

NOTE

THE LOW WRITTEN DESCRIPTION BAR FOR SOFTWARE INVENTIONS

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As regards the written description requirement, "it is not so easy to tell what the law of the Federal Circuit is."¹

INTRODUCTION

IT has long been established that patent claims in the United States must be adequately supported by a written description of some kind. This requirement stems from the first paragraph of 35 U.S.C. Section 112, which provides that a patent's specification shall contain a:

written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.²

¹ *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1560 (Fed. Cir. 1991) (quoting *Vas-Cath, Inc. v. Mahurkar*, 745 F. Supp. 517, 522 (N.D. Ill. 1990)).

² 35 U.S.C. § 112 (2000).

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Since the late 1960s, courts have interpreted Section 112, Paragraph 1 to include three distinct requirements. A patent specification must contain: (1) a *written description* of the invention, (2) sufficient information to *enable* a person having ordinary skill in the art to make and practice the invention, and (3) the *best mode* of carrying out the invention, if the inventor contemplated one.³

The degree to which the written description requirement and the enablement requirement are (or should be) distinct from one another is a matter of considerable disagreement. For most of its history, the written description requirement was used primarily as a priority policing tool, applied to bar the improper expansion of a patent through later amendments of the claims or specification. In the past ten years, however, the Federal Circuit's written description jurisprudence has undergone a sea change.

In 1997, *Eli Lilly* marked the beginning of the rigorous application of a free-standing written description requirement in the biotechnology context.⁴ Rather than using the doctrine solely to regulate improper introduction of new material or unsupported expansion of existing claims, the Federal Circuit now also applies the doctrine to *original*, unamended claims as a separate disclosure requirement.⁵ This new use of the doctrine, at least as applied to biotechnology and genetic inventions, requires extremely detailed disclosure—often at the level of specific chemical structures or nucleotide sequences. When dealing with biotechnology, functional claiming has repeatedly been held insufficient to satisfy Section 112, Paragraph 1. Rather than saying what a genetic invention *does*, a valid biotechnology patent specification must say what an invention *is*.

³ In re Alton, 76 F.3d 1168, 1172 (Fed. Cir. 1996) (observing that “[t]he adequate written description requirement . . . is distinct from the enablement and best mode requirements”). The written description requirement was first set forth as a separate requirement in 1967. In re Ruschig, 379 F.2d 990, 995–96 (C.C.P.A. 1967).

⁴ See Regents of the Univ. of Cal. v. Eli Lilly & Co., 119 F.3d 1559, 1566–67 (Fed. Cir. 1997).

⁵ This means that instead of just preventing a hypothetical inventor from later adding element *D* to a *previously*-disclosed *A*, *B*, and *C*, written description now also involves what the inventor has to disclose about *A*, *B*, and *C* in the first place.

Dissenting judges in patent cases often remind the majority that the Patent Act is not technology-specific.⁶ While ostensibly true, the “same” law of the written description is in practice applied differently in different arts. The treatment of biotechnology stands in stark contrast to the treatment of software inventions under Section 112, Paragraph 1. While a functional claim (“Gene *X* does functions *A*, *B*, and *C*”) is unlikely to pass muster for a drug or genetic invention, functional claiming appears to be standard practice for computer-based inventions (“Program *X* does functions *A*, *B*, and *C*”). Although many of the same policy concerns that underlie the Federal Circuit’s biotechnology written description jurisprudence would seem to be present in the context of the computer arts as well, the court has not chosen to reconcile its disclosure jurisprudence in these two areas.

This Note seeks to reconcile software’s low written description bar with the Federal Circuit’s more stringent biotechnology jurisprudence. Part I of this Note will trace the relevant history of the written description requirement and outline the contours of the modern requirement. Part II will explore in depth the recent—and controversial—rise of the written description as “super-enablement” requirement in the biotechnology context.⁷ Part III will contrast this treatment with the relatively low disclosure standard in the software arts, arguing by analogy where written description case law is sparse. Finally, Part IV of this Note will contend that the better route for software patents is to retain its low written description bar, coupled with a high bar for obviousness and enablement.

I. A BRIEF HISTORY OF THE WRITTEN DESCRIPTION REQUIREMENT

Beginning with the Patent Act of 1790, Congress has consistently required some measure of a written description of an invention for

⁶ See, e.g., *Moba, B.V. v. Diamond Automation, Inc.*, 325 F.3d 1306, 1325–26 (Fed. Cir. 2003) (Rader, J., concurring) (“Despite the technology-neutral language of the Patent Act, the *Lilly* rule imposes technology-specific requirements.”); *In re Joly*, 376 F.2d 906, 929 (C.C.P.A. 1967) (Smith, J., dissenting) (“The clear intent of the [patent] statute enacted under the constitutional grant is *that there is to be no distinction between classes of inventors.*”).

⁷ Janice M. Mueller, *The Evolving Application of the Written Description Requirement to Biotechnological Inventions*, 13 *Berkeley Tech. L.J.* 615, 618 (1998).

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a patent to issue.⁸ While the requirement was probably a useful disclosure mechanism in the early years of the patent system, the advent of claims under the later Patent Acts rendered the requirement superfluous. Until 1967, the written description requirement appears to have largely lain dormant, subsumed by the enablement requirement. A 1967 U.S. Court of Customs and Patent Appeals (“CCPA”) case, *In re Ruschig*, then breathed a modicum of life into the requirement: for the first time, the written description was used to police priority by barring an amended claim that contained matter not disclosed by the original patent specification.⁹ For the next three decades, the CCPA and its successor, the U.S. Court of Appeals for the Federal Circuit, applied the written description requirement primarily to resolve issues of priority.¹⁰

A. The Early Development of the Written Description Requirement

To a modern inventor, the existence of a requirement that the specification (as opposed to the claims) describe the invention must seem at best redundant: the purpose of claims, after all, is to describe the precise boundaries of the invention at issue. The Federal Circuit has offered several rationales for this anomaly.¹¹ The most straightforward, and most plausible, is that the written description requirement was included in the patent statutes “at a time before claims were required.”¹² In *Evans v. Eaton*, for example, the

⁸ For a useful synopsis of the early history of the description requirements of the Patent Acts of 1790 through 1952, see Shraddha A. Upadhaya, *The Postmodern Written Description Requirement: An Analysis of the Application of the Heightened Written Description Requirement to Original Claims*, 4 Minn. Intell. Prop. Rev. 65, 69–70 (2002) (citing Janice M. Mueller, *The Evolving Application of the Written Description Requirement to Biotechnological Inventions*, 13 Berkeley Tech. L.J. 615, 618 (1998) (“All United States patent statutes have required a ‘description’ of the applicant’s invention.”)), and *In re Barker*, 559 F.2d 588, 592 (C.C.P.A. 1977) (“Commencing with our first patent statute, there have been separate requirements for a description of the invention and a description of how to make and use it.”).

⁹ 379 F.2d 990, 995–96 (C.C.P.A. 1967).

¹⁰ For an exhaustive list of every such case, see *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956 app. at 984–87 (Fed. Cir. 2002) (Rader, J., dissenting).

¹¹ See, e.g., *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1560–61 (Fed. Cir. 1991).

¹² *Id.* at 1560. Professor Janis draws the opposite inference and discounts this historical rationale. In his view, the purpose of the possession requirement in early cases such as *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356 (1822), was to put the public on notice of what had been invented—a requirement that Janis believes is absent from the modern written description requirement. Mark Janis, *On Courts Herding Cats: Con-*

Supreme Court affirmed invalidation of a patent for want of an adequate description under the Patent Act of 1793.¹³ That statute had no requirement that the invention be set forth in claims but did require a written description of the invention.¹⁴ Thus, the written description may be seen as a relic of an earlier era of patent law, and it is therefore unsurprising that the doctrine was rarely invoked prior to 1967.

1. *In re Ruschig and the Rise of the Written Description*

After years of disuse, the written description requirement re-emerged in the late 1960s. The first modern case clearly recognizing the existence of a Section 112 written description requirement as distinct from enablement or best mode was *In re Ruschig*.¹⁵ Writing for the court in *In re Ruschig*, Judge Rich (who would develop much of the court's early written description jurisprudence) held that Claim 13 of the patent-in-suit was invalid.¹⁶ The claim, which covered certain compounds useful in the treatment of diabetes, relied on the original disclosure in the application and had been added to the patent after the original filing to provoke an interference proceeding.¹⁷ While the appellant patentees apparently believed that the Patent and Trademark Office ("PTO") had rejected Claim 13 based on *enablement* grounds, Judge Rich disagreed:

While we have no doubt a person so motivated would be enabled by the specification to make [the compound], this is beside the point for the question is . . . whether the specification *discloses* the compound to him, specifically, as something appellants actually invented. We think it does not. Second, we doubt that the rejection is truly based on section 112, at least on the parts relied

tending with the "Written Description" Requirement (and Other Unruly Patent Disclosure Doctrines), 2 Wash. U. J.L. & Pol'y 55, 63-64 (2000).

¹³ 20 U.S. (7 Wheat.) at 366. *Evans* is sometimes cited by proponents of a separate written description requirement as the earliest written description case, though the opinion is open to other interpretations (most notably that the court only required a written description to *enable* the invention, not a written description for the sake of a written description).

