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SEARCHING FOR AN EFFICACIOUS JOINT INVENTORSHIP STANDARD

Abstract: Congress's 1984 amendments to 35 U.S.C. § 116 lowered the bar for establishing joint inventorship of a patent, but did not clarify the uncertainty inherent in joint inventorship law. The crux of this uncertainty is the ability of a person to become a joint inventor because of a minor contribution to an invention and, thus, to obtain ownership rights commensurate with those of more significant contributors. This circumstance obscures the respective rights of researchers, enables dubious legal arguments regarding those rights, mandates unnecessary legal involvement in the research process, and inhibits research collaboration. This Note reviews current joint inventorship and joint ownership law and evaluates potential reforms. The Note concludes that a judicial "matrix approach" to joint inventorship, incorporating clear rules adapted to specific contextual concerns, would best achieve the policies and goals of patent law.

INTRODUCTION

In patent law, joint inventorship is a notoriously slippery concept. Who really knows how to partition accurately the mental achievements of two brainstorming inventors? How can a court distinguish the contributions of a true collaborator from the suggestions of an able associate whose ideas nevertheless do not materially advance the inventor's idea? Not surprisingly, the law of joint inventorship has always had vague guidelines, attaching legal significance to an abstract event, adhering to a metaphysical standard that deems an


2 See Chisum, supra note 1, § 2.02[2], at 2-4 to 2-5; Fasse, supra note 1, at 153, 160-61, 206-07; see also Clark & Hayes, supra note 1, at S8; Launson & Brunda, supra note 1, at C12; Sheldon & Mak, supra note 1, at 7.
inventor's "moment of conception" the badge of inventorship. These
types of rules have often been difficult to apply. Yet, courts have long
required a minimum threshold of contribution to qualify as a joint
inventor: one had to contribute in an original manner to the concep-
tion of an idea, not merely exhibit the knowledge of one skilled in an
inventive art. Then, in 1984, Congress amended 35 U.S.C. § 116,
which deals with the naming of joint inventors, and made it easier to
include members of a large research team as joint inventors on a pat-
ent. In so doing, it lowered the bar for joint inventorship status but
did not clarify any of the inherent uncertainty in joint inventorship
law. At the same time, no change was made to 35 U.S.C. § 262, the
separate section concerning joint ownership of patents. Under that
 provision, joint inventors each receive an equal bundle of ownership
rights, regardless of the quality or quantity of their contributions to
the patented subject matter. Joint owners each own an undivided
share in the whole patent as tenants in common. Joint owners may
unilaterally license or assign their interest in the patent without ac-
counting to other owners. Furthermore, because all joint owners are
necessary parties to a suit for patent infringement and may not be in-
voluntarily joined, a joint owner can essentially prevent other joint


9 See Chisum, supra note 1, § 2.02[2], at 2–4 to 2–5; Fasse, supra note 1, at 153, 160–61,
206–07; see also Clark & Hayes, supra note 1, at 58; Lauzon & Brunda, supra note 1, at C12;
Sheldon & Mak, supra note 1, at 7.
4 See Mueller, 352 F. Supp. at 1972; Fasse, supra note 1, at 153; see also Clark & Hayes, su-
pra note 1, at 58; Lauzon & Brunda, supra note 1, at C12; Sheldon & Mak, supra note 1, at 7.
5 See Chisum, supra note 1, § 2.02[2], at 2–5 to 2–7 (providing a general description of
the requirements for joint invention and a range of historical cases).
meier).
7 See Ethicon, Inc. v. U.S. Surgical Corp., 135 F.3d 1456, 1469 (Fed. Cir. 1998); Fasse,
supra note 1, at 153.
9 See id.
10 See Ethicon, 135 F.3d at 1465–66; Robert P. Merges & Lawrence A. Locke, Co-
Ownership of Patents: A Comparative and Economic View, 72 J. PAT. & TRADEMARK Off. SOC'Y
11 35 U.S.C. § 262. An assignment of patent rights often occurs when an employee is
obligated, pursuant to an agreement prior to any patentable work, to give all patent rights
to an employer. An assignment entails a conveyance of the entire interest in the patent. On
the other hand, a license is a contractual agreement, usually consummated after the patent
issues, which carves out a lesser interest in the patent, perhaps licensing a particular use of
the patented invention. An important difference is the ability to sublicense further—an
assignee owns the patent and so is free to license at will, whereas a licensee is bound by the
terms of the license, which typically will not allow a sublicense without the licensor's con-
sent.
owners from suing an infringer. Lax joint inventorship rules, a result of the 1984 amendments, now coexist with polar joint ownership rules, which Congress left unchanged. Thus, the crux of the controversy over joint inventorship doctrine is the following inequity: under current law, a person may become a joint inventor because of a minor contribution to an invention, yet obtain ownership rights commensurate with every other joint inventor on the patent.

What are the consequences of this situation? Given the minimal and rather vague, thus unpredictable, standards for determining inventorship, the current state of the law fosters uncertainty and apprehension regarding the contributions of various researchers or team members participating in the inventive process. In recent years, a claim of joint inventorship has become an attractive option for disgruntled scientists suing either their former research partners or former employers. Likewise, defendants accused of infringement might endeavor to find an unnamed, overlooked and minor contributor to defeat a claim of infringement. This tactic is twofold: the unnamed contributor, if found to be a valid joint inventor and joint owner, can either refuse to join the suit or can grant a license to the defendant to continue using the patented technology and thus defeat the suit; alternatively, the defendant can assert that the patent is invalid for failing to name the correct inventors. Thus, the very purpose of the

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13 See Ethicon, 135 F.3d at 1468, 1471-72; Carlson & Barney, supra note 12, at 253, 263, 266.
14 See, e.g., Ethicon, 135 F.3d at 1469-71; Carlson & Barney, supra note 12, at 263; Rochelle Cooper Dreyfuss, Collaborative Research: Conflicts on Authorship, Ownership, and Accountability, 53 VAND. L. REV. 1161, 1211-14 (2000).
16 Philip Konecny, Comment, Windfall Property Rights for the Left Out Co-Inventor Who Gets Let into the Patent, 16 SANTA CLARA COMPUTER & HIGH TECH. L.J., 141, 172-73 (1999); see Ethicon, 135 F.3d at 1472; Sung, supra note 15, at 435. Most of the cases cited in this Note deal with such a suit.
18 See Ethicon, 135 F.3d at 1468, 1472; Barney & Carlson, supra note 17, at 33; Konecny, supra note 16, at 173.
19 35 U.S.C. § 102(f) (2000); see Pannu v. Iolab Corp., 155 F.3d 1344, 1350-51 (Fed. Cir. 1998) (if patentee does not claim relief under 35 U.S.C. § 256, court should hold pat-
1984 amendments has been turned on its ear—refurbished § 116, designed to encourage team research, may now be impeding it.\(^\text{20}\)

This Note discusses the current law of joint inventorship and how it might be modified to solve this problem and to promote collaborative research more effectively. Part II.A. focuses on the three sections of the patent code that are the primary source of the law on joint inventorship and joint ownership.\(^\text{21}\) It also examines interpretive case law for each provision. Part II.A.1. discusses § 116, which allows for naming joint inventors on a patent.\(^\text{22}\) Part II.A.1. also discusses the important amendments made to § 116 in 1984.\(^\text{23}\) Part II.A.2. discusses 35 U.S.C. § 256, which allows a court to order the correction of an issued patent by adding, deleting, or modifying the named inventors.\(^\text{24}\) Part II.A.3. discusses § 262, which grants extensive rights to joint owners of a patent.\(^\text{25}\) Part II.B. describes in detail the seminal case Ethicon, Inc. v. U.S. Surgical, which created much of the existing joint inventorship problem.\(^\text{26}\) Part II.C. explores the ramifications of Ethicon and the effect of the problem on collaborative research.\(^\text{27}\) Part II.D. summarizes the types of solutions that have been proposed.\(^\text{28}\) Part III.A. argues that amending joint inventorship rules is a better solution than amending joint ownership rules.\(^\text{29}\) Finally, Part III.B. explores the most efficacious form of joint inventorship rules.\(^\text{30}\)

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\(^\text{20}\) See Sung, supra note 15, at 439.
\(^\text{21}\) See infra notes 31–151 and accompanying text.
\(^\text{22}\) See infra notes 38–110 and accompanying text.
\(^\text{23}\) See infra notes 38–110 and accompanying text.
\(^\text{24}\) See infra notes 111–138 and accompanying text.
\(^\text{25}\) See infra notes 139–151 and accompanying text.
\(^\text{26}\) See infra notes 152–187 and accompanying text.
\(^\text{27}\) See infra notes 188–223 and accompanying text.
\(^\text{28}\) See infra notes 224–264 and accompanying text.
\(^\text{29}\) See infra notes 265–308 and accompanying text.
\(^\text{30}\) See infra notes 309–373 and accompanying text.
I. BACKGROUND

A. Law of Joint Inventorship and Joint Ownership

Whoever invents patentable subject matter is entitled to a patent thereon.31 This principle derives from the U.S. Constitution’s grant of Congressional authority “[t]o promote the progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”32 When an invention is made by two or more persons jointly, they must apply for a patent jointly.33 The law of joint inventorship and ownership is embodied primarily in three sections of Title 35 of the U.S. Code:34 § 116 deals with the definition of joint inventors;35 § 256 allows for the correction of a patent which improperly names or omits an inventor;36 § 262 concerns joint ownership of patents.37

