Beyond abstraction: applying the brakes to runaway patent ineligibility

Dan L. Burk

School of Law, University of California-Irvine, 401 East Peltason Drive, Irvine, CA 92697, USA
Corresponding author: E-mail: dburk@law.uci.edu

INTRODUCTION
I was pleased to read and am now pleased to respond to the commentaries by Minssen and Schwartz\(^1\) and by Thambisetty\(^2\) on my article Dolly and Alice.\(^3\) Each of these commentaries offers a welcome comparative perspective to the doctrinal quandaries that I initially pointed out, indicating some prescription for the American patent eligibility problem based upon the parallel European experience.

But it seems already clear that the American courts, responding to an avalanche of lower court patent invalidations based on the Alice patent eligibility test, have already begun fashioning their own idiosyncratic response to the common global difficulty of distinguishing patentable subject matter. A set of recent opinions makes clear the determination of the United States Court of Appeals for the Federal Circuit to apply the brakes to runaway abstraction analysis under the Alice test. In some respects this response may indeed parallel that in other jurisdictions, but in major respects it departs from the prescriptions detailed by the commentators.

APPLYING THE BRAKES
Recent subject matter opinions by the United States Supreme court have thrown patent eligibility into some disarray, so there is a natural tendency to hope that the Supreme Court might intervene to sort out the chaos in the lower courts. Minssen and Schwartz look particularly to the Federal Circuit’s opinion in Ariosa Diagnostics v Sequenom, Inc.,\(^4\) hoping that it might be taken up by the Supreme Court as an additional opportunity to

\(^1\) Timo Minssen & Robert M. Schwartz, Separating Sheep from Goats: A European View on the Patent Eligibility of Biomedical Diagnostic Methods, 3 J. L. & BIOSCI. 365 (2016).
\(^2\) Siva Thambisetty, Alice and ‘Something More’: The Drift Towards European Patent Jurisprudence, 3 J. L. & BIOSCI. (2016).
\(^3\) Dan L. Burk, Dolly and Alice, 3 J. L. & BIOSCI. 606 (2015).
\(^4\) 788 F.3d 1371 (Fed. Cir. 2015).
elucidate, and perhaps redirect, the implementation of the Alice test developing in the lower courts.\(^5\)

But since the publication of their commentary, the petition for certiorari in *Sequenom* has been denied.\(^6\) Having denied certiorari in *Sequenom*, and similarly declined other opportunities to further take up the patent eligibility question, it seems increasingly clear that the Supreme Court has said its final word on the matter with the *Alice* opinion, at least for the time being. As I have observed previously, the quartet of recent Supreme Court subject matter cases eerily parallels the previous quartet of subject matter cases decided in the 1970s, which stood as the extent of the Court’s guidance for a period of 30 years.\(^7\) Four successive Supreme Court decisions on any single topic is a rarity, and the Court may well let its recent pronouncements stand for another 30 years, leaving the lower courts to work out the implementing details as it did before.

The Supreme Court has thus let stand undisturbed the Federal Circuit’s troubling application of the two-part Alice test in *Sequenom*. There the patentees claimed methods of fetal genetic diagnosis, using freely circulating fetal DNA that was surprisingly found to be present in the maternal bloodstream.\(^8\) Prior to this discovery, which the court acknowledged ‘revolutionized prenatal care’, such samples had to be drawn from amniotic fluid, creating a risk of miscarriage.\(^9\) But the court characterized the claims as directed to detecting a naturally occurring phenomenon, fetal DNA, that was present in maternal serum before its discovery, thus failing the first prong of the *Alice* test. Detecting its presence by the use of routine or conventional laboratory procedures was held to add nothing inventive to the discovery, thus failing the second prong of *Alice* as well.\(^10\)