¹⁴ Patent Act of 1793, ch. 11, 1 Stat. 318, 321-22.

¹⁵ 379 F.2d 990 (C.C.P.A. 1967).

¹⁶ *Id.* at 996.

¹⁷ *Id.* at 991.

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on by appellants. If based on section 112, it is on the requirement thereof that ‘The specification shall contain a *written description* of the invention’¹⁸

Judge Rich then went on to ask the question of fact that became the core of the written description “possession” inquiry for thirty years: “Does the specification convey clearly to those skilled in the art, to whom it is addressed, in any way, the information that appellants *invented* that specific compound?”¹⁹ In this way, the written description became a tool to ensure that a later added or amended claim was properly supported by an earlier disclosure. As suggested by the language in *Ruschig*, the requirement served to prevent a patentee from offering the public a given description of their invention initially and then attempting to claim broader subject matter at a later time.

Given that the United States managed to survive for nearly two hundred years without using Section 112 to regulate priority in patents, it is probably fair to ask whether it was necessary to develop a written description jurisprudence for this purpose in 1967. As noted by Judge Rader in one of his numerous, pointed objections to the reinvigoration—or in his view, creation from whole cloth—of the written description requirement, the CCPA might have instead chosen the more straightforward path of using 35 U.S.C. Section 132, which states that “[n]o amendment shall introduce new matter into the disclosure of the invention.”²⁰ In Judge Rader’s view, applying Section 132 would have avoided the necessity of using a judicially created doctrine to “prevent[] new matter from creeping into claim amendments.”²¹ Until recently, the choice made little difference: as articulated in *In re Rasmussen*, prior CCPA precedent held that a “rejection of an amended claim under § 132 is equivalent to a rejection under § 112.”²² The *Rasmussen* court, however, disapproved of this conflation present in earlier opinions. In its view, the better approach was to keep the two code sections analytically distinct: while Section 132 forbids adding new

¹⁸ Id. at 995–96 (emphases added and omitted).

¹⁹ Id. at 996 (emphasis added).

²⁰ 35 U.S.C. § 132 (2000).

²¹ *Enzo Biochem, Inc. v. Gen-Probe, Inc.*, 323 F.3d 956, 978 (Fed. Cir. 2002) (Rader, J., dissenting).

²² Id. (quoting *In re Rasmussen*, 650 F.2d 1212, 1214 (C.C.P.A. 1981)).

matter to the disclosure itself, Section 112's written description requirement, as articulated in *In re Ruschig*, forbids the broadening of a *claim* beyond what is already in the disclosure.²³

2. Vas-Cath and Confirmation of a Separate Doctrine

By 1991 the existence of the written description as a Section 112, Paragraph 1 requirement separate from enablement and best mode (at least with regard to amended or later-added claims) appears to have been firmly established. The Federal Circuit reconfirmed the existence of a separate doctrine in the oft-cited 1991 decision *Vas-Cath, Inc. v. Mahurkar*.²⁴ In the decision below, Judge Easterbrook (sitting by designation in the Northern District of Illinois) granted summary judgment of invalidity because the patent-in-suit's claims were anticipated.²⁵ Underlying the finding of anticipation was the priority date to which the relevant claims were entitled. Mahurkar, the patentee, claimed priority to an earlier-filed *design* patent, which disclosed only a drawing of the double-lumen catheter claimed in the later-filed utility patent. If the correct priority date for the claims at issue was that of the earlier-filed design patent, then a grant of summary judgment would have been improper.

The Federal Circuit reversed the grant of summary judgment with respect to all claims.²⁶ Aware of the fact that "it is not so easy to tell what the law of the Federal Circuit is [with respect to the written description]," it then proceeded to "review the case law development of the 'written description' requirement with a view to improving the situation."²⁷ After canvassing the development of the requirement, the court rearticulated that the question of written description arises primarily in the priority-policing context and that

²³ 650 F.2d at 1214. Judge Rader was apparently unconvinced by this distinction between § 132 and § 112, although his point is a rather nice one: in his view, § 132's prohibition of introducing new matter into a patent "disclosure" can be read as embracing "both new matter rejections of amended *claims* and new matter objections to amended *specifications*." *Enzo Biochem*, 323 F.3d at 978 n.4 (Rader, J., dissenting) (emphases added). On this view, § 132 can shoulder all of the priority-policing functions, and the written description should simply be swallowed by the enablement inquiry.

²⁴ 935 F.2d 1555, 1563 (Fed. Cir. 1991).

²⁵ *Id.* at 1557.

²⁶ *Id.*

²⁷ *Id.* at 1560.

an adequate description “must clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.”²⁸ In addition, the court explicitly reiterated that the written description requirement is “separate and distinct from the enablement requirement.”²⁹ Regardless of whether the description is sufficient to teach a skilled artisan how to make and use the invention, the question is whether the disclosure conveys “that, as of the filing date sought, [the inventor] was in possession of the invention.”³⁰

Having set forth the then-current law of the written description, the court found that a disputed factual question existed over whether the drawings of the earlier design patent were sufficient to convey to a person having reasonable skill in the art—in this case, a doctor familiar with catheters and the medical technology involved—that Mahurkar had invented the subject of the claims.³¹ He was possibly entitled to the earlier priority date if a factfinder determined that the drawings conveyed an adequate description of the invention. This resolution suggests that the court, at least as of 1991, was willing to grant considerable flexibility in the *form* by which an inventor described his or her invention.

In re Ruschig and *Vas-Cath* confirmed that the written description would be used as a separate requirement to ensure that patentees did not overreach in their later modifications of patent applications. For the decades between 1967 and 1997, this was arguably the only way in which the written description requirement was applied.³²

²⁸ Id. at 1560–63 (quoting *In re Gosteli*, 872 F.2d 1008, 1012 (Fed. Cir. 1989)). It is worth noting that, at least as of 1991, the court still felt that the primary use of written description was for claims that were later added or amended.

²⁹ Id. at 1563.

³⁰ Id. at 1563–64 (emphasis omitted).

³¹ Id. at 1567.

³² See *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 984–87 (Fed. Cir. 2002) (Rader, J., dissenting). Judge Rader lists some thirty cases and cites language in each which suggests that priority was the issue resolved using written description. But, as Judge Lourie points out in his thoughtful response to Judge Rader’s dissent, the language of the statute does not limit written description to priority cases, and the cases that have been decided may simply reflect priority issues because of the arguments counsel chose to put forth. Id. at 972 (Lourie, J., concurring).

B. The Broad Contours of the Written Description Requirement Today

Having explored the origins of the priority-policing function of the written description requirement, in this Part this Note seeks to describe briefly the current state of written description jurisprudence and its recent role as a “super-enablement” disclosure doctrine.

1. A Written Description Requirement Exists Today, but Its Boundaries Are Not Clear

After 1991, the existence of some form of a written description requirement became settled law. While litigants, perhaps surprisingly, have continued to challenge the very *existence* (as opposed to the application) of the requirement, the Federal Circuit has consistently rejected such challenges.³³ The rationale of such challenges is generally that the requirement is not distinct from the enablement requirement: in other words, that Section 112 requires a written description simply in order to enable the invention. As one opponent of the modern written description requirement has argued, “[T]he Federal Circuit has begun to convert [the requirement] into the enablement doctrine with a different label.”³⁴ On this view, maintaining two separate doctrines is unnecessary because “to enable is to show possession, and to show possession is to enable.”³⁵ The response to this argument has been that a patent specification can enable a skilled artisan to practice an invention without containing an adequate written description of the invention. The CCPA discussed a hypothetical example of such an enabling, but nevertheless deficient, disclosure in *In re DiLeone*: imagine a patent specification that discloses only compound *A* and that contains no broadening language of any kind.³⁶ Ignoring the implications of

³³ See, e.g., *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 920 (Fed. Cir. 2004) (“Rochester contends that no written description requirement exists independent of enablement. . . . [But we] agree with Pfizer that our precedent recognizes a written description requirement and that the ’850 patent does not satisfy that requirement.” (quotation omitted)).

³⁴ *Moba, B.V. v. Diamond Automation, Inc.*, 325 F.3d 1306, 1326 (Fed. Cir. 2003) (Rader, J., concurring).

³⁵ *Id.*

³⁶ 436 F.2d 1404, 1405 n.1 (C.C.P.A. 1971).

the doctrine of equivalents, “[t]his [disclosure of compound A] might very well enable one skilled in the art to make and use compounds B and C; yet the class consisting of A, B and C has not been described.”³⁷ The patentee would only be entitled to claim compound A, even though the genus of compounds A, B, and C might have been enabled by the disclosure.

In addition, if refusal to rehear cases applying the written description requirement is an accurate guidepost, a narrow majority of judges on the Federal Circuit appear to accept the existence of the written description requirement as a disclosure doctrine apart from enablement. In 2002, the Federal Circuit rejected en banc review of *Enzo Biochem, Inc. v. Gen-Probe, Inc.* in a significant (and controversial) opinion that focused on an aspect of the written description requirement as a separate disclosure doctrine.³⁸ Similarly, in 2004, the court refused, in a 7-5 decision, to grant en banc review of *University of Rochester v. G.D. Searle & Co.*, another major application of the “new” written description requirement.³⁹ Finally, the Supreme Court appears to have recognized (at least in dicta) the existence of a separate written description requirement in *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*: “In addition, the

³⁷ Id.