1. 35 U.S.C. § 116—Joint Inventorship

Joint inventorship is governed by 35 U.S.C. § 116, which indicates in pertinent part:

When an invention is made by two or more persons jointly, they shall apply for a patent jointly and each make the required oath, except as otherwise provided in this title. Inventors may apply for a patent jointly even though (1) they did not physically work together or at the same time, (2) each did not make the same type or amount of contribution, or (3) each did not make a contribution to the subject matter of every claim of the patent.38

32 U.S. Const. art I, § 8, cl. 8.
34 Id. §§ 116, 256, 262. For a further discussion of joint inventorship, and particularly the 1984 amendments to §§ 116 and 103, see Fasse, supra note 1.
36 Id. § 256.
37 Id. § 262.
38 Id. § 116. The scope of protected intellectual property in a patent is defined by the claims. There is no limit to the allowable number of claims, though many are duplicative in coverage but contain slightly varying language to provide reliable protection. See U.S. Patent & Trademark Office, Manual of Patent Examining Procedure § 706.03(k) (8th ed. 2001) [hereinafter Manual].
This section provides no explicit quantitative or qualitative lower limit to the amount of inventive contribution required to qualify one as a joint inventor. As the statutory text implies, a joint inventor is only required to perform part of the task that produces the invention and to contribute to one claim.

The test for inventorship under § 116 turns on the notion of an inventor's "conception." One leading writer has supplied the following easy-to-read, difficult-to-apply articulation of the joint inventorship standard: "joint invention occurs when two or more persons, collaborating together, each contribute to the conception of the solution to a problem which constitutes the invention." Therefore, only where a single, unitary idea is the product of two or more minds, working in communication with one another, is the conception truly joint. As courts have emphasized, "[C]onception is the touchstone of inventorship." "Conception is the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention, as it is thereafter to be applied in practice." An inventor need not

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40 See Ethicon, Inc. v. U.S. Surgical Corp., 135 F.3d 1456, 1460 (Fed. Cir. 1998). In fact, contributing to the invention of one disclosed means of a mean-plus-function claim qualifies one as a joint inventor, unless the means was simply a perfunctory reduction to practice of the sole inventor's broader concept. See Winbond Elec. Corp. v. Int'l Trade Comm'n, 262 F.3d 1363, 1372 (Fed. Cir. 2001); Ethicon, 135 F.3d at 1463; see also Sewall v. Walters, 21 F.3d 411, 416 (Fed. Cir. 1994) (holding designer of one disclosed means was not joint inventor because inventive aspect of claim did not encompass particular means for reducing it to practice). A means-plus-function claim describes an invention in terms of the function performed rather than structure. Alternate means for performing that function are disclosed in the specification of the patent; the patent protects these alternate methods and their equivalents. An example might be "means for attaching two surfaces." This claim would protect the invention regardless of the "means" used for attachment—the surfaces could be glued, taped, nailed, screwed together, and so on. See 35 U.S.C. § 112 ¶ 6; see also, e.g., Ethicon, 135 F.3d at 1462-64 (providing examples of means-plus-function claims and explaining the significance of a means-plus-function claim in the context of joint inventorship). See generally CHISUM, supra note 1, § 18.03[5].

41 See Ethicon, 135 F.3d at 1460; Fina, 123 F.3d at 1473; Burroughs, 40 F.3d at 1227-28.

42 CHISUM, supra note 1, § 2.02[2], at 2-5. This definition of joint inventorship summarizes the law of many older inventorship cases. Fasse, supra note 1, at 160-61, n.39.

43 See CHISUM, supra note 1, § 2.02[2], at 2-5 n.3 (quoting 1 William C. Robinson, The Law of Patents for Useful Inventions § 396 (1890)).

44 Acromed Corp. v. Sofamor Danek Group, Inc., 253 F.3d 1371, 1379 (Fed. Cir. 2001); Ethicon, 135 F.3d at 1460; Fina, 123 F.3d at 1473; Burroughs, 40 F.3d at 1227-28.

45 Ethicon, 135 F.3d at 1460 (quoting ROBINSON, supra note 43, § 532). The inventive process is said to comprise both conception and reduction to practice. Conception is the mental act of formulating an idea, particular and definite. Reduction to practice is the process of transforming an intangible idea into a working physical reality. Ethicon, 135 F.3d at 1460. Filing a proper patent application with the U.S. Patent and Trademark Office
know an invention will work in practice to achieve conception—realizing a working invention is part of the separate step of reduction to practice. Accordingly, each person claiming to be a joint inventor must contribute to the conception of the invention. The contribution must be significant and inventive; merely explaining well-known principles or the current state of the art does not make one a joint inventor. Conception is complete when an idea is sufficiently definite and permanent such that one with ordinary skill in the art could reduce it to practice. Because completed conception connotes completed invention, one who merely exhibits ordinary skill in the art and reduces an invention to practice after conception is not a joint inventor. Similarly, exhibiting ordinary skill in performing tests or experiments, assisting the sole inventor, or acting at the sole inventor's specific instructions does not qualify one as a joint inventor. In

(USPTO) is considered constructive reduction to practice—that is, a patent application that properly discloses an invention is considered to have been conceived and reduced to practice, regardless of whether the inventor made, or ever makes, the invention. Cooper v. Goldfarb, 154 F.3d 1321, 1327 (Fed. Cir. 1998); Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986). Courts have also referred to the doctrine of "simultaneous conception and reduction to practice," albeit sparingly, for cases involving experimental sciences. In a field such as pharmaceutical research, researchers often cannot discern the feasibility of an idea until after conducting rounds of testing and reducing the invention to practice. Conception is not considered complete, under this theory, until experimentation proves out the concept. But this does not mean a purported inventor must always wait until experimentation—a sufficiently definite and permanent idea—before testing is sometimes enough to connote inventorship. See Burroughs, 40 F.3d at 1228-29. Arguably, this standard of "simultaneous" conception and reduction to practice should be applied to the biomedical and other experimental fields, whereas the usual standard requiring a "definite and permanent idea" ought to be restricted to predictive or engineering sciences. See generally Jackie Hutter, Note, A Definite and Permanent Idea? Invention in the Pharmaceutical and Chemical Science and the Determination of Conception in Patent Law, 28 J. Marshall L. Rev. 687 (1995) (exploring the advantages of the simultaneous reduction to practice doctrine in the pharmaceutical industry). For a discussion on the level of "conceptual specificity" needed to connote inventorship, see generally David W. Carstens, Joint Inventorship Under 35 U.S.C. § 116, 79 J. Pat. & Trademark Off. Soc'y 616 (1995) (proposing conceptual specificity as a requirement for joint inventorship).

40 Burroughs, 40 F.3d at 1228.
41 Acromed, 253 F.3d at 1379; Pannu v. Iolab Corp., 155 F.3d 1344, 1351 (Fed. Cir. 1998); Ethicon, 135 F.3d at 1460.
42 Acromed, 253 F.3d at 1379; see Ethicon, 135 F.3d at 1460; Hess, 106 F.3d at 981.
43 Ethicon, 135 F.3d at 1460; Burroughs, 40 F.3d at 1228; Sewall, 21 F.3d at 415.
44 Pannu, 155 F.3d at 1351; Ethicon, 135 F.3d at 1460; Fina, 123 F.3d at 1473.
45 Hess, 106 F.3d at 981; see Ethicon, 135 F.3d at 1460; see also Shatterproof Glass Corp. v. Libbey-Owens Ford Co., 758 F.2d 613, 616 (Fed. Cir. 1985) (holding that an inventor may use the services, ideas, and aid of others in the process of perfecting the inventor's inventions without losing the right to a patent).
1998, in *Pannu v. Iolab Corp.*, the U.S. Court of Appeals for the Federal Circuit summarized these requirements:

All that is required is that [the joint inventor] (1) contribute in some significant manner to the conception or reduction to practice of the invention, (2) make a contribution to the claimed invention that is not insignificant in quality, when that contribution is measured against the dimension of the full invention, and (3) do more than merely explain to the real inventors well-known concepts and/or the current state of the art.52

Nevertheless, given this explanation of what it means to conceive of an invention, the law of joint inventorship for patents is relatively unclear.53 The principles just described are difficult to apply—especially for a judge who may be unfamiliar with a particular technology and with what type of contribution might be “significant” in that technology.54 Thus, those who contribute very little to an invention may still be considered joint inventors.55

In addition, courts have promulgated one further guideline: the requirement of collaboration.56 Courts have interpreted § 116 to include a requirement of collaboration between joint inventors, though there is no mandate that joint inventors work together physically or work simultaneously.57 To collaborate, joint inventors must be working towards the same end, on the same subject matter, and producing an invention by their aggregate efforts.58 In *Pannu*, the Federal Circuit found the inventor of a snag-resistant intraocular lens59 to have collaborated with the president of a lens making company, who suggested he use single-piece technology in fabricating his lenses.60 The president also supplied the inventor with prototype lenses, which the

52 155 F.3d at 1351.
53 See Ethicon, 135 F.3d at 1469–71.
54 See id.
55 See id.
56 Fina, 123 F.3d at 1473; *Burroughs*, 40 F.3d at 1227; Kimberly-Clark Corp. v. Procter & Gamble Distrib. Co., 973 F.2d 911, 916–17 (Fed. Cir. 1992).
57 *Burroughs*, 40 F.3d at 1227; Kimberly-Clark, 973 F.2d at 916–17.
58 Kimberly-Clark, 973 F.2d at 916; Monsanto Co. v. Kamp, 269 F. Supp. 818, 824 (D.D.C. 1967); see also Credle v. Bond, 25 F.3d 1566, 1574 (Fed. Cir. 1994) (holding that there can be no collaboration and no joint invention if one inventor conceives and reduces to practice, in non-overlapping time period, before other inventor).
59 The intraocular lens at issue was a plastic lens that could, for example, be surgically inserted into the eye to replace a failed natural lens. *Pannu*, 155 F.3d at 1346.
60 Id. at 1346, 1351.
inventor tested. The snag-resistant features of the lens were already in a patent application before any collaboration, but the inventor then filed a continuation-in-part and added the one-piece technology feature to a claim. The Federal Circuit found this contact enough to constitute collaboration, even though one inventive step was taken before the other, and contact between the individuals was limited in scope.