However, troubling the *Sequenom* analysis may be, it seems now that the opinion may represent the appellate high water mark of patent ineligibility under *Alice*. In the absence of Supreme Court intervention, the Federal Circuit appears to have taken a new tack in cases such as *Rapid Litigation Management v CellzDirect, Inc.*, where it reversed a holding of patent ineligibility for method claims directed to cryopreserving hepatocytes.\(^11\) After harvesting, such cells are frequently preserved until needed in liquid nitrogen, which damages many of the cells. But the patentees had discovered that the hardier hepatocytes which survived cryopreservation could remain viable through subsequent rounds of freezing and thawing.\(^12\) Prior to this discovery, it had been thought that cryopreserved cells must be used or discarded, and could not be refrozen.\(^13\)

Applying the two-step *Alice* test, the appellate court first found that the process was not directed to a law or principle of nature, but to the patentable application of such a principle—that the inventors had not sought to claim the phenomenon of hepatocyte resistance to freezing and thawing, but merely a laboratory process based on this

---

\(^5\) Minssen & Schwartz, *supra* note 1, at 372.
\(^6\) 136 S. Ct. 2511 (2016).
\(^7\) See Dan L. Burk, *The Curious Incident of the Supreme Court in Myriad Genetics*, 90 NOTRE DAME L. REV. 505, 520–22 (2014).
\(^8\) 788 F.3d at 1373.
\(^9\) *Id.* at 1379.
\(^10\) *Id.* at 1377–78.
\(^11\) 827 F.3d 1042 (Fed. Cir. 2016).
\(^12\) *Id.* at 1045.
\(^13\) *Id.*
phenomenon. This was said to satisfy patent eligibility under the first prong of the test. And, the court continued, even were the patent to viewed as directed to this phenomenon, the combination of freezing and thawing steps satisfied the second prong of the Alice test, constituting an inventive concept that was ‘something more’ than an attempt to patent the natural principle. This seems emblematic of the kind of course correction Minssen and Schwarz hoped to see from the Supreme Court.

The shift in approach readily appears in comparison of the two cases. It is nearly impossible to square the outcome in Rapid Litigation Management with that in Sequenom. If the process in Rapid Litigation Management was characterized as directed to a ‘new and useful laboratory technique/rather than to the underlying occurrence of freeze-resistant cells, then it is unclear why the process in Sequenom could not be equally well characterized as directed to a new and useful laboratory technique rather than to the underlying occurrence of fetal DNA in the maternal bloodstream. If the employment of the known, conventional, and routine steps of freezing and thawing hepatocytes became ‘inventive’ by virtue of sequential repetition, then it is unclear why the employment of known, conventional, and routine steps for extracting and manipulating DNA could not be considered similarly inventive.

The contrasting outcomes seem to stem from a new appreciation for two issues that I observed in Dolly and Alice, which were taken up by the commentators, and which also have now been taken up by the Federal Circuit. First, there appears a clear concern that sufficiently abstract characterization of any process invention will lead to patent ineligibility, and some recognition that the Alice test as promulgated leads almost inevitably to this outcome. Of course, the Supreme Court recognized that ‘all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas’ and that abstracting away the claimed embodiment of an invention would ‘if carried to its extreme, make all inventions unpatentable because all inventions can be reduced to underlying principles of nature which, once known, make their implementation obvious’. But the Court left unarticulated any principled criterion for how to choose the proper level of abstraction for viewing the claims. Lower courts began identifying abstraction in much the same fashion as Justice Potter Stewart’s infamously arbitrary ability to detect obscenity by knowing it when one sees it.