³⁸ 42 Fed. App'x 439 (Fed. Cir. 2002). The decision not to grant en banc review was contentious: Judges Gajarsa, Linn, and Rader dissented, with Rader specifically urging that the modern written description doctrine be abandoned. Id. at 445, 457 (Rader & Linn, JJ., dissenting from the denial of rehearing en banc). Judge Dyk concurred with the decision not to grant en banc review but indicated that he would consider revisiting the issue in a more appropriate case. Id. at 445 (Dyk, J., concurring in the denial of rehearing en banc). Judges Lourie and Newman, on the other hand, filed concurrences defending the modern interpretation of the doctrine. Id. at 440, 444–45 (Lourie & Newman, JJ., concurring in the denial of rehearing en banc).

³⁹ 375 F.3d 1303, 1303 (Fed. Cir. 2004). Again, the decision not to grant review was narrow. Judges Bryson, Gajarsa, Linn, Newman, and Rader voted in favor of en banc reconsideration, while Chief Judge Mayer and Judges Clevenger, Dyk, Lourie, Michel, Prost, and Schall voted against reconsideration. Id. at 1307 n.1 (Rader, J., dissenting from the denial of rehearing en banc). Judges Gajarsa, Linn, and Rader filed a dissent critical of the substance of the modern interpretation. Id. at 1307–27 (Rader, J., dissenting from the denial of rehearing en banc). Judge Newman, while agreeing with Judge Lourie's defense of the modern requirement, dissented on the grounds that it was an appropriate time for en banc review to settle the issue. Id. at 1304 (Newman, J., dissenting from the denial of rehearing en banc). Judge Dyk, while concurring in the denial, wrote that his denial should not be seen as an endorsement of the current law and that he would support en banc review on better facts. Id. at 1327 (Dyk, J., concurring in the denial of rehearing en banc).

patent application must describe, enable, and set forth the best mode of carrying out the invention.”⁴⁰ Inclusion of “describe” in a list with “enable” and “best mode”—separated by serial commas with a final “and”—suggests that “describe” is a separate and independent requirement.⁴¹ In sum, it seems clear that patents must comply with a written description requirement of some sort. The remaining question is what, exactly, the requirement entails.

2. Four Major Features of the Written Description Requirement Today

Regardless of any confusion over the exact boundaries of Section 112 disclosure, the Federal Circuit’s case law has established general blazes concerning written descriptions. As the sufficiency of a written description is a question of fact, precedent is necessarily of limited value in predicting the outcome of future cases.⁴² Some patterns are nevertheless discernible. At least the four following general observations can be made about the modern requirement, arranged in order of increasing controversy from the unobjectionable to the most contentious: (a) the inventor has some flexibility in the form of the written description; (b) the requirement applies broadly across technologies and arts; (c) the description requirement applies broadly in the context of priority claims, and in this context an adequate description is one that shows possession of the invention by the inventor; and (d) the description, at least for biotechnology, must provide adequate support for the claims in the form of precise definition, such as structure or formula (for original claims). Each of these observations should be kept in mind when evaluating the differing application of Section 112 in the contexts of biotechnology and software.

(a) First, the large number of cases in which the Federal Circuit has found compliance with the written description requirement suggests that as a general rule the inventor has considerable flexibility in the form of the description, so long as that description ultimately allows one who is skilled in the art to recognize what it

⁴⁰ 535 U.S. 722, 736 (2002).

⁴¹ *Enzo Biochem*, 42 Fed. App’x at 440 (Lourie & Newman, JJ., concurring in the denial of rehearing en banc).

⁴² See, e.g., *In re Driscoll*, 562 F.2d 1245, 1250 (C.C.P.A. 1977) (stating that precedent is of “extremely limited” value in written description cases).

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claims. The description need not be *in haec verba*: even if the language used in the patent specification to describe the invention is different from the language used in the claims themselves, the written description requirement may be satisfied.⁴³ In addition, the mandate that the description be “written” has not been interpreted literally, and no set formula exists for how a description must be conveyed. Rather, an adequate description can consist of “words, structures, figures, diagrams, formulas,” and whatever else is needed to demonstrate possession of the invention.⁴⁴ In *Vas-Cath*, for example, the original description to which priority was claimed was a design patent consisting solely of a drawing of a double-lumen catheter.⁴⁵ As discussed below, the stringent requirement that DNA inventions be described in a specific form at the nucleotide-by-nucleotide sequence level is therefore best seen as something of an anomaly.

(b) Second, it seems apparent that the written description requirement is not limited to the biotechnology context. While in practice it is applied most rigorously to genetic, chemical, and DNA-based inventions,⁴⁶ the Federal Circuit has applied a written description analysis in a broad range of other fields of invention.⁴⁷ These include, for example, reclining sofas,⁴⁸ a computerized airline reservation system,⁴⁹ automotive gasoline compositions,⁵⁰ real-time compilation software,⁵¹ injection-molded plastics,⁵² and image proc-

⁴³ *Koito Mfg. Co. v. Turn-Key-Tech, LLC*, 381 F.3d 1142, 1154 (Fed. Cir. 2004) (quoting *Eiselstein v. Frank*, 52 F.3d 1035, 1038 (Fed. Cir. 1995)) (“[T]he prior application need not describe the claimed subject matter in exactly the same terms as used in the claims . . .”).

⁴⁴ *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997).

⁴⁵ *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1557–58 (Fed. Cir. 1991).

⁴⁶ See, e.g., *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 964 (Fed. Cir. 2002); *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566–67 (Fed. Cir. 1997).

⁴⁷ For additional examples of non-biotechnology applications of written description, see Dan L. Burk & Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 *Berkeley Tech. L.J.* 1155, 1165 n.41 (2002).

⁴⁸ *Gentry Gallery, Inc. v. Berklene Corp.*, 134 F.3d 1473, 1474, 1479 (Fed. Cir. 1998).

⁴⁹ *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1568, 1572 (Fed. Cir. 1997).

⁵⁰ *Union Oil v. Atl. Richfield*, 208 F.3d 989, 991, 996 (Fed. Cir. 2000).

⁵¹ *Reiffin v. Microsoft Corp.*, 214 F.3d 1342, 1344–45 (Fed. Cir. 2000).

⁵² *Koito Mfg. Co. v. Turn-Key-Tech, LLC*, 381 F.3d 1142, 1145, 1154 (Fed. Cir. 2004).

essing software.⁵³ Furthermore, the applicability of the doctrine to all fields of invention was made explicit in a 2004 decision.⁵⁴ While the requirement has been applied to achieve different results in these cases (both in its usual role as a priority-policing doctrine, but also in some cases as a stringent disclosure doctrine), the trend of the court appears to be towards expanding the reach of the requirement. Thus, the written description requirement should not be seen as a technology-specific doctrine applied only to bar overly broad biotechnology claims, but rather as an evolving doctrine that impacts all fields of invention (albeit in different ways).

(c) Third, an adequate written description must allow one of skill in the art to recognize that the inventor has invented (that is, was in possession of) what she claims. In various formulations, this was the most common use of the written description requirement in the three decades between *In re Ruschig* and *Eli Lilly*. As the Federal Circuit noted in *Vas-Cath*, as of 1991, the written description requirement “most often [came] into play where claims not presented in the application when filed are presented thereafter. Alternatively, patent applicants often [sought] the benefit of the filing date of an earlier-filed foreign or United States application . . . for claims of a later-filed application.”⁵⁵ The two most common formulations of this test for priority-policing functions can be found in *In re Gostelli*⁵⁶ and *Vas-Cath*. The court in *In re Gostelli* asked whether the description would clearly “allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.”⁵⁷ The *Vas-Cath* court, while retaining the language of *In re Gostelli*, further inquired whether the disclosure “reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter.”⁵⁸ This aspect of the written description requirement seems to have gained acceptance and does not appear to be limited to any given field of technology. The “pos-

⁵³ *LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1337, 1344–45 (Fed. Cir. 2005).

⁵⁴ *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 925 (Fed. Cir. 2004).

⁵⁵ *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1560 (Fed. Cir. 1991).

⁵⁶ 872 F.2d 1008, 1012 (Fed. Cir. 1989).

⁵⁷ *Id.*

⁵⁸ 935 F.2d at 1563 (quoting *Ralston Purina Co. v. Far-Mar-Co*, 772 F.2d 1570, 1575 (Fed. Cir. 1985)).

session” test, at least in the context of priority claims, is therefore probably an enduring feature of written description jurisprudence.⁵⁹

(d) Finally, modern written description doctrine in the context of biotechnology (but apparently only for biotechnology) requires that the disclosure provide “‘a precise definition, such as by structure, formula, chemical name, or physical properties,’ not a mere wish or plan for obtaining the claimed chemical invention.”⁶⁰ This stringent requirement applies in the context of *original* claims—not just in matters of regulating priority of claims which are added or amended after a patent application has already been filed with a given disclosure. In contrast, when the patent does not involve biotechnology, the requirement appears to be applied primarily if claims are changed after the original disclosure is made, and even then only to determine priority (rather than to strictly judge whether the original claims of the patent are adequately supported). This seemingly technology-specific aspect of disclosure developed only recently, and is the most controversial aspect of the modern doctrine. The remainder of this Note focuses on the rise of this new and stringent biotechnology disclosure requirement, and then contrasts it with the low disclosure bar for software-based inventions.