If two parties are wholly unaware of each other's work, however, there can be no collaboration and no joint invention. In 1992, in Kimberly-Clark Corp. v. Procter & Gamble Distributing Co., the Federal Circuit held that three inventors who worked at the same company and developed very similar products were not joint inventors on the same patent because they were not aware of each other's work. The defendant in Kimberly-Clark, trying to obtain the benefit of an earlier priority date, argued that the patent in question was the product of a joint invention made by three of its employees, who had done work in different years. None of the employees knew of each other's work (indeed, one worked at a different facility in Germany) until three or four years after the patent issued. In rejecting this argument, the Federal Circuit interpreted § 116 to mean that an invention can be made jointly only if two or more persons collaborate in creating it. The Federal Circuit found no examples of joint behavior, such as one inventor reading a relevant report and building upon it, or hearing another's suggestion at a meeting.

61 Id. at 1346.
62 Id. A continuation-in-part application is an extension of the application process, allowing an inventor to claim new subject matter in a patent application while retaining the benefit of the same (earlier) filing date for the patent. MANUAL, supra note 38, § 201.08, 201.11; RONALD B. HILDETH, PATENT LAW: A PRACTITIONER'S GUIDE § 4:3.3(C) (3rd ed., release 3, 2001).
63 See Pannu, 155 F.3d at 1351.
64 See Kimberly-Clark, 973 F.2d at 916–17.
65 See id. at 915–17.
66 A priority date is usually the date at which an inventor conceives of an invention, unless the inventor is not diligent in reducing the invention to practice (either by actually making a prototype of the invention or by filing with the USPTO). See 35 U.S.C. § 101 (2000); CHISUM, supra note 1, § 10.01. If an inventor is not diligent, a second inventor who conceives later but reduces to practice first may be named the inventor. Id. In the United States, the first person to invent is legally entitled to a patent, whereas in most other countries the first to file is entitled. Id.
67 Kimberly-Clark, 973 F.2d at 913.
68 Id.
69 See id. at 915–17.
70 Id. at 917.
The legislative history of § 116 provides insight as to why the section has such minimal joint inventorship requirements.71 Congress last substantially amended § 116 in 1984.72 In enacting these amendments, Congress was primarily concerned with accommodating the modern paradigm of the research and development team at a corporation, university, or other large organization.73 Such research teams, particularly in the biomedical industry, are often large in number and develop products that may take years to mature.74 As a consequence, researchers may work on a particular project over a long period of time, sometimes sporadically, and each team member’s quantitative contributions to the final invention may vary.75 With the 1984 amendments, Congress attempted to encourage team research by codifying certain rules existing in the case law and thereby preventing courts from moving in an unfavorable direction.76 Specifically, Congress adopted the joint inventorship definition in Monsanto Co. v. Kamp and the “non-all-claims” rule in SAB Industri AB v. Bendix Corp.77

First, to foster communication and collegiality between and within large teams, Congress explicitly adopted the rationale of Mon-


76 See Section-by-Section Analysis, 130 Cong. Rec. 28,071, reprinted in 1984 U.S.C.C.A.N. at 5833–34; Innovation and Patent Law Reform: Hearing on H.R. 3285, H.R. 3286, and H.R. 3605 Before the House Subcomm. on Courts, Civil Liberties and the Admin. of Justice, Comm. on the Judiciary, 98th Cong. 6, 28–29 (1984) [hereinafter Hearings] (testimony of Gerald Mossinghoff, Assistant Secretary & Commissioner of Patents & Trademarks, indicating that contemporary case law requiring that a joint inventor contribute to all claims in a patent was difficult and sometimes impossible to comply with, and recommending passage of the proposed 1984 patent law amendments to change the case law).

standards for joint inventorship from 1967. In that case, the U.S. District Court for the District of Columbia confronted the question of whether defendants Kamp and Jahn were proper joint inventors for a patent on a polyethylene lined plastic bottle. Kamp owned and actively managed the business and employed Jahn as a chemist. The two men each had their own laboratory and conducted experimental work. According to their collective recollection, Jahn conducted the majority of the experimental work, but Kamp conducted some experiments as well. More often, Jahn would report some of his findings to Kamp, and Kamp frequently made suggestions to him. In finding the two proper joint inventors, the court articulated a now famous standard for joint inventorship:

Each needs to perform but a part of the task if an invention emerges from all of the steps taken together. It is not necessary that the entire inventive concept should occur to each of the joint inventors, or that the two should physically work together. One may take a step at one time, the other an approach at different times. One may do more of the experimental work while the other makes suggestions from time to time. The fact that each of the inventors plays a different role and that the contribution of one may not be as great as that of another, does not detract from the fact that the invention is joint, if each makes some original contribution, though partial, to the final solution of the problem.

The Monsanto court's description of what was not required to become a joint inventor was essentially adopted in the 1984 amendments without substantive modification. Note the inherently vague nature of this approach—by describing only that which does not disqualify one from joint inventorship, the criteria provide little guidance as to

79 Monsanto, 269 F. Supp. at 824. The defendant's patent was challenged as invalid for failure to name the proper inventors.
80 Id. at 825.
81 Id.
82 Id.
83 Id.
84 Monsanto, 269 F. Supp. at 824.
what does qualify one for joint inventorship.86 The Monsanto court did provide some positive requirements for finding joint inventorship, including that joint inventors each collaborate and contribute to the inventive thought and final result.87 These positive criteria, for unstated reasons, were not adopted.88 Congress seems to have been reluctant to promulgate specific standards for joint inventorship lest a court omit a bona fide inventor from a patent for failure to meet rigid statutory requirements.89 In adopting Monsanto, Congress also implicitly rejected the more narrow contemporary rule of the 1981 case General Motors Corp. v. Toyota Motor Corp., in which the U.S. Court of Appeals for the Sixth Circuit had formulated a test equating “working under the aegis of one employer” to joint inventorship.90 In that case, General Motors sued Toyota for infringement of a catalytic converter patent.91 General Motors’ engineers developed the catalytic converter working sporadically over a period of years.92 Toyota argued that General Motors’ patent was invalid because the converter was developed in three stages, different engineers working on each stage, and that the prior stages constituted disabling prior art to the final patent.93

87 See Patent Law Amendments Act of 1984 § 104(a); Monsanto, 269 F. Supp. at 824.
89 Cf. id.
91 Gen. Motors II, 667 F.2d at 505.
92 Id. at 506; Gen. Motors I, 467 F. Supp. at 1150–51.
93 Gen. Motors II, 667 F.2d at 506. The patentability of an invention is evaluated in the context of prior art, which is the body of existing knowledge at the time of the invention. Of course, an invention is not patentable if, in light of the prior art, it is “obvious” to one skilled in the art. 35 U.S.C. § 103 (2000). Under the law at the time, an invention was unpatentable if a patentee’s prior invention rendered the present invention obvious. In re Clemens, 622 F.2d 1029, 1038 (C.C.P.A. 1980); In re Bass, 474 F.2d 1276, 1285–86, 1288 (C.C.P.A. 1973). Recognizing that team research often produces a number of related inventions, team members contributing varying amounts to each, Congress desired to eliminate from consideration prior art that was simply a result of prior work either by the inventor or the research team. Congress amended 35 U.S.C. § 103 to disqualify these kinds of prior art (those falling under 35 U.S.C. § 102(f) and (g)) from consideration in determining patentability. See 35 U.S.C. §§ 102, 103(c); Patent Law Amendments Act of 1984, Pub. L. 98–662, § 103, 98 Stat. 3383, 3384 (codified at 35 U.S.C. § 116 (2000)); Section-by-Section Analysis, 130 Cong. Rec. 28,071, reprinted in 1984 U.S.C.C.A.N. at 5833–34. This was yet another 1984 amendment Congress made to encourage team research. See also Fasse, supra note 1, at 167–70 (providing further discussion of these amendments).
The court rejected this argument, stating that the numerous inventors had all worked "under the aegis of a common employer towards a common goal," and thus were considered part of the inventive process. Under the circumstances, the Sixth Circuit thought it unrealistic to require that joint inventors work side by side and that each step be taken by all the company’s collaborators. The court viewed the development of the catalytic converter as one long process and found every engineer who participated was eligible to be a joint inventor. Congressional rejection of the rationale of this case, not even including it as a non-requisite positive criterion, again indicates a reluctance to provide more specific guidelines to the court for determining joint inventorship—rather, Congress seemed content to emphasize that the minimum threshold for inventorship must accommodate team research.