But in the recent McRO v Bandai Namco et al. decision, the Federal Circuit specifically recognized and addressed this subject matter abstraction problem, admonishing the lower courts against viewing the claims too generally and failing to consider their specific requirements. Similarly, in Enfish v Microsoft, the court observed ‘that describing the claims at such a high level of abstraction and untethered from the language of the claims all but ensures that the exceptions to § 101 swallow the rule’. Both opinions held that the specific limitations found in the claims prevent it from encompassing an abstract idea. This is also the gist of the court’s decision in Rapid Litigation Management

14 Id. at 1045–46.
15 Id. at 1375–76.
16 Mayo Collaborative Services v. Prometheus Laboratories, Inc., 132 S.Ct. 1289, 1293 (2012).
17 Diamond v. Diehr, 450 U.S. 175, 189 n.12 (1981).
18 Jacobellis v. Ohio, 378 U.S. 184, 197 (1964) (Stewart, J., concurring).
19 2016 U.S. App. LEXIS 16703.
20 Enfish, LLC v. Microsoft Corp., 822 F.3d 1327, 1337 (Fed. Cir. 2016).
with regard to patent ineligible laws of nature: that the specific steps of the process claim were ‘directed to’ a method based upon a natural phenomenon, not to the existence of the phenomenon itself.

**TRUTH, JUSTICE, AND THE AMERICAN WAY**

Such salvific limitations need not constitute physical embodiments. In *Enfish*, the court held that claims need not be directed to hardware in order to avoid abstraction; claims directed to particular tabular data storage formats were sufficiently specific to be patent eligible, even though they were not physically tangible.\(^1\) Thus, unlike the ‘any apparatus’ approach that Professor Thambisetty discusses in the European context,\(^2\) the American courts are making clear that the addition of conventional or known mechanisms to a patent’s claims will not meet the need for ‘something more’ beyond a prohibited subject matter category under the *Alice* test.

Indeed, according to the *Alice* opinion, the addition of computer hardware that gives the process physical rather than conceptual form/is beside the point’.\(^3\) Thus, in the *Alice* opinion, once the business method process claims failed the subject matter requirements, related claims encompassing implementing media and hardware were also deemed ‘to add nothing of substance to the underlying abstract idea’ and fell alongside the process claims.\(^4\) Rather, the opinion indicates that to pass the second prong of the test, the apparatus must constitute an improvement in computer science or some other technological field.\(^5\) Apparatus claims in themselves are clearly neither necessary nor sufficient for patent eligibility.

But if American courts seem determined to part company from their European counterparts in the treatment of process implementation, the question remains how implementation is to be treated. In *Sequenom*, for example, the claimed diagnostic methods failed the second prong of the *Alice* test because the implementation relied on conventional or routine DNA amplification mechanisms and other ‘standard techniques’ that were well known in the art. Given this holding of patent ineligibility for the conventional process steps in *Sequenom*, it is perhaps surprising that the very conventional process claims in *Rapid Litigation Management* were found to be patent eligible. The respective outcomes appear to signal a shift in the determination of what constitutes a routine or conventional implementation.

Minssen and Schwarz note that the court’s opinion in *Sequenom* appears to exclude the routine and conventional aspects of the invention from subject matter analysis.\(^6\) This approach would seem to necessarily abstract away the specific implementation of process inventions in software or medical diagnostics, which outside of extraordinary circumstances where a novel apparatus is developed, will nearly always be implemented on existing equipment. If implementation on existing apparatus is excluded from consideration, the disembodied process will always appear to constitute an abstract idea without ‘something more’ to achieve patent eligibility.

---

1. *Id.* at 1335.
2. Thambisetty, *supra* note 2, at.
3. 134 S.Ct. 2347, 2358–59.
4. *Id.* at 2360.
5. *Id.* at 2359.
6. Minssen & Schwarz, *supra* note 1, at 370.
Minssen and Schwarz thus lament Sequenom as accepting the sub silento overruling of a more holistic subject matter approach from the Supreme Court’s opinion in Diamond v Diehr. Similarly, Professor Thambisetty alludes to the 30-year evolution of the subject matter determination under the European Patent Convention, stretching back to the now discarded ‘technical contribution’ under which EPO examiners were to conceptually divide the claimed invention into technical and non-technical portions, looking for an inventive step in the technical portion. If the inventive step resided in the non-technical, patent ineligible portion of the invention, then the claims were said to fall outside patentable subject matter. This approach required the examiner to determine the presence of an inventive step in order to assess patent eligibility, reversing the usual order of examination.