II. THE RISE (AND FALL?) OF STRINGENT SECTION 112, PARAGRAPH 1 DISCLOSURE IN BIOTECHNOLOGY INVENTIONS

Beginning in 1997 with *Eli Lilly*, panels of the Federal Circuit dealing with biotechnology patents reinterpreted the written description requirement to include a stringent disclosure requirement. While some judges objected to this seemingly new disclosure burden on a specific technology, the doctrine continued to evolve over the next decade. While the disclosure requirement was retained, the bar for compliance has gradually become lower.

Because any discussion of the modern written description requirement requires a basic understanding of how and why the

⁵⁹ See, e.g., *Falkner v. Inglis*, 448 F.3d 1357, 1365 (Fed. Cir. 2006), reh'g en banc denied, No. 05-1324, 2006 U.S. App. LEXIS 22630 (Fed. Cir. Aug. 24, 2006), cert. denied, 127 S. Ct. 1151 (Jan. 22, 2007) (describing possession function of written description requirement).

⁶⁰ *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566 (Fed. Cir. 1997) (quoting *Fiers v. Revel*, 984 F.2d 1164, 1171 (Fed. Cir. 1993)).

modern doctrine evolved, this Part selects several landmark cases in this area and examines their underlying reasoning. Like the disclosure (as opposed to priority-policing) function of the doctrine itself, these cases are confined almost entirely to chemical, genetic, and biological inventions.

A. *Eli Lilly and the Rebirth of the Written Description*

Eli Lilly was the first modern case to apply Section 112's written description requirement to original claims as a stringent disclosure mechanism without implicating priority issues. While the case has been justified and reconciled with precedent by later courts and commentators, the case was deeply unsettling to the patent bar and resulted in considerable uncertainty at the time it was decided.⁶¹

The patent in *Eli Lilly* ("the '525 patent") related to recombinant DNA technology and was held by the Regents of the University of California.⁶² Specifically, the '525 patent disclosed recombinant plasmids for use in the production of human insulin. Claim one of the patent described a replicable plasmid "containing within its nucleotide sequence a subsequence having the structure of the reverse transcript of an mRNA of a *vertebrate*, which mRNA encodes insulin."⁶³ Claim two related to a microorganism containing vertebrate insulin-encoding cDNA, and several dependant claims stemmed from this (one limited to the subset of mammalian cDNA and another to human cDNA encoding insulin).⁶⁴

The claiming was essentially functional rather than structural: the cDNA claimed was defined as the cDNA that functioned to encode insulin. As a result, the specification of the '525 patent did

⁶¹ Since an in-depth analysis of the history of the written description in biotechnology is beyond the scope of this Note, discussion of several important secondary cases has been excluded. These cases include *University of Rochester v. G.D. Searle & Co.*, 358 F.3d 916 (Fed. Cir. 2004), and *Enzo Biochem, Inc. v. Gen-Probe, Inc.*, 323 F.3d 956 (Fed. Cir. 2002). The effect of *Eli Lilly* and the rise of the written description requirement in biotechnology has been more than adequately examined by commentators. For a good starting place for further reading, see Margaret Sampson, *The Evolution of the Enablement and Written Description Requirements Under 35 U.S.C. § 112 in the Area of Biotechnology*, 15 Berkeley Tech. L.J. 1233 (2000); Corrin Nicole Drakulich, Note, *Univ. of Rochester v. G.D. Searle & Co.: In Search of a Written Description Standard*, 21 Berkeley Tech. L.J. 11 (2006).

⁶² 119 F.3d at 1562–63.

⁶³ *Id.*

⁶⁴ *Id.* at 1563.

not include a chemical formula or other precise structural description of human insulin cDNA. It did, however, describe a method of obtaining the cDNA referenced by the patent claims, but it did so via a constructive (hypothetical) example rather than documenting the results of an actual experiment which had resulted in human insulin-encoding cDNA. The example was only a general method for obtaining the cDNA and incorporated by reference a method used to isolate rat cDNA encoding insulin (but not the corresponding human cDNA).⁶⁵

The court affirmed the district court, which had invalidated the asserted claims of the '525 patent for lack of an adequate written description.⁶⁶ Beginning with *Vas-Cath*, the Federal Circuit reiterated the standard tests for possession. At that point, however, the court's analysis differed from that which had occurred before by laying out a specific, heightened requirement for compliance with Section 112, Paragraph 1 for chemical inventions:

An adequate written description of a DNA, such as the cDNA of the recombinant plasmids and microorganisms of the '525 patent, 'requires a precise definition, such as by structure, formula, chemical name, or physical properties,' not a mere wish or plan for obtaining the claimed chemical invention. Accordingly, 'an adequate written description of a DNA requires more than a mere statement that it is part of the invention and reference to a potential method for isolating it; what is required is a description of the DNA itself.'⁶⁷

This description is notable for several reasons. First, the written description requirement arguably had never been applied before to the original, unamended claims of a patent. Second, the standard articulated by the court—a precise definition, or structure—appears to be far more stringent than the usual test for possession or recognition of the invention by a person having ordinary skill in the art. Taken at face value, in the absence of a nucleotide-by-nucleotide listing, the language in *Eli Lilly* would bar a DNA claim even if a person having ordinary skill in the art would understand

⁶⁵ Id. at 1567.

⁶⁶ Id. at 1566, 1569.

⁶⁷ Id. at 1566–67 (quoting *Fiers v. Revel*, 984 F.2d 1164, 1170–71 (Fed. Cir. 1993)).

from the description exactly what had been invented and what was being claimed.

The claim of the '525 patent that was limited to human insulin-encoding cDNA failed to satisfy this heightened disclosure standard. Importantly, the court found that even if the constructive example in the specification for obtaining the human cDNA encoding insulin was *enabling* (that is, it would allow a scientist to obtain the cDNA), it was nevertheless not an adequate *written description* of that cDNA.⁶⁸ Essentially, the court found that the inclusion of the term “human insulin cDNA” was an insufficient description because it did not say *what* human insulin cDNA was; the state of the art at that time was such that even if a person having ordinary skill would know that *some* human cDNA that codes for insulin must exist, she would not have known *which* of the essentially infinite possible cDNA sequences would have done so.⁶⁹ The specification lacked “sequence information indicating which nucleotides constitute human cDNA”⁷⁰ Thus, it was at most a “mere wish or plan” for obtaining human insulin cDNA, and not a written description of the cDNA itself.

Furthermore, the disclosure of just one species of the invention (here, rat insulin-encoding cDNA) was insufficient to support a broad, generic claim to all vertebrate or mammalian insulin-encoding cDNA (which would have included human cDNA of the same function). For chemical genus claims, the court held, a precise definition (as by structure or formula) would be required to differentiate the invention from other materials.⁷¹ The reason, in this instance, was that generic, functional statements such as “mammalian insulin cDNA” (functional because it claims by references to what the cDNA does: of all of the possible cDNA sequences in existence, those claimed were cDNA sequences that encode for

⁶⁸ *Id.*

⁶⁹ Judge Lourie offered a more lucid explanation of this point several years later in *Enzo Biochem, Inc. v. Gen-Probe, Inc.*, 323 F.3d 956, 974 (Fed. Cir. 2002) (Lourie, J., concurring) (“[A] functional description of DNA does not indicate which DNA has been invented. And simply acknowledging the presence of a DNA that serves a particular function, whose existence has been postulated since, perhaps, Mendel, plus a general process for finding it, is not a description of the DNA. It is a research plan at best, and does not show ‘possession’ of any invention.”).

⁷⁰ *Eli Lilly*, 119 F.3d at 1567.

⁷¹ *Id.* at 1568.

mammalian insulin) do not tell the public anything about the boundaries of the material that is being claimed. Such a generic term does not specify “any of the genes that fall within its definition. . . . One skilled in the art therefore cannot, as one can do with a fully described genus, visualize or recognize the identity of the members of the genus.”⁷² For genus claims of DNA, a definition of what a gene *does* rather than what it *is* would therefore be insufficient.

Eli Lilly touched off a firestorm of commentary, both in favor and in opposition to the unusual application of the written description requirement.⁷³ Many commentators expressed uncertainty as to whether the heightened disclosure standard would last, and whether it would be applied to other fields as well. In 2002, the en banc court rejected an opportunity to eliminate the new written description requirement, confirming the likely durability of the doctrine.⁷⁴

B. Amgen: Retreat from Eli Lilly?

The Federal Circuit affirmed the existence of a stringent disclosure requirement while backing away from the harsh standard of *Eli Lilly* in *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*⁷⁵ In *Amgen*, the patentee (Amgen) held several patents that related to the production of erythropoietin (“EPO”), a hormone involved in the production of red blood cells in marrow.⁷⁶ The district court found the written description of the patents to be satisfactory, and the majority of the Federal Circuit agreed.⁷⁷ What is relevant for the purpose of this discussion is the ease with which the panel applied the modern written description doctrine and the dissent’s concern that it was not being applied *stringently* enough.⁷⁸

⁷² *Id.*

⁷³ A casual December 2006 search of Lexis-Nexis yielded nearly 200 law review articles citing the case and approximately eighty references in treatises.