Congress’s second adoption from contemporary case law was an explicit endorsement of the rationale of SAB Industri AB and its "non-all-claims" rule. Prior to 1984, some courts required that a purported joint inventor contribute to the subject matter of all the claims in the patent. In 1978, in SAB Industri AB, the U.S. District Court for the Eastern District of Virginia stated in dicta that neither the statute nor U.S. Patent and Trademark Office (USPTO) regulations required a joint inventor to contribute to every claim in a patent. Rather, contribution to just one claim was enough. Congress saw the “all-claims” rule as a considerable obstacle to team research, because many team members made small but significant contributions that,
through the imprecise artifice of claim drafting, were not captured in every claim. The all-claims rule hindered team research by discouraging small contributions to a project. With the abandonment of the all-claims rule, Congress clearly lowered the bar for joint inventorship. Though adopting a non-all-claims rule, Congress did emphasize its conceptual limit—if a particular feature of an invention is actually a separate invention, then the joint inventors should not include it in the claims of one patent, or attempt to patent it as a joint invention. Pursuant to 35 U.S.C. § 121, a patent application may only contain one invention. If a patent application discloses two inventions, it is subject to a restriction requirement, whereby the original patent application is "restricted" to one of the inventions. The remaining invention becomes the subject of a "divisional" application and patentability is pursued separately. Thus applicants place the inventions in two separate patents, the inventors of each separate invention listed only on the patent to which they contributed. Each patent should truly embody not two but one single invention—the product of joint inventors.

2. 35 U.S.C. § 256—Correction of Named Inventor

If an issued patent is found to name an incorrect person (misjoinder) or omit an inventor (nonjoinder), 35 U.S.C. § 256 permits either the Commissioner of the USPTO or the federal courts to correct the error. The correction could be the addition of an inventor, the deletion of an individual, or the complete substitution of one inventor for another. The statutory language indicates this action may

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104 See id.
105 See id.
107 See id. A restriction requirement occurs when a Patent Examiner determines that a patent application actually describes two inventions. The inventor restricts the application to only one of the invention and files a separate application for the remaining invention. Manual, supra note 38, §§ 802–803.
110 See id.
111 See id. § 256.
be taken "[w]henever through error a person is named in an issued patent as the inventor, or through error an inventor is not named in an issued patent and such error arose without any deceptive intention on his part." Significantly, courts interpret the word "error" to connote any error, including deliberate acts or honest mistakes. Therefore, even purposeful omissions (presumably by the named inventors), if the omitted inventor does not know about it, still fall under the definition of an "error." The unnamed inventor, though, must have acted "without any deceptive intention." If it can be corrected under § 256, the patent is not invalid for erroneously naming the improper inventors when it was issued. The statute is quite liberal in application—a patent can usually be corrected. If the validity of a patent is challenged in court (by the defendant in an infringement suit who produces an alleged joint inventor and shows by clear and convincing evidence that the joint inventor should be named on the patent), the patentee (the plaintiff) has the burden of proving by clear and convincing evidence that the unnamed joint inventor acted without deceptive intent, and that, therefore, the patent can be corrected. But in this regard, good faith, or the absence of deceptive intent, on the part of the unnamed inventor is presumed. The patentee must make a motion to correct the patent and the court then orders correction pursuant to § 256. The correction is not automatic. The only prerequisites to a § 256 action are notice and an opportunity to be heard. There is no requirement of consent on the part of the named inventors, or of diligence on the part of the unnamed inventor seeking correction.

114 See Stark, 119 F.3d at 1554-55.
115 See id.
116 See id. at 1555.
118 Id.
119 See Pannu, 155 F.3d at 1350-51.
120 See id. at 1351 n.4. The Federal Circuit is not entirely clear on exactly how the presumption of good faith comports with the patentee's burden of proof—it seems, at a minimum, the patentee must make a perfunctory assertion of good faith, then in the absence of contradicting evidence, ask for correction of the patent under § 256. See Barney & Carlson, supra note 17, at 29.
121 Pannu, 155 F.3d at 1350-51.
122 Id. at 1350.
123 Stark, 119 F.3d at 1553.
124 Id. at 1553-54; Stark v. Advanced Magnetics, Inc., 29 F.3d 1570, 1575 (Fed. Cir. 1994).
Courts presume the named inventors on a patent are correct and the burden of showing misjoinder or nonjoinder is a heavy one, which must be proven by clear and convincing evidence. This rule follows from the understanding that the temptation is too great for even honest witnesses to reconstruct events and their states of mind in a way favorable to themselves, especially when those events occurred years beforehand. Therefore, in addition to the alleged inventor’s testimony, corroborating evidence is required. Corroborating evidence can take the form of documents, contemporaneous disclosures of information, or testimony of persons other than the alleged joint inventor. The evidence may be direct or circumstantial and is evaluated in context by the trial court, making credibility determinations necessary to determine if, overall, the claim of joint inventorship is credible. As a result of this comprehensive examination, corroboration is not required for every single factual issue that the parties contest. A case illustrative of a borderline level of corroboration is Virginia Electronic & Lighting Corp. v. National Service Industries, decided in 2000. In Virginia Electronic, the Federal Circuit held that prototypes sent by the alleged inventor (the plaintiff) and oral testimony of a third party were sufficient to corroborate a § 256 claim of joint inventorship for a light-emitting-diode (LED) lamp. Under the terms of a confidentiality agreement, the alleged inventor sent prototype lamps to the defendant, who employed the named inventor. A few months later, the defendant applied for a patent on certain features for LED lamps. The alleged inventor’s evidence consisted of his own testimony, the prototype lamps sent to the defendant, and the testimony of a third party who supplied lamps to the alleged inventor (but who, distressingly, then testified that the third party had actually made the invention). The court stated that the sufficiency of the evidence was a “very close question,” but held that, crediting all inferences in favor

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125 See Hess, 106 F.3d at 980.
126 Acromed, 253 F.3d at 1379; Ethicon, 135 F.3d at 1461; Hess, 106 F.3d at 980.
127 Acromed, 253 F.3d at 1379; Ethicon, 135 F.3d at 1461; Hess, 106 F.3d at 980.
128 Id. at 1464.
129 Id.
131 Id. at *5–6.
132 Id. at *1–2.
133 Id. at *2.
134 Id. at *5.
of the plaintiff, the evidence was sufficient to reverse the district
court's summary judgment decision for the defendant. The court
noted that it was not clear whether the lamps actually contained the
features at issue, but this uncertainty and the third party claiming to
be the inventor both created genuine issues of material fact. The
court also highlighted relevant circumstantial evidence: (1) the de-
fendant approaching the plaintiff to be a vendor for the lamps, (2)
the plaintiff's experience in the lighting industry, (3) the informal
business relationship between the two, (4) the absence of compensa-
tion to the plaintiff for the work on the lamps, and (5) the similarities
between the plaintiff's drawings and the patent figures.


The language of 35 U.S.C. § 262 grants broad powers to each
joint owner of a patent:

In the absence of any agreement to the contrary, each of the
joint owners of a patent may make, use, offer to sell, or sell
the patented invention within the United States, or import
the patented invention into the United States, without the
consent of and without accounting to the other owners.

The law of joint inventorship, as discussed above in Part II.A.1., pro-
vides a low and uncertain threshold for becoming a joint inventor.

Nevertheless, as is clear from the plain text of § 262, the law of joint
ownership is not graduated; joint inventors receive a complete bundle
of ownership rights regardless of the quality or quantity of their con-
tribution to the inventive subject matter. Joint owners each own an
undivided share in the whole patent. Joint owners may unilaterally
license or assign their interest in the patent without accounting to
other owners. One rationale for this view is that if joint owners were
required to account to each other, there would exist a disincentive to

137 Id. at *5–6.
138 Id. at *7.
140 See Ethicon, 135 F.3d at 1469–71.
142 Ethicon, 135 F.3d at 1465.
143 35 U.S.C. § 262. For a comparison of joint ownership law in the United States with
the law in other countries, and an economic evaluation of U.S. law (particularly provisions
for accounting to other joint tenants), see generally Merges & Locke, supra note 10.
utilize the patent because part of the profits would be siphoned off to other joint owners who had done no work. In effect, the rule would create "free-riders" who do not seek to advance or commercialize the technological development. On the other hand, it has been argued that because a joint inventor can freely (or indiscriminately) license the entire patent, the current rule does create a disincentive to collaborate. Another principle of joint ownership is that an action for infringement must join all joint owners of a patent as plaintiffs. This rule protects the rights of all patent joint owners (because, for instance, a court could invalidate the patent), prevents infringers from multiple lawsuits, and protects licensees from harassing lawsuits by other joint owners. Because all joint owners of a patent are necessary parties to a suit for patent infringement and may not be involuntarily joined, a joint owner can prevent other joint owners from suing an infringer. Patent joint owners are essentially "at the mercy" of one another.