Yet the Federal Circuit seems now determined to avoid such bifurcated, piecemeal analysis. Instead, the court has asserted in its recent opinions that the safeguard against undue abstraction is viewing the claims “as a whole” rather than as individual steps that may well have been previously known in the art. This approach moves the analysis not only away from the piecemeal analysis that Minssen and Schwartz decry in Sequenom, but away from reliance on the flawed logic of Parker v Flook, which the Supreme Court drew upon for the Mayo and Alice opinions. Flook had long been thought to have been effectively overruled by the Supreme Court’s subsequent decision in Diehr, until the Flook analytical division of inventive and conventional characteristics of subject matter was resurrected in Mayo.

This gravitation back toward Diehr may correct the piecemeal analysis discussed by Minssen and Schwarz, but also demonstrates the doctrinal creep identified by myself and the commentators. The Alice requirement of an inventive concept seems strikingly close to the patentability requirement of non-obviousness, and the admonition to view the claims as a whole smacks of non-obviousness analysis under the American statutory section 103. While the American statute’s subject matter provisions say nothing about considering claims holistically, the non-obviousness provision in section 103 of the statute explicitly requires this approach.

The Federal Circuit has made some attempt to police the problem. In Rapid Litigation Management, court observed that the ease or obviousness of the claimed process is not a criterion for patent eligibility, but is to be separately assessed under section 103. And in the recent BASCOM Global Internet Services v AT&T Mobility software opinion, the Federal Circuit chides the lower court for making the inventive concept inquiry under section 101 too closely resemble an obviousness inquiry under section 103. The appellate opinion observes that the trial court, by finding no inventive concept in the claimed combination of known filtering technologies, seemed to be looking for the
Beyond abstraction: applying the brakes

‘motivation to combine’ prior art that one would assess in determining obviousness, but that this is not needed under the *Alice* subject matter inquiry.\(^{35}\)

**A COMMON DENOMINATOR**

In reversing the district court’s finding of patent ineligibility in *McRO*,\(^{36}\) the Federal Circuit not only stressed viewing the claims as a whole, but additionally focused on claim limitations that cabin the invention to embodiments that will not preempt other methods achieving the same result via alternative techniques. The Federal Circuit adopted a similar approach in the *BASCOM* opinion, finding a method of filtering Internet content to be patent eligible because the claims did not ‘preempt all ways of filtering content on the Internet; rather, they recite a specific, discrete implementation of the abstract idea of filtering content’.\(^{37}\) The incorporation of such preemption considerations adopts an important justification for subject matter eligibility that was repeatedly articulated by the Supreme Court in its subject matter opinions: avoiding exclusive rights in fundamental discoveries that would stifle future downstream applications of the discovery.\(^{38}\)

But ironically, as I pointed out in my initial article, potential preemption of downstream innovation was a consideration that was brushed aside as superfluous in *Sequenom* and which went entirely unconsidered in *Roslin*.\(^{39}\) Whereas the Federal Circuit previously opined in *Sequenom* that ‘Where a patent’s claims are deemed only to disclose patent ineligible subject matter under the Mayo framework, as they are in this case, preemption concerns are fully addressed and made moot’,\(^{40}\) it now appears to recognize that preemption concerns instead are indicators as to whether or not the claims disclose ineligible subject matter. This analytical development should be welcome so long as it does not become circular.

Taken as a patent eligibility criterion, preemption may provide the just kind of unifying theme that Professor Thambisetty argues can provide coherence to the otherwise disjointed subject matter inquiry.\(^{41}\) Rather than looking for doctrinal coherence in the ‘something more’ required under the second prong of *Alice*, the common denominator among the prohibited subject matter categories may lie in their potential to preempt future innovation. As I have discussed in previous work, the rationale offered by the Supreme Court for the judicial development of non-statutory patent eligibility exceptions is the preservation of fundamental inputs to the process of innovation.\(^{42}\) Products of nature, laws of nature, insufficiently instantiated abstract ideas comprise fundamental elements for downstream innovation, which the Court has said constitute a common fund of innovative building blocks.\(^{43}\) To be sure, any patent may stifle some follow-on

---

\(^{35}\) *Id.* This observation is of course somewhat ironic given that the United States Supreme Court famously reprimanded the Federal Circuit several years ago for imposing unnecessarily stringent restrictions on the evidence of motivation to combine known elements under section 103. See KSR Int’l Co. v. Teleflex, Inc., 550 U.S. 398, 415 (2007).