⁷⁴ *Enzo Biochem*, 42 Fed. App’x at 440 (Lourie, J., concurring) (denying rehearing en banc where the primary purpose would be “revising written description law”).

⁷⁵ 314 F.3d 1313, 1330–32 (Fed. Cir. 2003).

⁷⁶ *Id.* at 1319.

⁷⁷ *Id.* at 1331.

⁷⁸ The court also rejected the defendant’s position that *Gentry Gallery, Inc. v. Berlinline Corp.*, 134 F.3d 1473 (Fed. Cir. 1998), had established a new “essential elements” test for written description. *Amgen*, 314 F.3d at 1333–34. This aspect of the case is not

The Court found that the stringent disclosure requirements of *Eli Lilly* (and a later case, *Enzo Biochem*) were simply inapposite to the DNA-based invention at hand, because here, the claim terms were not “new or unknown biological materials that ordinarily skilled artisans would easily miscomprehend.”⁷⁹ Rather, the novel elements in the claims were the “types of cells that can be used to produce recombinant human EPO.”⁸⁰ Thus, the terms “vertebrate cell” and “mammalian cell” described exactly what was claimed; these terms were precisely descriptive in a way that “cDNA” would not be.⁸¹ Furthermore, the two species of cells that were expressly disclosed on the specification were found by the court to be sufficiently descriptive to support the genus claim for EPO produced using any vertebrate or mammalian cells.⁸²

Note, then, that the Federal Circuit was willing to apply the strict disclosure standard of *Eli Lilly* had it been applicable, but did not because no “new or unknown” biological materials were implicated. Even though the invention was biotechnology-based, the court’s analysis suggests that the state of the art had advanced sufficiently that for this particular invention the “precise definition, such as by structure [or] formula” of *Eli Lilly* was unnecessary.⁸³ This possibility concerned Judge Clevenger, who noted in his dissent that rejecting the applicability of *Eli Lilly* in this case, “on the grounds that no undisclosed DNA molecule appears in this case, verges on confining *Eli Lilly* to its facts.”⁸⁴ Specifically, his concern was that the two general principles of *Eli Lilly*—first, that a vague description may not be sufficient to describe a claim, even if the same vague description appears in the claim language itself, and

pertinent to this discussion, although it does illustrate that written description precedent is not necessarily cabined within the art in which a case arises. On the other hand, since the *Gentry* precedent (which arose in the context of furniture) was rejected in this case (which implicated biotechnology), the opposite inference is also fair.

⁷⁹ *Amgen*, 314 F.3d at 1332.

⁸⁰ *Id.*

⁸¹ *Id.* In any case, the patentee had a strong argument that *Eli Lilly* was satisfied: Figure six of the patent included the complete human genomic EPO DNA sequence. *Id.* at 1332 n.7.

⁸² *Id.* at 1332.

⁸³ *Id.* at 1336–37 (finding that a skilled artisan in biotechnology could readily practice the claimed invention).

⁸⁴ *Id.* at 1361 (Clevenger, J., dissenting).

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second, that disclosure of a species might be insufficient to describe an entire genus—were not fairly addressed by the district court.⁸⁵ Regardless of the merit of the argument, the dissent's position shows that the heightened written description requirement in the context of biotechnology continues to evolve, and is arguably becoming more relaxed.

C. *Falkner v. Inglis*

Finally, the Federal Circuit maintained the modern requirement while taking another step away from *Eli Lilly* in a 2006 appeal from the Board of Patent Appeals and Interferences case, *Falkner v. Inglis*.⁸⁶ As rephrased by the court, the written description “implements the principle that a patent must describe the technology that is sought to be patented; the requirement serves both to satisfy the inventor's obligation to disclose the technologic knowledge upon which the patent is based, and to demonstrate that the patentee was in possession of the invention”⁸⁷ This choice of words implies that as long as the appropriate amount of technologic knowledge is divulged, the specific or precise form of that disclosure is not important: when much of the knowledge is already in the public's possession, precise structure or definition may be unnecessary.

In a brief opinion, the *Falkner* court resolved three specific (and important) written description questions, and it is for these three principles that the case will be cited: (1) an adequate written description does *not* require an actual reduction to practice, even if

⁸⁵ *Id.*

⁸⁶ 448 F.3d 1357 (Fed. Cir. 2006), reh'g en banc denied, No. 05-1324, 2006 U.S. App. LEXIS 22630 (Fed. Cir. Aug. 24, 2006), cert. denied, 127 S. Ct. 1151 (Jan. 22, 2007). Judge Gajarsa delivered the opinion for a panel consisting of Judge Dyk, Judge Gajarsa, and Senior Judge Archer. Since Judge Gajarsa had previously dissented from the continued use of the written description requirement, see *Univ. of Rochester v. G.D. Searle & Co.*, 375 F.3d 1303, 1307–14 (Fed. Cir. 2004) (Rader, J., dissenting), and Judge Dyk also felt the jurisprudence needed reexamination, see *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 42 F.3d 956, 975–76 (Fed. Cir. 2002), it is noteworthy that the vitality of the requirement was confirmed. The result probably stems from the fact that the panel would be bound by prior panels' precedent, regardless of whether or not the current panel agreed with it. In addition, the composition of the panel lends further support to the reading of the case that suggests a reduction in stringency of written description disclosure.

⁸⁷ *Falkner*, 448 F.3d at 1366 (quotation and citation omitted).

actual reduction to practice ordinarily produces the best evidence of possession and completeness;⁸⁸ (2) an adequate written description need not contain specific examples of the invention that is claimed, even though such examples may be useful to visualize or recognize the invention;⁸⁹ and most critically, (3) a patentee need not recite *known structure* in order to satisfy Section 112, Paragraph 1's disclosure requirement.⁹⁰

The third principle stated by the court is an acknowledgement that DNA science is moving forward. The patentee argued that he had no need to include sequences or descriptions of known regions of the poxvirus vaccine the patent claimed.⁹¹ The court agreed, reading *Eli Lilly* as requiring an evolving standard of adequate disclosure, not as enacting a *per se* rule that any DNA or chemical invention must include a recitation of the gene or sequence regardless of whether that sequence is already known.⁹² Put differently, "As each field evolves, the balance also evolves between what is known and what is added by each inventive contribution."⁹³

D. Summary of the Rise of the Strong Written Description for Biotechnology

This Part has traced the evolution of the written description requirement from a priority-policing tool to a stringent disclosure mechanism. *Eli Lilly* began this transformation, requiring precise definitions for claims involving macromolecular sequences. Subsequent cases, ending with *Falkner v. Inglis*, have retained the disclosure function espoused by *Eli Lilly* but gradually lowered the written description bar as the state of the art progressed. The disclosure requirement for biotechnology nevertheless remains high when compared to other fields of invention.

⁸⁸ Id. at 1366–67.

⁸⁹ Id. at 1366.

⁹⁰ Id. at 1367–68.

⁹¹ Id.

⁹² Id.

⁹³ Id. at 1368 (quotation and citation omitted).

III. SOFTWARE-BASED INVENTIONS: A LOW WRITTEN DESCRIPTION BAR

Perhaps most surprising about the application of Section 112's written description requirement to software is how rarely the issue has surfaced in litigation. While courts have considered using the written description requirement to invalidate software patents on *priority* grounds,⁹⁴ no court appears to have invalidated a software patent for lack of disclosure akin to the missing "precise definition" of *Eli Lilly*. The few cases that do address the written description issue for software, when coupled with the Federal Circuit's jurisprudence concerning the related Section 112 requirements of best mode and enablement, suggest a much lower bar exists for disclosures of software-related inventions than for biotechnological inventions.

A. *In re Sherwood and the Beginnings of the Low Section 112 Bar for Software*

The first major indication that the Federal Circuit viewed software as an art requiring little disclosure came in *In re Sherwood*, a 1980 case before the Court of Customs and Patent Appeals.⁹⁵ The patent at issue in *Sherwood* had been rejected, among other reasons, for failure to satisfy Section 112's best mode requirement. Although the invention required use of digital hardware equipment programmed to carry out the seismic wave processing covered by the claims, the program listing that the inventor had used was not included in the patent application.⁹⁶ While the best mode was disclosed at a general level—using a computer to achieve the result—the examiner contended, and the Board of Patent Appeals agreed, that the disclosure was not enabling since program flowcharts and

⁹⁴ See, e.g., *Symbol Techs., Inc. v. Lemelson Med., Educ. & Research Found.*, 301 F. Supp. 2d 1147, 1165 (D. Nev. 2004) (recognizing, but not reaching, the written description issue). In addition, at least one case has applied written description to invalidate an unsupported claim to a software *genus* when only a few species were disclosed. *LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1345–46 (Fed. Cir. 2005). This may be another emerging use of the written description requirement but does not implicate the stringent disclosure function in the sense of requiring detailed source code or structure.

⁹⁵ 613 F.2d 809 (C.C.P.A. 1980).

