2015), https://www.cadwalader.com/uploads/books/a6f71ed8a91dd0a70721a4f685 31d835.pdf.

[308] Ameritox, Ltd. v. Millennium Health, LLC, 88 F.Supp.3d 885, 914 (W.D. Wis. Feb. 19, 2015).

[309] *Id.* (comparing § 101 to § 103, and noting that "some *rational basis* for combination must be proffered, particularly in a case where the patent has survived prosecution and two further rounds of re-examination") (citing Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1299

versed in the state of the art at the time of the invention," having "had the benefit of claims [sic] construction and viewing the claims through the lens of the skilled addressee." It recognized that, "[l]ike other provisions of the statute, it is the state of the art that provides the objective baseline for the analysis" and "Section 101 should be no exception."[310] Because "there is nothing in the art that demonstrates that such a combination was well-known" and defendant "failed to offer any evidence that someone in the scientific community would even have 'thought' to combine the clamed elements," "[t]his provides indicia" that the patent is "inventive for § 101 purposes" and "makes the claims new and useful over the prior art."[311] The evidence before the *Ameritox* court included (1) evidence as to the state of the prior art, indeed enough to give the court a notion of both the broader field as well as "the seminal reference in the art at the time"; (2) testimony from both parties' experts; and (3) the prosecution history.[312]

Guidance from the Federal Circuit regarding the specific factual inquiries underlying a § 101 determination is badly needed, all the more so in light of the fact-laden character of *Mayo/Alice* Step Two, the "conventionality" test that overlaps with novelty issues and reveals whether the claims contain an "inventive concept." We are also in dire need of clarification as to procedural issues, such as the timing of eligibility determinations, especially vis-à-vis claim construction. An *en banc* intervention on the order of *Markman* may be necessary to sort these matters out.

D.   The Interaction of *Alice* and *Aristocrat*

We have addressed two seemingly disparate areas of patent doctrine (indefiniteness and eligibility) in part because

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(2012))("[A]t least the combination of steps, were in context *obvious*, already in use, or purely conventional.") (emphasis added).

[310] *Id*. at 915.

[311] *Id*.

[312] *Id*. at 916.

they are both animated by the concern with claim overbreadth or preemption. We should not be surprised, therefore, that the two doctrines should interact in order to allow only those claims with limited scope to survive. As one court has commented, a "narrow claim construction from the beginning likely save[s]" a patent "from an unfavorable ruling under § 101," whereas a construction that "broaden[s] the patented claims" brings "significant challenges" for surviving under § 101.[313]

Just as *Aristocrat* invalidates claims that would likely also fail under *Alice*, the flipside of the doctrine often works to preserve them: *Aristocrat's* requirement that a computer-implemented means-plus-function be limited to the particular algorithmic structure disclosed in the specification (or else face indefiniteness) operates to remove the claim from the realm of abstraction.[314] As Collins observed acutely, several cases on § 101 after *Bilski's* revival of the "abstract idea" standard indicated that "an algorithm limitation is a sign of a software claim to a particular machine and, in turn, a particular machine is one antipode of an abstract idea."[315] Thus the Federal Circuit in *Dealertrack* and *Cybersource* criticized patents for not claiming the particular algorithms disclosed and hence claiming at too abstract a level.[316] Collins correctly read the "negative implication" of these cases to be that the court "would have looked more favorably on the claim if it had recited an algorithm limitation."[317]

Most recently, this implication emerged as an explicit factor driving the result in *Enfish*, which was the first § 101

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[313] LendingTree, LLC v. Zillow, Inc., 54 F. Supp. 3d 444, 453 n. 3 (W.D. N.C. 2014). *LendingTree* is not an algorithm case but the observation is especially true in this context.

[314] This flipside can be seen quite clearly in *WMS Gaming* and *Harris*, where indefiniteness was not even raised.

[315] Collins, *supra* note 33, at 1457.

[316] Dealertrack, Inc. v. Huber, 674 F.3d 1315, 1334 (Fed. Cir. 2012); CyberSource Corp. v. Retail Decisions, Inc., 654 F.3d 1366, 1372 (Fed. Cir. 2011).

[317] Collins, *supra* note 33, at 1459.

decision from the Federal Circuit in 18 months to uphold the patent's eligibility.[318] Notably, *Enfish* was that rare case where the claims were *not* held to be directed to an abstract idea (under *Mayo/Alice* Step One), in part because "the claims are not simply directed to any form of storing tabular data" and "this is reflected in step three of the … algorithm" corresponding to the claim.[319] That the claim was limited to an algorithm buttressed the patent owner's argument for eligibility. Although the district court had properly construed the claims as limited to a four-step algorithm, when shifting to the eligibility analysis it (erroneously) "oversimplified" very specific aspects of the claim reflected in the algorithm—aspects that constituted an "improvement" to "computer-related technology."[320] The Federal Circuit found that the district court's description of the claims' "abstract idea" was operating at too "high a level of abstraction" because it failed to recognize that the claims were "specifically directed" to the algorithm disclosed.[321]

Although the Federal Circuit has recognized "*Alappat* has been superseded by *Bilski*…and *Alice*," it has nonetheless maintained that the principles underlying *Aristocrat* are "consistent with recent Supreme Court precedent."[322] Thus, while disclosure of an algorithm alone may not convert the general purpose computer into a special purpose computer and "new machine" under § 101 as *Alappat* had held, it certainly renders such claims definite, and definite claims go some distance toward allaying the fear of preemption animating *Mayo/Alice*.