\(^{36}\) 2016 U.S. App. LEXIS 16703 at 33.

\(^{37}\) 827 F.3d at 1341, 1350.

\(^{38}\) Alice Corp., 134 S. Ct. 2347, 2354 (2014); Mayo, 132 S. Ct. 1289, 1301 (2012).

\(^{39}\) See Burk, *supra* note 3, at 619.

\(^{40}\) 788 F.3d at 1371, 1379.

\(^{41}\) See Thambisetty, *supra* note 2, at.

\(^{42}\) See Burk, *supra* note 7, at 535.

\(^{43}\) Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948).
innovation, but the Court has suggested that the preclusive effect of the patent ineligible categories rises to an unacceptable level.

**PRODUCTS AND PROCESSES**

None of this brings us appreciably closer to understanding the problem I initially set out to map, which was the application of the *Alice* test to Dolly the cloned sheep, nor for that matter closer to understanding *Alice’s* applicability to other composition of matter or article of manufacture claims. *Rapid Litigation Management* and *Sequenom* are process patent opinions, as are the trio of recent software opinions curtailing the level of abstraction applied under the *Alice* analysis. The *Alice* and *Mayo* opinions developed their subject matter test in the context of process claims; the product inventions in *Myriad* and *Roslin* are presumably subject to the same two-part test, but concrete examples as to how the test applies to product patents remain lacking.

To be sure, the *Sequenom* opinion goes to some trouble to connect the diagnostic process at issue with the *Myriad* product of nature rationale, arguing that the process was patent ineligible because it ‘begins and ends’ with naturally occurring fetal DNA.\(^{44}\) Similarly, the *Rapid Litigation Management* opinion draws a connection to products of nature and the *Myriad* analysis by touting the freeze-resistant hepatocytes that were the end products of the claimed process. But products of nature were not at issue in *Sequenom* or *Rapid Litigation Management*, and there was no particular reason for the Federal Circuit panel to have discussed them except to try to shoehorn the *Myriad* decision into process analysis, by positing a relationship between the patent eligibility of a process and the patent eligibility of its starting or ending materials.

What this rhetorical move accomplishes is to underscore the relationship between a starting material, a process, and the product of the process. This is of course a version of the problem that I identified in *Dolly* and *Alice*: in the Section 103 non-obviousness context, there is a relationship between the novelty and obviousness of a process and the novelty and obviousness of that process’ starting or ending materials.\(^{45}\) Logically, one cannot foresee a process that involves unforeseeable starting materials, and a process that yields a non-obvious outcome seems by its nature non-obvious. It took American courts decades to sort this problem out in the context of non-obviousness, and creating a parallel ‘inventive concept’ requirement in patent eligibility surely raises the same issues.\(^{46}\)

**CONCLUSION**

The patent subject matter issues I noted in *Dolly* and *Alice* are unlikely to be resolved by the United States Supreme Court, but are increasingly apparent in the Federal Circuit’s jurisprudence. The Federal Circuit is clearly moving to prevent runaway subject matter invalidations, although not necessarily following the trajectory suggested by my commentators. And while the court is attempting to police the boundary between subject matter and obviousness doctrines, the relationship between product and process patents remains, and seems likely to remain, a hidden obstacle to any sensible ‘product of nature’ doctrine.

---

\(^{44}\) 788 F.3d at 1376.

\(^{45}\) Burk, *supra* note 3, at 622.

\(^{46}\) Id. at 624.