⁹⁶ *Id.* at 811–13.

algorithms were not included.⁹⁷ The CCPA proceeded to examine the Board's decision with regard to Section 112's best mode requirement. The language and logic used, however, appear actually to scrutinize whether the disclosed best mode was *enabling*: since the "best mode" of a computer running a known program was disclosed, the question was "[w]hether failure to disclose a listing of that known computer program [was] fatal" to the claim.⁹⁸ The treatment of the enablement requirement in the context of software inventions is strongly suggestive of the court's probable treatment of the written description as well. This is because a single written disclosure is generally used to satisfy both of these Section 112 requirements. In other words, because enablement and written description are "related and spring[] from the same factual predicates,"⁹⁹ the Section 112 "requirements usually rise and fall together."¹⁰⁰ Thus, the court's treatment of enablement in the software context (even through an indirect examination of a best mode disclosure) can be seen as foreshadowing the future direction of the court with regard to the written description as well.

The *Sherwood* court found that a detailed program listing was not required to enable (or disclose the best mode) of a computer-related invention. In an oft-quoted passage, the court wrote:

In general, writing a computer program may be a task requiring the most sublime of the inventive faculty or it may require only the droning use of a clerical skill. The difference between the two extremes lies in the creation of mathematical methodology to bridge the gap between the information one starts with (the "input") and the information that is desired (the "output"). If these bridge-gapping tools are disclosed, there would seem to

⁹⁷ Id. at 813. The specification described an analog method, but noted without elaboration that "it is within the present skill of the art to carry out the entire method on a large scale digital computer such as the IBM 360/50." U.S. Patent No. 4,355,379 col.13 l.25 (filed Oct. 19, 1982).

⁹⁸ *Sherwood*, 613 F.2d at 816.

⁹⁹ *Crown Operations Int'l v. Solutia Inc.*, 289 F.3d 1367, 1378 (Fed. Cir. 2002) (noting that enablement and written description have different purposes but are analyzed using the same factual predicates).

¹⁰⁰ *LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005); see also *Capon v. Eshhar*, 418 F.3d 1349, 1360 (Fed. Cir. 2005) ("[T]he legal criteria of enablement and written description are related and are often met by the same disclosure . . .").

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be no cogent reason to require disclosure of the menial tools known to all who practice this art.¹⁰¹

By characterizing programming in this way, the court apparently took the view that programmers are quite skilled, and a relatively low disclosure is necessary as long as the “trick” or functional goal is communicated.¹⁰² Translation of this functional goal into a working computer program is assumed to require nothing more than a clerical skill, and the level of required disclosure for Section 112 is correspondingly low. In contrast with biotechnology, this level of disclosure (for best mode, and by analogy, for written description) is remarkably low.

B. In re Hayes: An Adequate Written Description of Software Requires Very Little

The only major on-point published Federal Circuit opinion considering the application of the written description requirement to software-based inventions, *In re Hayes*, confirmed the low bar for Section 112 compliance suggested by *In re Sherwood*.¹⁰³ The patent at issue (“the ‘302 patent”) in *In re Hayes* concerned controlling a modem using the Hayes “AT” modem command set. Specifically, Claim 1 related to the guard time required before and after a user entered the escape sequence to switch the modem from transparent mode to control mode.¹⁰⁴ Critical to the case was the language of Claim 1 (representative of the remaining claims) which contained the following “means” limitations: “*timing means* for detecting each occurrence of a passage of a predetermined period [of guard time] . . . and *means* . . . for causing said modem to switch to said command mode of operation, if and only if” the escape sequence characters are contiguous and preceded by, as well as followed by, a predetermined period of guard time.¹⁰⁵

¹⁰¹ *Sherwood*, 613 F.2d at 816–17.

¹⁰² See Burk & Lemley, *supra* note 47, at 1192 (“[T]he court thinks of programmers as people of astonishing skill, capable of implementing any idea in a computer program as a matter of course.”).

¹⁰³ *In re Hayes Microcomputer Prod. Patent Litig.*, 982 F.2d 1527 (Fed. Cir. 1992).

¹⁰⁴ U.S. Pat. No. 4,549,302 col.17 l.16 (filed Oct. 22, 1985).

¹⁰⁵ *Hayes*, 982 F.2d at 1531; ‘302 Patent col.17 l.22 (emphases added).

The specification of the '302 patent disclosed that the modem was driven by a Zilog Z-8 microprocessor, but that other microprocessors could be used. The specification additionally disclosed that the “decision making capability” of the modem “preferably resides in a microprocessor,”¹⁰⁶ but details on programming the microprocessor were not included. Ven-Tel, the adverse party, argued that the '302 disclosure lacked an adequate written description because the “timing means” referenced in the claims was implemented using software executed by the microprocessor, but Hayes did not include a program listing or otherwise provide the specifics of the program used.¹⁰⁷

The court rejected this argument. Recognizing that “the specification is directed to one skilled in the art,”¹⁰⁸ the court agreed that the details of the microprocessor structure would be known to those skilled in the art. Because the desired *function* was disclosed, and the use of a microprocessor was suggested, “[o]ne skilled in the art would know how to program a microprocessor to perform the necessary steps described in the specification.”¹⁰⁹

Additionally, the court disagreed that Hayes was required to disclose the firmware listing (that is, the software code implemented in the microprocessor) itself in order to satisfy the written description requirement. Rather, the evidence showed that a person of ordinary skill would know what had been invented and how to implement the “timing means,” even without a specific listing of the code that the inventor had used: “[A]ll that was required for one of ordinary skill in the art to understand what the invention was and how to carry it out was the disclosure of a microprocessor having certain capabilities *and the desired functions* it was to perform.”¹¹⁰

In re Hayes thus stands for the proposition that in the ordinary case, a listing of the specific program used in a computer-based invention need not be supplied to satisfy the written description requirement, so long as the *functions* of that program are disclosed, as well as a rough description of the hardware required to imple-

¹⁰⁶ *Hayes*, 982 F.2d at 1533 (emphasis omitted).

¹⁰⁷ *Id.* at 1533–34.

¹⁰⁸ *Id.* at 1533.

¹⁰⁹ *Id.* at 1534 (emphasis omitted).

¹¹⁰ *Id.* (emphasis added).

ment it. The remainder of the work involved—writing software to achieve those functions—is assumed to be well within the capabilities of one skilled in the art, and not requiring any inventive facility that would render it “a mere wish or plan.” As a result, functional claiming of software has become general practice.

C. Arguing by Analogy: Best Mode and Enablement Suggest a Low Section 112 Bar

*Northern Telecom, Inc. v. Datapoint Corp.*¹¹¹ and *Fonar Corp. v. General Electric Co.*,¹¹² a pair of cases decided by the Federal Circuit focusing on the remaining two requirements of Section 112—enablement and best mode, respectively—also suggest a low disclosure burden for software.

The earlier of the two cases, *Northern Telecom*, found the patentee challenging the trial court’s decision that its software-implemented invention was invalid for lack of enablement. The Federal Circuit reversed.¹¹³ Viewing the case from the “viewpoint of a skilled programmer,” the court held that “[t]he amount of disclosure that will enable practice of an invention that utilizes a computer program may vary according to the nature of the invention, the role of the program in carrying it out, and the complexity of the contemplated programming.”¹¹⁴ In this instance, the innovation claimed was not in the *details* of the programming, but rather in the method or apparatus which included the software functionality. Given that the evidence showed that implementing the programming would not be beyond the ordinary skill of the art, the failure to include the specific code or program used did not amount to a lack of an enabling disclosure.¹¹⁵ As with *In re Sherwood* and *In re Hayes*, this suggests a low bar for Section 112 disclosure. Absent unusual circumstances, only the intended function of the software need be disclosed to satisfy the patent statute. The court was careful to point out that such unusual cases could certainly exist, such as *White Consolidated Industries v. Vega Servo-Control, Inc.*, where

¹¹¹ 908 F.2d 931 (Fed. Cir. 1990).

¹¹² 107 F.3d 1543 (Fed. Cir. 1997).

¹¹³ *Northern Telecom*, 908 F.2d at 943.

¹¹⁴ *Id.* at 941.

¹¹⁵ *Id.* at 943.

implementing the claimed program took an unreasonable amount of time—almost two programmer-years of work.¹¹⁶

Fonar, decided seven years later in 1997, concerned the application of the best mode requirement. Like the patent in *Northern Telecom*, the disclosure of the invention in *Fonar* did not include a program listing of two software routines which were necessary to render the invention operable.¹¹⁷ The Federal Circuit rejected this as a ground for invalidating the patent, finding that best mode was satisfied by the disclosure of the functions of the software and the hardware upon which it might run.¹¹⁸ In justifying the holding that “best mode is satisfied by a disclosure of the functions of the software” (as opposed to structural or code-level disclosure), the court wrote that “normally, writing code for such software is within the skill of the art Stating the functions of the best mode software satisfies that description test.”¹¹⁹ The court then went on to further reduce the Section 112 disclosure burden for software: “[F]low charts or source code listings are not a requirement for adequately disclosing the functions of software.”¹²⁰ While *In re Sherwood* and *In re Hayes* established that no source code listing was required, *Fonar* went so far as to suggest that a pure textual description of what the software should achieve, without diagrams or logic flowcharts, could also be sufficient. Taken together, the low bars for enablement and best mode suggest that the written description requirement will be equally lax when the invention concerns the art of computer programming.