B. The Ethicon Case

In 1998, in the seminal case Ethicon, Inc. v. U.S. Surgical Corp., the Federal Circuit issued a troubling split decision that stirred debate over the efficacy of current joint inventorship and joint owner law. See Merges & Locke, supra note 10, at 593-94 (discussing the view espoused in 2 William C. Robinson, Robinson on Patents § 796 (1890)). See id. at 594.

144 See id. at 594.
145 See id. at 594-95.
147 See id. at 594.
148 See id. at 594-95.
149 See Ethicon, 135 F.3d at 1468; Schering Corp. v. Roussel-UCLAF SA, 104 F.3d 341, 345 (Fed. Cir. 1997). A joint owner could either refuse to join suit or grant the infringing party a license (both of which happened in Ethicon), but cannot absolve a party of liability for past infringement and past damages. See Schering, 104 F.3d at 345. Such an action requires a release, which cannot be granted by a single joint owner alone. See id. A patent joint owner can be involuntarily joined only pursuant to a prior existing contract whereby the patent joint ownership has waived its right to refuse to join suit. See id. Also, if a patent owner grants an exclusive license, that owner stands in a relationship of trust to the licensee and must allow him to sue in his name. See Ethicon, 135 F.3d at 1468 n.9 (citing Indep. Wireless Tele. Co. v. Radio Corp. of Am., 169 U.S. 459, 469 (1926), and Willingham, 555 F.2d at 1344-45).

150 See Ethicon, 135 F.3d at 1468; Barney & Carlson, supra note 17, at 33; Carlson & Barney, supra note 12, at 260.
151 Ethicon, 135 F.3d at 1468 (quoting Willingham, 555 F.2d at 1344).
152 See id. The debate continues in popular legal media, see supra note 1 and accompanying text, and in scholarly journals, see infra notes 224-264 and accompanying text.
The patent concerned a trocar, a surgical tool. The tool is used to make incisions in the wall of a body cavity that allow the insertion of medical instruments. One problem with these devices was that the sudden loss of resistance when a surgeon completed an incision could cause the blade of the trocar to plunge forward into internal organs. In the late 1970s, Dr. InBae Yoon began to conceive of an improved trocar that would lessen the risk of organ damage by retracting the blade into a protective sheath as it entered a body cavity and providing a signal to the surgeon when the incision was nearly complete. In 1980, Dr. Yoon met an electronics technician, Young Chae Choi, who had worked on the research and development of other technical devices and agreed to help him on the trocar project. After working together for eighteen months, the collaboration between the two ended when Choi decided the work was unlikely to produce any viable product and asked to leave. Shortly thereafter, however, Yoon filed for a patent on the trocar, naming himself the sole inventor of all fifty-five claims. When the patent issued, Yoon granted an exclusive license to Ethicon. In 1989, Ethicon sued U.S. Surgical for infringement of the Yoon patent.

In its defense, U.S. Surgical alleged that under § 256, Dr. Yoon’s technical assistant Choi should be named a joint inventor on the Ethicon patent and stated that they had purchased a license from Mr. Choi. To corroborate his testimony, Choi provided his notebook sketches of some of the trocar features. Notwithstanding a pointed dissent by Judge Newman, the majority held that Choi had contributed to two of the fifty-five claims in the patent. The court found that, on both claims, Choi had at least contributed to one alternate structure of a means-plus-function statement. For example, the court pointed to some of Choi’s drawings of electrical networks and

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153 Ethicon, 135 F.3d at 1459.
154 Id.
155 Id.
156 Id.
157 Id.
158 Ethicon, 135 F.3d at 1359.
159 Id.
160 Id.
161 Id. Exclusive licensees have the power to sue for patent infringement, though the patent is not their property. See supra note 149.
162 Ethicon, 135 F.3d at 1459.
163 Id. at 1462.
164 Id. at 1461–64, 1469–71.
165 See id. at 1462–64. For a discussion of means-plus-function claims see supra note 40.
indicated that these were alternate embodiments of the feature claimed as "[means for] creating a sensible signal." The court pointed to other drawings in Choi’s notebook resembling certain features of the patented trocar. The court also cited a number of circumstantial factors in finding Choi’s claim of joint inventorship corroborated. For instance, the court highlighted (1) Yoon’s need for a person with electronics expertise, (2) Choi’s electronics expertise, (3) Yoon’s proposal that the two work together, (4) their informal business relationship, (5) the length of time they worked together, (6) the absence of pay to Choi, (7) the similarity between the patent figures and the notebook drawings, and (8) Choi’s letter saying he could no longer be a “member” of Yoon’s business. The court then held that the contributor of any disclosed means of a means-plus-function claim element is a joint inventor as to that claim, unless one asserting sole inventorship can show that the contribution of that means was simply a reduction to practice of the sole inventor’s broader concept. Therefore, and most importantly, the court held that by contributing to at least one claim in the patent, Choi became a joint inventor and joint owner of the entire patent. Because Choi was a joint owner of the patent, he became a necessary plaintiff in the suit against U.S. Surgical. As Choi would not join the suit, it was dismissed.

Judge Newman’s dissent focused on the fundamental inequity of awarding Choi patent rights in all fifty-five claims of the patent when he had at most contributed to two claims. Judge Newman pointed out that under pre-1984 law, Choi would not have been considered a joint inventor because he had not contributed to all the claims in the patent. She interpreted § 116 as merely permitting the naming of an additional person as a joint inventor on a patent. Equal ownership rights, she explained, did not automatically flow from this naming because inventorship and ownership of patent rights are concep-
Ownership rights in a patent, she contended, were based on the notion that both inventors had shared equally in the invention. A joint invention, under pre-1984 law, was the simultaneous production of the genius and labor of both parties. Thus, the tenancy-in-common model for patent ownership, each tenant owning an undivided share of the whole, was appropriate. But because the law of joint inventorship had changed, the law of joint ownership should have been reevaluated by the majority. According to Judge Newman, by applying pre-1984 ownership concepts to the post-1984 amended law of joint inventorship, the majority had inequitably apportioned patent rights. Nevertheless, Judge Newman did not purport to provide a complete answer; she only proposed that perhaps a patent could be partitioned, such that each inventor owned the claims to which they contributed rather than the entire patent. In fact, she noted with some frustration that there was little scholarly debate on the subject.

The *Ethicon* ruling exposed the previously dormant rift between joint inventorship and joint ownership and highlighted the seeming inequities that could result from it. The case also created a somewhat treacherous state of law to guide group researchers in determining who should be involved in a research and development project, as even small contributors now were potentially joint inventors. Judge Newman’s dissent also generated some discussion on amending the law of joint ownership of patents.

C. The Effect of Current Joint Inventorship Rules on Collaborative Research

Since the 1984 amendments, the standards for joint inventorship have frequently been described as muddy—in that respect, little has
changed recently. But the *Ethicon* case raised the stakes in the joint inventorship game and was met with a round of trepidation, a smattering of booing, and a dose of "how did we end up here?" handwringing. Current joint inventorship rules affect conduct both in and out of the courtroom.

In the courtroom, a defendant in an infringement suit can often assert a defense based on joint inventorship principles. A defendant can find an unnamed joint inventor to license the patent to the defendant (or otherwise persuade the unnamed party to refrain from voluntarily joining the suit), as in *Ethicon*. A defendant can assert that a patent is invalid under § 256 for failure to name the proper inventors and place a burden on the patentee to show the named inventors are correct. There are three steps in this process. First, the party asserting nonjoinder (the defendant) must show by clear and convincing evidence that the omitted inventor contributed to the patent. Then, the burden of proving that the patent can be corrected falls on the plaintiff (a burden that entails proving that the unnamed inventor acted without deceptive intent). Finally, the patentee must ask the court to correct the patent pursuant to the statute. The effectiveness of this strategy is somewhat unclear, in part because the Federal Circuit seems to place the burden of proof on the plaintiff, but then presumes good faith on the part of the unnamed inventor. It is at least a delay or nuisance tactic (particularly if a defendant can

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190 See *infra* notes 191-221 and accompanying text.
191 See *Ethicon*, 135 F.3d at 1458-59; Barney & Carlson, *supra* note 17, at 24, 31-33 (discussing the strategies behind three affirmative defenses to patent infringement, the recent Federal Circuit cases that support them, and recommending legislative change to 35 U.S.C. § 256 in light of liberalized joint inventorship rules).
192 See *Ethicon*, 135 F.3d at 1459; Barney & Carlson, *supra* note 17, at 31-33.
193 35 U.S.C. § 256 (2000); see Barney & Carlson, *supra* note 17, at 29, 33; see also *supra* notes 119-121 and accompanying text.
194 See *Pannu*, 155 F.3d at 1350; Barney & Carlson, *supra* note 17, at 24; see also *supra* notes 119-120 and accompanying text.
195 See *Pannu*, 155 F.3d at 1350; Barney & Carlson, *supra* note 17, at 24; see also *supra* notes 119-120 and accompanying text.
196 See *Pannu*, 155 F.3d at 1350-51; Barney, & Carlson *supra* note 17, at 24; see also *supra* note 121-122 and accompanying text.
197 See Barney & Carlson, *supra* note 17, at 29; see also *supra* note 120 and accompanying text.
find more than one potential unnamed inventor, given the low hurdle for joint inventorship), but if there is uncontroverted evidence of deceptive intent, such a move could be fatal to the patent.\textsuperscript{198} In another strategy, a defendant can assert that pursuant to § 112 \textsuperscript{1} the patent did not disclose the best mode known to an inventive entity.\textsuperscript{199} Though these technical defenses are generally disfavored by courts, they are nevertheless viable strategies which affect and sometimes determine the outcome of cases.\textsuperscript{200} Of course, aside from these defenses there is the more straightforward inequity that a relatively minor contributor (even one who only made a sales visit to the inventor),\textsuperscript{201} on seeing the commercial success of a patented invention, may sue pursuant to § 256 to be named a joint inventor. That contributor could gain unrestricted ownership of the patent—a reward sufficient to entice many contributors, and their contingent-fee counsel, to initiate legal action.