Such claims may not do so entirely, of course. Indeed, if claims held definite under *Aristocrat* (whose reasoning derives

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[318] Enfish, LLC v. Microsoft Corp., 822 F.3d 1327 (Fed. Cir. May 12, 2016). The last such case was DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245 (Fed. Cir. 2014).

[319] *Id.* at 1337.

[320] *Id.* at 1335 –38.

[321] *Id.* at 1337.

[322] EON Corp. IP Holdings LLC v. AT&T Mobility LLC, 785 F.3d 616, 623 (Fed. Cir. 2015).

from *Alappat*) are eligible *because* of their definiteness (their limited scope), this reasoning would effectively return us to the eligibility regime of *Alappat*. Something more may be necessary, such as an "inventive concept" under Step Two of *Mayo/Alice*, and in *Enfish* the court repeatedly emphasized that the algorithm which rendered the claim definite was also the point of novelty over the prior art.

But that is only one possible way to understand the interaction between *Aristocrat* and *Alice*. Notwithstanding the panel decision in *EON*, not all judges agree that *Alappat* has been overruled. After *Mayo*, though prior to the Supreme Court's decision in *Alice*, four Federal Circuit judges maintained that the "Supreme Court has never cast doubt on the patentability of claims such as those at issue in *In re Alappat*" and that "*Alappat*'s reasoning is completely consistent with *Bilski*, [*Mayo*], and the Supreme Court's other § 101 cases."[323]

Indeed, the fact that *Enfish* was decided at *Mayo/Alice* Step One is practically a revival of *Alappat*'s reasoning. By holding that the algorithm limiting the claims distinguished them from an "abstract idea" at Step One, the court in *Enfish* virtually held (with *Alappat*) that *programming* creates a new machine under § 101. The court went out of its way to point out that it was "not persuaded that the invention's ability to run on a general purpose computer dooms the claims," and that "[m]uch of the advancement made in computer technology consists of improvements to software that, by their very nature, may not be defined by particular physical features but rather by logical structures and processes."[324]

Enfish does make an effort to distinguish *Alice* by noting that the claims "here are directed to an improvement in the functioning of the computer." However, the *Enfish* court

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[323] CLS Bank Int'l v. Alice Corp. Pty. Ltd., 717 F.3d 1269, 1316 (Fed. Cir. 2013) (Moore, Rader, Linn, & O'Malley, JJ., dissenting).

[324] Enfish, LLC v. Microsoft Corp., 822 F.3d 1327, 1338–39 (Fed. Cir. 2016).

explicitly stopped at Step One,[325] so these observations might be fairly read as dicta, and discussion of issues surrounding the "inventive concept" at *Mayo/Alice* Step Two is arguably beside the point. At the very least, the *Enfish* court does not explain how novelty is relevant to determining whether a claim is directed to an abstract idea at Step One.

To state the issue clearly: if a claim is rendered definite through disclosure of an algorithm under *Aristocrat*, how can that claim be both "definite" (under *Aristocrat*) and "abstract" (under *Mayo/Alice*)? *Enfish* implicitly suggests that definiteness negates abstraction at *Mayo/Alice* Step One—which leads us very much where we began, back to *Alappat*.

The interaction between *Aristocrat* and *Alice* (and the looming reasoning of *Alappat*) will, of course, have to be litigated further. In part, the uncertainty over these matters arises from the Supreme Court's reluctance ever to tackle the eligibility of software. It has avoided the issue when squarely presented[326] and, in *Alice*, failed to "answer the bigger questions."[327] Now, we face situation where "software patents have been called into question following *Alice*" and "cases decided since" *Alice* "can arguably be read to suggest that software patents as an entire category are no longer within the scope of 101."[328] Had the Supreme Court addressed this issue, we might be better poised to assess *Alappat*'s legacy. Meanwhile, *Enfish* suggests that legacy lives on through *Aristocrat* and its impact on eligibility analysis.

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[325] *Id*. at 1339.

[326] Brief for Petitioner, Dann v. Johnston, 425 U.S. 219 (1976) (No. 74-1033), 1975 WL 173464, at *2 (quoting question presented for certiorari: "[w]hether programs for existing general purpose digital computers, however claimed, are patentable under present law?").

[327] Cal. Inst. of Tech. v. Hughes Commc'n Inc., 59 F. Supp. 3d 974, 984 (C.D. Cal. 2014).

[328] Paone v. Broadcom Corp., 2015 WL 4988279, at *5, *9 (E.D.N.Y. Aug. 19, 2015).

V.   CONCLUSION

The application of eligibility and indefiniteness doctrines has become unmoored from the proper starting point for virtually all issues in patent law: the perspective of the skilled artisan. We are seeing this play out daily in district courts throughout the nation, particularly in the wake of the Supreme Court's revolutions in eligibility jurisprudence. Yet this trend contravenes the Supreme Court's own test for eligibility under *Mayo/Alice*, as well as long-standing precedent establishing the skilled artisan's understanding as the starting point for all definiteness inquiry. *En banc* action from the Federal Circuit is urgently needed to correct these departures in the law. If that is not forthcoming, Congress should consider amending § 101[329] and § 112 to explicitly establish that eligibility and indefiniteness must be determined from the skilled artisan's perspective—and resolved in proper context.

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[329] Robert Sachs has proposed a number of statutory fixes to § 101, one of which would require eligibility to be determined as "recognized by a person having ordinary skill in the art to which the claimed invention pertains." *See* Robert R. Sachs, *Twenty-Two Ways Congress Can Save Section 101*, BILSKIBLOG (Feb. 12, 2015), *available at* http://www.bilskiblog.com/blog/2015/02/twenty-two-ways-congress-can-save-section-101.html.