D. The PTO’s Written Description Guidelines Suggest a Low Bar

In 1999 and 2001, the PTO released new guidelines for patent examiners confronting problems with the written description requirement.¹²¹ The new guidelines were intentionally written to be

¹¹⁶ 713 F.2d 788, 791 (Fed. Cir. 1983).

¹¹⁷ 107 F.3d at 1548.

¹¹⁸ *Id.*

¹¹⁹ *Id.* at 1549 (citing *In re Hayes Microcomputer Prod. Patent Litig.*, 982 F.2d 1527, 1537–38 (Fed. Cir. 1992); *In re Sherwood*, 613 F.2d 809, 816–19 (C.C.P.A. 1980)).

¹²⁰ *Fonar*, 107 F.3d at 1549.

¹²¹ Guidelines for Examination of Patent Applications Under the 35 U.S.C. § 112, ¶ 1 ‘Written Description’ Requirement, 66 Fed. Reg. 1099 (U.S. Pat. & Trademark Off. Jan. 5, 2001).

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technology-neutral (rather than focusing on biotechnology) in recognition of the expanding scope of the Section 112 requirement.¹²² The PTO additionally released a series of examples to illustrate the application of Section 112 in concrete situations.¹²³

Taken together, the Guidelines and Synopsis strongly suggest that patent examiners will apply an extremely lenient written description bar to software inventions (or the software components inventions of apparatus claims that include software). The Guidelines, for example, explicitly compare the high bar for biotechnology with the low bar established by *Fonar* in the software context.¹²⁴ The Synopsis of the Guidelines adopts the *In re Hayes* fact pattern as an example: where a “claimed invention is supported by conventional hardware structure and because there is a functional description of what the software does to operate the computer, there is sufficient description of the claimed invention.”¹²⁵ Thus, the PTO apparently agrees that functional descriptions of software, in stark contrast with the treatment of biotechnological inventions, are generally acceptable.

E. Summary of the Weak Written Description Requirement for Software

Few cases adequately explore the application of the written description requirement as a disclosure (as opposed to priority-policing) mechanism to software. The cases that do exist strongly suggest that the bar is minimal. Along with *In re Sherwood*, *In re Hayes* established that software code listings are not necessary to provide an adequate written description, so long as the functions of the software are disclosed. *Fonar* and *Northern Telecom* establish that the other disclosure mandates of Section 112 are equally lenient in the software arts. Finally, the Written Description Guidelines promulgated by the PTO suggest that examiners will apply a

¹²² See Revised Interim Guidelines for Examination of Patent Applications Under the 35 U.S.C. § 112, ¶ 1 ‘Written Description’ Requirement; Request for Comments, 64 Fed. Reg. 7,142,771,428 (U.S. Pat. & Trademark Off. Dec. 21, 1999).

¹²³ U.S. Pat. & Trademark Off., Synopsis of Application of Written Description Guidelines, available at <http://www.uspto.gov/web/menu/written.pdf> (last visited 1/10/2007).

¹²⁴ U.S. Pat. & Trademark Off. Guidelines, *supra* note 121, at 1108 n.14.

¹²⁵ U.S. Pat. & Trademark Off., *supra* note 123, at 26 (Example 5).

low level of scrutiny to written description claims in the context of software.

IV. DIVERGENT SECTION 112 STANDARDS EXIST FOR SOFTWARE AND BIOTECHNOLOGY

Clearly, then, a major discrepancy has arisen between the Federal Circuit's treatment of the written description requirement in the context of biotechnology and in software. This is easily demonstrated by substituting the court's language from one discipline into another field of invention. Take, for instance, *Fonar*'s low bar for best mode in the software context (discussed *supra* in Section III.C). Professors Burk and Lemley suggest that replacing every instance of "software" in the *Fonar* opinion with "DNA" results in the following:

As a general rule, where [DNA] constitutes part of a best mode of carrying out an invention, description of such [DNA] is satisfied by a disclosure of the functions of the [DNA]. This is because, normally, [identifying such DNA] is within the skill of the art, not requiring undue experimentation, once its functions have been disclosed.¹²⁶

Perversely, such a rule would be "exactly antithetical to the actual rule in biotechnology cases, as stated by *Eli Lilly*."¹²⁷ Disclosure of the functions of DNA is insufficient: structure or a structure-function correlation must be disclosed.

This technological specificity of Section 112's application has not been lost on the judges of the Federal Circuit. As Judge Rader has noted, biotechnology is held to a more stringent standard, even after *Enzo Biochem* and *Rochester*. In an earlier decision, he noted the contrast between the rule for software (as set forth in *Northern Telecom*, discussed *supra* in Section III.C) and the rule for DNA-based inventions:

This burdensome disclosure standard is tantamount to requiring disclosure, for a new software invention, of the entire source code, symbol by symbol, including all source code permutations

¹²⁶ Burk & Lemley, *supra* note 47, at 1184.

¹²⁷ *Id.*

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that would not alter the function of the software. Ironically, the Federal Circuit has expressly rejected such a requirement for software inventions [in *Northern Telecom*], but apparently enforces the requirement for biotechnology. This discrepancy emphasizes another problematic aspect of the *Lilly* doctrine. That is, it imposes a different disclosure standard for biotechnology than for computer technology. Despite the technology-neutral language of the Patent Act, the *Lilly* rule imposes technology-specific requirements.¹²⁸

A. Understanding the Rationale for Disparate Treatment

Having established that software and biotechnology are treated differently, it remains to be seen whether satisfactory rationales exist for the difference. This Note posits that as a descriptive matter, two main (and related) explanations exist: First, software and biotechnology are treated differently because of the varying level of predictability between the two arts. Second, functional claiming (and hence less written description) of software makes more sense, given the intangible and multi-structured nature of software inventions.

1. Software Is Currently a More Predictable Art than Biotechnology

In re Hayes illustrates the maxim that “[a]n applicant’s disclosure obligation varies according to the art to which the invention pertains.”¹²⁹ This varying level of disclosure can be seen as relating directly to the predictability of the art. For less predictable arts, more disclosure is required to place the public in possession of the invention; for more predictable arts, less disclosure is required, since much is already in the public sphere of knowledge. While the theoretical burden remains the same (the disclosure must demonstrate to a hypothetical person of skill in the art that the inventor possessed the invention at the time of filing), the level of disclosure required would vary.

¹²⁸ *Moba, B.V. v. Diamond Automation, Inc.*, 325 F.3d 1306, 1325–26 (Fed. Cir. 2003) (Rader, J., dissenting) (citation omitted).

¹²⁹ *In re Hayes Microcomputer Prod. Patent Litig.*, 982 F.2d 1527, 1534 (Fed. Cir. 1992).

Although the state of the science is advancing, biotechnology is currently a less predictable art than many of the traditional fields of invention (and some of the more recent ones, such as software). As succinctly put by one commentator:

The electrical and mechanical arts, in contrast to the chemical and biotechnological arts, are considered “predictable” because once a single embodiment of the invention is enabled, other embodiments can be made without difficulty and their performance characteristics can be predicted by known scientific laws.¹³⁰

While biotechnology patent litigation is replete with examples of unpredictable results,¹³¹ implementation of software appears to be more straightforward. This is because software engineering, though a relatively young field, has developed at an astonishing rate. As indicated by Federal Circuit jurisprudence, one skilled in the art of programming is viewed as an expert; software is therefore predictable in the sense that a programmer is able to implement almost any function given sufficient time and direction.¹³² If the implementation takes too long, however, enablement may become an issue. Even so, the written description requirement may still be satisfied,

¹³⁰ Drakulich, *supra* note 61, at 17 n.50 (2006) (citing Sampson, *supra* note 61, at 1240); see also Thomas P. Noud, Mark. S. Carlson & Paul T. Meiklejohn, Patent Law Issues Affected by the Predictability of Technology in the Field of Invention, 88 J. Pat. & Trademark Off. Soc’y 603, 637 (2006) (“[A] tension exists between the adequacy of the written description and the scope of the claimed invention in unpredictable fields such as biotechnology.”).

¹³¹ See, e.g., *Adang v. Fischhoff*, 286 F.3d 1346, 1357 (Fed. Cir. 2002) (upholding finding that “the art of expressing a full length *Bt* crystal protein gene . . . in tobacco cells, not to mention tomato cells, in amounts insecticidal to Lepidopteran insects was highly unpredictable”); *Enzo Biochem, Inc. v. Calgene, Inc.*, 188 F.3d 1362, 1372 (Fed. Cir. 1999) (affirming district court finding that antisense in eukaryotic and prokaryotic cells is a “highly unpredictable technology”); *In re Vaeck*, 947 F.2d 488, 495 (Fed. Cir. 1991) (affirming § 112 rejection of a patent claim where “heterologous gene expression in cyanobacteria [was] ‘unpredictable’”).