Outside the courtroom, this law affects the conduct of both researchers and patent counsel in a few ways.\textsuperscript{202} These extra-judicial effects are particularly disturbing, considering that the legislative intent of the 1984 patent amendments involved encouraging open research.\textsuperscript{203}

First, the job of patent counsel is complicated by joint inventorship rules, which increase the interplay between patent counsel and researchers. Numerous commentators note the dangerous implications of unnamed joint inventors in an effort to increase awareness of potential problems.\textsuperscript{204} A frequent recommendation is to involve at-

\textsuperscript{198} See Barney & Carlson, \textit{supra} note 17, at 24; see also \textit{supra} notes 119–122 and accompanying text.

\textsuperscript{199} See 35 U.S.C. § 112 (2000); Barney & Carlson, \textit{supra} note 17, at 32–33. Under 35 U.S.C. § 112 \textsuperscript{1}, a patent “shall set forth the best mode contemplated by the inventor of carrying out his invention.” If a defendant can prove the unnamed inventor knew of a best mode of carrying out the invention which was not included in the patent specification (even if that inventor is later added to the patent), then the patent might be invalidated under § 112. The Federal Circuit has indicated a willingness to entertain such an argument. See Barney & Carlson, \textit{supra} note 17, at 32–33; see also \textit{Pannu}, 155 F.3d at 1351 n.5 (stating that if a patent is corrected, a defendant may nevertheless assert the theory that the proper inventive entity failed to disclose its best mode).

\textsuperscript{200} See generally \textit{Cushum}, \textit{supra} note 1, § 2.03[4], at 2–54.

\textsuperscript{201} See generally \textit{Pannu}, 155 F.3d at 1344.

\textsuperscript{202} See Clark & Hayes, \textit{supra} note 1, at 58; Lawson & Brunda, \textit{supra} note 1, at C12; Sheldon & Mak, \textit{supra} note 1, at 7.


\textsuperscript{204} See \textit{THE LAW AND STRATEGY OF BIOTECHNOLOGY PATENTS} 138 (Kenneth D. Sibley ed., 1994) \textit{[hereinafter LAW AND STRATEGY]} (observing that whenever collaborative team
torneys at an early stage in the research process and to evaluate the role of each collaborator on a team, as well as the potential rights accruing to that person. 205 In this way, joint inventorship rules place significant restrictions on the ability of researchers to collaborate freely and necessitate attorney involvement in the research process. 206

Second, the recognition that the subject matter in a patent can greatly affect ownership rights complicates the prosecution of patents. 207 Often, patent counsel may be able to control how many inventions are contained in each patent, notwithstanding the rule in § 121 that each patent contain only a single invention. 208 By including what is arguably more than one invention in a single patent, joint inventors may gain ownership rights to subject matter to which they did not contribute according to the Ethicon reasoning. 209 For this reason, the right to control the patent prosecution resulting from collaborative research enterprises becomes crucial. 210

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205 See LAW AND STRATEGY, supra note 204, at 138; SEIDEL, supra note 204, at 6; Regalado, supra note 15, at B4.
206 See LAW AND STRATEGY, supra note 204, at 138; SEIDEL, supra note 204, at 6; Regalado, supra note 15, at B4.
207 See id. at 22 nns.32 & 34.
208 See id. The authors explain that, based on current USPTO examination practices, more than one distinct invention may be examined in the same patent application. This result can be achieved via the following strategies: (1) a showing that the examination of the inventions in one patent does not create an undue burden on the examiner; (2) electing to prosecute a product claim, pursuant to a restriction requirement, then “re-joining” the process claim depending on that product claim; (3) requesting examination of multiple distinct “species inventions” which fall under a genus claim that may not be patentable; (4) examination of polynucleotide sequences, up to about ten of which can be examined per application; or (5) filing an application under the Patent Cooperation Treaty (a common international application) and proving that there is a “common technical relationship” between the claims and that when a patent is examined in the U.S. the claims will be examined together, even if a restriction would have been required in an original U.S. application. See id. at 22 nn.32 & 34.
209 See Ethicon, 135 F.3d at 1471; Steffe & Reed, supra note 207, at 92.
210 See Steffe & Reed, supra note 207, at 22.
Third, the law affects relations between researchers. A recent exploration of this problem is Lawrence Sung’s *Collegiality and Collaboration in the Age of Exclusivity*, which explores the impact of the new minimum criteria of joint inventorship on the medical and pharmaceutical arts. At its heart, Sung says, the patent system balances the public good of disclosing inventive ideas, so that others may build upon them, with the dangers of granting a limited monopoly right. Science is optimally a collaborative effort. This notion rests on the additive concept of background experience, cognitive synergy, and the social aspects of collaboration. Sung posits that scientists are typically organized in communities of inventive scholars, and that the nature of collegial interaction and collaboration within these communities are influenced by patent laws. This influence derives from the pecuniary and honorary benefits to being named as an inventor on a patent.

Sung argues that the pronouncements of the Federal Circuit in recent cases concerning joint inventorship have led to anxiety in the exchange of information between researchers. One can point to amended § 116 and the court’s interpretation of that provision as the primary factors. Current doctrine could result in restrictions on extramural collaboration among scientists. As Sung puts it, *Ethicon* “escalat[es] the potential harm from unseen joint inventorship scenarios” and thereby fosters “an environment of caution and mistrust.”

Other commentators such as Rochelle Dreyfuss have noted the increased value of collaboration in today’s research environment. She argues that the current prevalence and value of collaborative work product stems from a number of factors: intense specialization of many scientists, necessitating collaboration; the globalization of the marketplace; new avenues, particularly the Internet, that ease col-

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211 Sung, supra note 15, at 435-36.
212 See id. at 411, 416.
213 Id. at 413.
214 Id. at 416-19.
215 Id. at 419.
216 Sung, supra note 15, at 420.
217 See id. at 421.
218 See id. at 435.
219 See id. at 436.
220 See id. at 435-36, 438.
221 Sung, supra note 15, at 436.
222 See Dreyfuss, supra note 14, at 1161-67.
laboration; the rise in use of transient expert collaborators such as consultants; the expansion of intellectual property rights; and the need to encourage highly accomplished experts to collaborate.\textsuperscript{223}

D. Heretofore Proposed Solutions

Most proposals for change have focused on procedural solutions or on the law of joint ownership under § 262, which Congress left unchanged in 1984.\textsuperscript{224} The suggestions take various forms, but their general thrust is to amend the joint ownership rules either judicially or legislatively through an amendment to § 262.\textsuperscript{225} Such an amendment would essentially update the law of joint ownership to comport with the post-1984 law of joint inventorship.\textsuperscript{226} A brief discussion of these approaches illustrates the feasibility of amending joint ownership law and the variety of means to do so, and simultaneously provides background for understanding where such approaches succeed and where they fail.

In \textit{The Division of Right Among Joint Inventors: Public Policy Concerns After Ethicon v. U.S. Surgical}, Dale Carlson and James Barney offer a practitioner's perspective and suggest modification to the rule that patent joint owners must voluntarily join a suit for infringement, the crux of the problem in \textit{Ethicon}.\textsuperscript{227} They examine the standard three policy reasons for this rule.\textsuperscript{228} First, the authors confront the rationale that each interested party should have an opportunity to protect that party's substantive rights;\textsuperscript{229} when any one joint owner attempts to sue on a patent, the patent rights of all are put at risk because the patent could be found invalid during the proceedings.\textsuperscript{230} Nevertheless, the authors point out that if patent owners are at each other's mercy with

\textsuperscript{223} See id. at 1162–63, 1166.


\textsuperscript{227} See Carlson & Barney, \textit{supra} note 12, at 263–64.

\textsuperscript{228} See Carlson & Barney, \textit{supra} note 12, at 260–61.

\textsuperscript{229} Willingham, 555 F.2d at 1344–45; see Carlson & Barney, \textit{supra} note 12, at 260, 230 Willingham, 555 F.2d at 1344–45; see Carlson & Barney, \textit{supra} note 12, at 260.
respect to licensing, there seems to be no justification why they should not be at each other's mercy in bringing infringement actions.231

Carlson and Barney also confront the rationale that there is a public interest in not requiring defendants to litigate multiple suits concerning infringement of a single patent.232 They argue that this goal would also be achieved by allowing involuntary joinder.233 In addition, the authors challenge the notion that there is a public interest in enabling a patent joint owner to license to third parties without harassing suits by other joint owners.234 Carlson and Barney argue that this rule is really based on a desire for judicial efficiency; sanctions for harassing lawsuits already exist under the Federal Rules of Civil Procedure ("FRCP") and any such lawsuit could easily be dismissed before trial simply by producing a copy of the license from the other joint owner.235 As a result, they propose that non-consenting parties be involuntarily joined under Rule 19(a) of the FRCP.236

In another approach, Philip Konecny's Windfall Property Rights for the Left-Out Co-Inventor Who Gets Left into the Patent explores solutions to the problem by discussing various ways to divide joint inventors' ownership interests.237 Konecny bases his solutions on the proposition that undivided joint ownership depends on substantially equal joint inventorship.238 Konecny presents several options for dealing with the discord between joint inventorship and joint ownership, based on the idea that patent ownership can be apportioned rather than left as undivided shares in a joint tenancy, an idea espoused by other commentators as well.239

Konecny's first suggestion is to invalidate the patent if there is a dispute over inventorship, then allow each inventor to apply for another patent containing only the inventor's specific subject matter.240

231 See Carlson & Barney, supra note 12, at 260-61.
232 Willingham, 555 F.2d at 1344; see Carlson & Barney, supra note 12, at 261.
233 See Carlson & Barney, supra note 12, at 261.
234 Willingham, 555 F.2d at 1344-45; see Carlson & Barney, supra note 12, at 261.
235 See Carlson & Barney, supra note 12, at 261.
236 See id. at 263-64. The authors also advocate clarifying the law with respect to joint inventorship and property rights after the 1984 amendments, but do not go into detail about what form the clarifications should take. See id. at 266.
237 Konecny, supra note 16, at 141.
238 Id. at 160.
239 Id. at 164; see also Dreyfuss, supra note 14, at 1224-25 (proposing a "proportionality principle" in which each contributor's rights are limited to the claims to which they contributed and each contributor is given an implied right to use the other inventions protected by the patent).
He notes that this rule would be very harsh, as each party would lose patent rights and subject matter in the patent would be split.\textsuperscript{241} His second solution is to sever the claims of the patent, retaining the undisputed claims for the named inventor.\textsuperscript{242} The remaining claims would be subject to a reissue proceeding.\textsuperscript{243} This solution may not work, admits Konecny, if the claims of the patent cannot be severed without destroying the value of the patent—for each severed group of claims would have to be patentable on its own.\textsuperscript{244}

Another solution he proposes is to limit the undivided rights of the newly named joint inventor to the claims to which that joint inventor contributed.\textsuperscript{245} Because § 256 only states that courts "may" add a joint inventor to a patent, Konecny argues courts have the power to grant rights to each claim rather than to the patent as a whole.\textsuperscript{246} Then the joint inventors could bargain for the claims, which would result in a more accurate valuation of each inventor's contribution.\textsuperscript{247} Konecny also explores the idea of granting only one inventor (either the named or omitted inventor) ownership rights and giving the other owner damages under 35 U.S.C. § 284.\textsuperscript{248} It is unclear how damages can be estimated (especially future damages) according to this section, which pertains to infringement, but the suggestion seems to evoke an accounting process.\textsuperscript{249} Konecny does say that, if courts grant patent rights to the party most invested in the invention, an efficient economic result is achieved.\textsuperscript{250} According to Konecny, under this scheme the court would give the party who can best bring the patented technology to market an unfettered right to the patent.\textsuperscript{251} That party would only be burdened by a pecuniary liability, which can be taken out of the profits from the patent.\textsuperscript{252}

Finally, Konecny suggests that the standard for joint inventorship simply be raised for patents in which an omitted joint inventor would otherwise gain rights to substantially more claims than that to which

\textsuperscript{241} See id.
\textsuperscript{242} Id. at 165.
\textsuperscript{243} Id.
\textsuperscript{244} See id.
\textsuperscript{245} Konecny, \textit{supra} note 16, at 168.
\textsuperscript{247} See Konecny, \textit{supra} note 16, at 168.
\textsuperscript{248} See id. at 168--70.
\textsuperscript{250} Id.
\textsuperscript{251} Id.
\textsuperscript{252} Konecny, \textit{supra} note 16, at 170.
The contributed. This approach would mean that the party who made a minor contribution would lose ownership rights. Despite its harsh consequences, this solution has the advantage of being a quick judicial fix, without the administrative and foundational shift in patent prosecution found in his other suggestions.

Konecny's main argument is that ownership of patents can be fashioned in an equitable and efficient way without upsetting the current framework for the law of joint inventorship. His approach is echoed in Tigran Guledjian's *Teaching the Federal Circuit New Tricks: Updating the Law of Joint Inventorship in Patents.* First, Guledjian advocates fractioning the patent into individual claims and calculating an ownership percentage based on the number of claims to which a joint inventor contributed. Thus, by establishing contribution to three claims in a patent with ten claims, an alleged joint inventor would be entitled to a thirty-percent ownership share. Guledjian bases this approach on the common-law right of co-tenants to force partition of their property. He does not explain how rights attaching to the patent would be split, or what significance a split would entail for ownership rights, especially when each joint owner can unilaterally license a patent.

Guledjian's second solution is to raise the bar for joint inventorship, again much as Konecny advocates. He gives the suggestion a twist, however, by proposing a higher bar for inventorship to determine only ownership rights, not inventorship. Thus, an omitted joint inventor might recover the prestigious accolades that accompany inventor status, but not the pecuniary reward of ownership.
II. Analysis

A. Amending Joint Inventorship Rules Is a Better Solution Than Amending Joint Ownership Rules

Conceptually, the problem of *Ethicon, Inc. v. U.S. Surgical Corp.* is often characterized as a discord between post-1984 rules for joint inventorship and pre-1984 rules for joint ownership. This discord, originating from the 1984 amendments to 35 U.S.C. § 116, has had effects that are in some instances directly contrary to the explicit Congressional intent of those amendments. There are two general solutions to this problem: the law of joint ownership could be updated to reflect relaxed inventorship rules, or the law of joint inventorship could be made more stringent to comport again with all-or-nothing joint ownership rules.

Recent scholarship focuses on the former solution: updating the outdated framework for joint ownership. This approach is attractive because it seems simple and straightforward and because the consequences of joint ownership are so harsh. But tinkering with joint ownership harbors many problems and does not actually address the underlying difficulties with current joint inventorship rules.

There are important policy reasons for maintaining current joint ownership rules. The rule that each joint owner has rights to the entire patent is logically equitable—if a patent contains one invention and each joint inventor has contributed to that unitary invention, the “amount” of contribution is not crucial, for a working invention would not exist without either contribution. This logic becomes


266 See *supra* notes 38-110, 188-221 and accompanying text.

267 *Cf.* *supra* notes 175-184, 238-256 and accompanying text.


269 See Carlson & Barney, *supra* note 12, at 266; Gulehdjian, *supra* note 224, at 1301-02; Konecny, *supra* note 16, at 176; *see also* *supra* notes 139-151 and accompanying text.

270 See *supra* notes 229-234 and accompanying text.

271 See 35 U.S.C. § 121 (2000). Often, the “amount” of contribution might be thought equivalent to the “effort” made by an inventor. See, e.g., Carlson & Barney, *supra* note 12, at 263. But it is unclear why the amount of time or work, or any other measure of individual contribution, should be the indicator of inventive contribution. Some great ideas are the product of laborious effort, some are epiphanies. Patent laws protect new, useful,
difficult to accept if instead the contribution of one inventor only serves to add a particular and minor feature to an invention.\textsuperscript{272} Then the patent begins to look like it embodies one invention and one minor improvement to that invention, which nevertheless may be patentable itself.\textsuperscript{273} In this case, however, there are either two patentable inventions or one patentable invention and an unnecessary feature.\textsuperscript{274} In either circumstance, each invention can (and should) be placed in its own separate patent if an inventor wishes to avoid the entire problem of joint ownership.\textsuperscript{275} But even beyond this formalism, a practical imperative supports the current doctrine: if courts currently have trouble deciding who qualifies as a joint inventor, they will face even greater difficulty trying to parse technical data, evaluate inevitably conflicting expert testimony regarding which technical contribution was more important, and determine an equitable measure of contribution from each inventor. The current catch-all standard for joint inventorship is conceptually pleasing, but difficult to apply.\textsuperscript{276} A judge must first attempt to evaluate the existence of an inventive "conception" from a lab notebook sketch or testimony, then evaluate whether that abstract contribution is "significant" in the context of the invention.\textsuperscript{277} And in a struggle over joint inventorship, a court must further make decisions about the knowledge of the named inventor—for instance, assuming someone suggested an idea to the named inventor, nonobvious ideas that are turned into inventions; they do not protect effort. See \textsection{}\textsection{}35 U.S.C. \textsection{}\textsection{}101 (requiring a patentable invention to be new and useful), 102 (requiring a patentable invention to be novel), 103 (requiring a patentable invention to be non-obvious, and stating "[p]atentability shall not be negatived by the manner in which the invention was made").