¹³² See, e.g., *In re Sherwood*, 613 F.2d 809, 816–17 (C.C.P.A. 1980); Burk & Lemley, *supra* note 47, at 1192 (“[T]he court thinks of programmers as people of astonishing skill, capable of implementing any idea in a computer program as a matter of course.”); Lance D. Reich, One of Skill in the Art in Software Engineering: The Rising Tide, 84 J. Pat. & Trademark Off. Soc’y 269, 272 (2002). Note, however, that Professors Burk and Lemley think the Federal Circuit misunderstands the level of technological sophistication of a person having ordinary skill, overestimating it for software and underestimating it for biotechnologists. See Burk & Lemley, *supra* note 47, at 1192–93.

as a programmer will presumptively have the tools and know-how to reach the desired result (even though it may take an unreasonably long time to do so).

The written description works in the face of this basic level of unpredictability, acting as a check on the scope of claims. If a person skilled in the art is likely to recognize the full range of embodiments of an invention—in other words, understand the breadth of the invention—then less description is required. This is characteristic of more predictable arts (which this Note posits includes software); given a functional claim, a skilled programmer would understand that any number of methods of achieving that function may be claimed. This result does not necessarily occur with biotechnology; given that functionality may not be clear, even after a given DNA sequence is obtained, a person skilled in the art of genetics could not necessarily visualize (or possess) the entire scope of the invention. In Judge Lourie's words, unlike software, "a functional description of DNA does not indicate which DNA has been invented."¹³³ A stringent written description requirement is therefore applied to narrow the scope of what may be claimed.

Such a rationale has implications for future "breakthrough" technologies. The logical result of a doctrine keyed to the current state of the art (such as obviousness or written description) might be that a high-disclosure bar could again be appropriate for an art similar to biotechnology, should such a field appear. The wisdom of using the *written description* for this function, however, instead of the enablement requirement is questionable.

With the exception of fairly artificial examples, the disclosure function for young arts is adequately served by enablement. By requiring proof that one skilled in the art could make and use the invention from the patent specification, instead of attempting to duplicate the contentious written description saga in yet another field, the Federal Circuit can assure a more even-handed approach to disclosure doctrines across arts.¹³⁴ An illustration of this point can

¹³³ *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 974 (Fed. Cir. 2002) (Lourie, J., concurring).

¹³⁴ For an example of an artificial situation where enablement would not capture a written description problem, see *In re DiLeone*, 436 F.2d 1404, 1405 (C.C.P.A. 1971). Such examples are less than convincing: If *A* and *B* are claimed but *C* is not claimed, then § 132 would adequately prevent the inventor from later adding it. See 35 U.S.C.

be seen in the early days of software development: while today software development is viewed as generally predictable, it is worth noting that even in the early stages of the computer revolution the written description requirement was never applied with the rigor with which it applied to biotechnology inventions. As such, the particularly robust version of the written description requirement for biotechnology is better seen as a one-time deviation from the norm than a repeating trend that should occur for new fields in the future.

2. *For Software, Function Is More Important than Structure*

A second major difference explaining the discrepancy in application of the written description requirement for software and biotechnology inventions is the usefulness of functional claiming. For biotechnology, having a desired function does not necessarily give any indication of which existing DNA structure might map to that function. Indeed, the court views functional claiming in DNA-based inventions as little more than a treasure hunt; some sequence of DNA likely encodes for the desired result, and allowing a claim for an unknown sequence would offer little public benefit.¹³⁵ As a result, functional claiming (in the absence of a known function-structure correspondence) is disallowed.

The opposite is true for software. In the usual case, the logical structures of software are the crux of a software-based invention.¹³⁶ While DNA inventions result from finding or creating a physical DNA sequence that achieves a given result, software inventions involve designing a desired functionality, and *then* creating a software structure to achieve that given result. DNA is an artifact of

§ 132 (2000) (“No amendment shall introduce new matter into the disclosure of the invention.”); see also *supra* note 23 (discussing § 132).

¹³⁵ See, e.g., *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 926–27 (Fed. Cir. 2004) (noting that description was deficient because patent specification “discloses nothing more than a hoped-for function for an as-yet-to-be-discovered compound, and a research plan for trying to find it” that is insufficient to allow the public to “distinguish infringing compounds from non-infringing compounds, or infringing methods from non-infringing methods”).

¹³⁶ See Robert Plotkin, *Computer Programming and Automation of Invention: A Case for Software Patent Reform*, 2003 *UCLA J.L. & Tech.* 4, 4–5 (2003) (differentiating software from electromechanical inventions and arguing for patent reform allowing software to be claimed entirely functionally as logical constructs).

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nature, and as a result may exist independently of the inventor; software, in contrast, is a specific implementation of an inventor's logical or functional plan. The way in which that implementation occurs (the specific programming routine, the data structure, or the language used) is generally irrelevant to the functionality and usefulness of the invention. Some implementations may be more desirable than others, but the invention can be achieved in multiple ways. Thus, functional claiming makes sense; functionality is what software *is*.

Because software can be adequately disclosed in functional terms, a detailed written description of the structure of the resulting code is unnecessary. So long as the logical structure of the software is apparent, the invention has been described. In contrast, biotechnology cannot currently be described in shorthand with equal ease. As a result, until the functional characteristics of basic genetic building blocks become better understood, the disclosure burden for biotechnology will be higher.

B. Moving Forward: A Low Section 112 Bar for Software Is Appropriate

Given the continued vitality of the modern written description requirement, the Federal Circuit will eventually be confronted with the divergent treatment of software and biotechnological inventions. There is only one patent law, and at least at a theoretical level, it must apply evenly to all fields of invention. As a result, the Federal Circuit will either have to rationalize the divergent standards or articulate a new theory justifying disparate treatment.

Assuming that the Federal Circuit will choose to find a unified standard (as the unity of patent law would suggest), it can reconcile these two treatments in one of two ways: by lowering the bar in biotechnology to match that of software or by raising the software bar to match that of biotechnology. Several factors suggest that the written description bar for software should not be made more stringent to match that applied to biotechnology and that the better path is to wait for the eventual relaxation of the written description bar for biotechnology as the field matures.

First, the predictability of biotechnology is improving. The evolving Section 112 standard for chemical and genetic inventions supports this characterization. *Eli Lilly*, the earliest of the modern

written description biotechnology cases, required the most explicit disclosure. Subsequent cases such as *Enzo Biochem* and *Falkner v. Inglis* backed away from the nucleotide-by-nucleotide disclosure requirement as the art began to mature; once correlations between functions and structures emerged, recitation of known structure was no longer required. Presumably, this trend will continue as the art continues to advance, and biotechnology will once again be on equal footing with the other inventive arts.

Secondly, mechanisms more appropriate than the written description exist to police the scope of software patents. The most important of these is the high bar in the software arts for obviousness.¹⁵⁷ The high skill level imputed by the courts to programmers is a double-edged sword: while it reduces the disclosure burden on the patentee, it also makes patents harder to obtain as the field is rich with opportunities to find new inventions obvious from the existing art. Given that obviousness is a well-established doctrine that is understood by courts and litigants, using that mechanism instead of the newly-minted written description requirement to police claim scope should reduce cost and confusion.

Third, the functional claiming typically used for software simply does not fit well into the structural-disclosure role of the modern written description requirement. Artificially emphasizing disclosure of the structure or implementation of software is counterproductive, regardless of how useful similar disclosure may currently be in the biotechnology context. The important question for software is not what the specific underlying structure is—the written description—but rather whether it is nonenabled (and hence not patentable), obvious (and hence not patentable), or nonoriginal (and hence not patentable). These questions are better answered by other doctrines.

Finally, lowering the biotechnology disclosure bar to the level required for other fields (including software) avoids the potential for a future technology to require a *sui generis* high disclosure bar (in the way that biotechnology did). By affirming the fact that only one standard exists for all technologies (rather than raising the

¹⁵⁷ See Amir A. Naini, *Convergent Technologies and Divergent Patent Validity Doctrines: Obviousness and Disclosure Analyses in Software and Biotechnology*, 86 J. Pat. & Trademark Off. Soc'y 541, 555–56 (2004).

software bar to match that of biotechnology, while the mechanical arts retain a low written description requirement), disclosure in a breakthrough art would be regulated by more appropriate mechanisms such as enablement.

In sum, maintaining the status quo with regard to the written description requirement and software is the preferable path; in time, disclosure for biotechnology will become harmonized without introducing yet another disclosure doctrine to software patent litigation.

CONCLUSION

Section 112 of the Patent Act requires that an inventor disclose her invention to the public in return for a patent. Historically, the written description requirement was essentially subsumed by the enablement requirement. In the 1960s, the written description emerged as a separate requirement used to police priority in claim amendments and additions. In the late 1990s, the doctrine took on an additional function as a stringent disclosure mechanism in biotechnology. Soon afterwards, the Federal Circuit extended the disclosure function to the other arts.

The disclosure burden of Section 112 has remained remarkably low in the software context, in sharp contrast with the biotechnology field. Unlike DNA-based inventions, software may be claimed in terms of functionality. The key differences between biotechnology and software that explain this disparate treatment are predictability and the functional nature of software design.

The written description requirement has spawned an astonishing level of confusion and debate in its short existence; the result has been uncertainty and increased costs in biotechnology development and patent practice. Extending this confusion to software via a stringent written description mechanism seems unwarranted. The better route is to maintain a low written description bar coupled with a high bar for obviousness. By doing so, the courts can avoid the morass that currently ensnarls biotechnology while retaining the ability to police the scope of software patents.