\textsuperscript{272} Cf. \textsection{}35 U.S.C. \textsection{}121; \textit{Manual, supra} note 38, \textsection{}\textsection{}802-803.

\textsuperscript{273} Cf. \textsection{}35 U.S.C. \textsection{}121; \textit{Manual, supra} note 38, \textsection{}\textsection{}802-803.

\textsuperscript{274} Cf. \textsection{}35 U.S.C. \textsection{}121; \textit{Manual, supra} note 38, \textsection{}\textsection{}802-803.

\textsuperscript{275} See \textsection{}35 U.S.C. \textsection{}121; \textit{Manual, supra} note 38, \textsection{}\textsection{}802-803. There is additional motivation, beyond mere doctrinal logic, for inventors to claim one invention per patent. It is good and common practice to ensure that each patent claim only the invention. A patent with "extra" features unnecessary to the invention is not infringed unless every claimed limitation and feature of the invention—even an unnecessary one—is copied. Thus infringers might be able to copy the invention claimed in a poorly drafted patent and avoid liability by simply omitting unnecessary but claimed features. \textit{See Chisum, supra note} 1, \textsection{}18.03(4), at \textsection{}18-161 to \textsection{}18-163; \textit{Robert C. Faber, Landis on Mechanics of Claim Drafting: §X-1 to X-3 (4th ed., release 5, 2001)} (hereinafter \textit{Faber, Landis on Mechanics: Robert C. Faber, Patent Claim Writing, in Fundamentals of Patent Prosecution: A Boot Camp for Claim Drafting & Amendment Writing 3}) (Martin Pfeffer, Chair, 2000) (hereinafter \textit{Faber, Patent Claim Writing}).

\textsuperscript{276} See \textit{supra} notes 53-57 and accompanying text.

\textsuperscript{277} See \textit{supra} notes 53-57 and accompanying text.
had that inventor already conceived of the idea anyway? 278 What was the nature of their interaction? 279 These are difficult questions to resolve accurately inside (or outside) a courtroom. 280 In addition, patent claims are not necessarily written to reflect inventive contribution. 281 There is no limit to the number of claims on an invention, and claims may overlap or duplicate certain features in an effort to bolster patentability arguments before the USPTO. 282 Patent counsel may thus claim the same invention in many ways. 283 At the same time, patent counsel might claim two inventions in one patent for efficiency and to capture subject matter for one owner. 284 In sum, requiring or relying on the patent prosecution process accurately and narrowly to identify "the invention" in the patent is a dubious proposition because patents are drafted to secure the widest possible protection for the inventor's disclosure. Thus, very little guides courts to make easy, efficient decisions about inventive contribution. 285 This makes solutions that fraction ownership daunting to implement. 286

Even if a court could determine an ownership interest share for an accounting, every joint owner would have the right to make and use the patented subject matter and could license the patent without accounting to other owners. 287 Therefore, fractional ownership of the patent would make little difference unless the rules regarding patentees' rights were modified. 288 But disallowing unilateral action by joint owners is not necessarily an efficacious solution, for it would give one joint owner the power to inhibit utilization of the patent. 289 A sin-

278 See supra notes 53-57 and accompanying text.
279 See supra notes 53-57 and accompanying text.
280 See supra notes 53-57 and accompanying text.
281 See Faber, Landis on Mechanics, supra note 275, at X-1 to X-3; Faber, Patent Claim Writing, supra note 275, at 14-15; cf. 35 U.S.C. § 121 (2000); Manual, supra note 38, § 706.03(k).
282 See Manual, supra note 38, § 706.03(k).
283 See id.
284 See supra notes 207-208 and accompanying text.
286 See supra notes 297-296 and accompanying text.
287 See supra notes 139-151 and accompanying text.
288 See supra notes 139-151 and accompanying text.
289 See supra notes 144-145 and accompanying text. It might be more clear to say that each party could inhibit utilization of an invention. If there are some number of constituent parts in a working invention, each owned by a separate inventor, then a single intransigent owner could prevent utilization of the invention. This is so whether the ownership of
gle party might refuse—absent yet more judicial intervention—to allow others to work the patent, or to license the patent to another party seeking to commercialize the patent. The transaction costs in such a situation are extremely high, as the joint owners (some of whom may have been antagonistic former litigants in a § 256 action to become joint owners) are forced to bargain with one another. This result seems worse than that in *Ethicon*—a single joint inventor still wields considerable power, but now can act to block any commercial development of the patent, a public disservice.

In addition to the policy rationales for maintaining current joint ownership rules, Congressional intent ought to set priority in the inevitable tradeoff between equity and pragmatism that accompanies the determination of patent rights. The clear intent of the 1984 amendments to § 116 focused on promoting large-scale, team-oriented collaborative research. Thus, collaboration and collegiality among researchers ought to be the primary consideration in addressing the problem *Ethicon* presents.

To this end, heretofore proposed amendments to the law of joint ownership seem only tangentially related to the essential problem: joint inventorship law stifles collaboration among large research teams and unnecessarily involves lawyers in the inventive process. They muddy the legal landscape, preventing inventors from knowing when rights accrue and when bargaining is required. In short, in the context of *Ethicon*, they keep Dr. Yoon unaware that he should negotiate with his assistant for patent rights. So, if a research team is unsure, because of the legal consequences, whether to involve an outside collaborator, they will hardly be comforted by the suggestion that the outside collaborator might own only some unknown fraction, possibly the crucial fraction, of the resulting invention. They will be only minimally assuaged by the suggestion that, via involuntary joiner, they can force that outside collaborator to join their lawsuits

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200 See supra notes 144–145 and accompanying text.
201 See supra notes 144–145, 248–251 and accompanying text.
202 See supra notes 281–286 and accompanying text.
203 Cf. supra notes 38–110 and accompanying text.
204 See supra notes 211–221 and accompanying text.
205 See supra notes 168–221 and accompanying text.
206 See supra notes 168–221 and accompanying text.
207 See supra notes 168–221 and accompanying text.
208 See supra notes 211–221 and accompanying text.

a single patent has been fractioned among multiple owners or ownership has been fractioned into multiple patents.
against infringers (assuming the collaborator has not granted the infringers a license). 299 With these approaches remains the basic issue: fear of having a joint inventor named on the patent. 300 That fear originates from uncertainty about the law of joint inventorship, not the law of joint ownership. 301

Furthermore, amending the law of joint ownership seems to maintain troublesome legal involvement in research and development. 302 It does not address or eliminate the initial reason for the legal presence (to identify possible joint inventors), but instead may increase the lawyer’s role. 303 Patent counsel, it seems, need continued contact with research teams to determine not only who contributed to an invention but what pieces they contributed. 304 This is a point that did not seem to bother the Ethicon court, as the majority dismissed Judge Newman’s dissent by commenting that “where inventors choose to cooperate in the inventive process, their joint inventions may become joint property without some express agreement to the contrary.” 305 This approach also increases legal intrusion in another way—if each part of an invention is up for grabs in a piecemeal joint ownership approach, control of patent prosecution becomes vital. 306 This, in effect, creates another battleground for competing inventorship interests. 307 In sum, amending joint ownership law may address the in-court effects of the Ethicon problem, but amending the law of

299 See supra notes 211–221 and accompanying text.
300 See Sung, supra note 15, at 435; see also supra notes 211–221 and accompanying text.
301 See supra notes 211–221 and accompanying text.
302 See supra notes 202–210 and accompanying text. Some have argued that legal involvement in this area is needed because collaborators cannot always bargain efficiently themselves. See Dreyfuss, supra note 14, at 1165, 1172.
303 See supra notes 202–210 and accompanying text.
304 See LAW AND STRATEGY, supra note 204, at 138; SEIDEL, supra note 204, at 6; Regalado, supra note 15, at B4; see also supra notes 202–210 and accompanying text. A cynic might predict that allowing each part of an invention to be owned separately will lead to a separate legal fight over each part of the invention.
305 Ethicon, 135 F.3d at 1466. Besides inviting the law into the lab, there are at least two other issues worth noting about this argument: first, Dr. Yoon apparently did not believe he was entering into a cooperative and inventive process with Choi, or even that the process would bear patentable fruit; second, as inventors become aware of this standard, it is likely to inhibit choices such inventors make, the likely victim being collaboration. See Dreyfuss, supra note 14, at 1166 (arguing that collaboration holds particular social value in today’s research, so that private, self-inflicted choices concerning inventorship arrangements nevertheless inflict significant social costs which the law must deal with); Dale L. Carlson & James R. Barney, Who Owns What’s in Your Patent?, INTELL. PROP. TODAY, June 1998, at 8 n.15.
306 See supra notes 207–214 and accompanying text.
307 See supra notes 207–214 and accompanying text.
joint inventorship better addresses both the in-court and out-of-court effects.\textsuperscript{308}

B. Efficacious Joint Inventorship Rules

The goals of joint inventorship rules include equity,\textsuperscript{309} ease of administration,\textsuperscript{310} and promotion of collegial and collaborative team research.\textsuperscript{311} This last goal may be further broken-down: collaboration requires equitable rules, as potential collaborators must feel that their inventive efforts will be rewarded.\textsuperscript{312} But it also requires something more—that each potential inventor know the threshold for achieving joint inventorship status set by joint inventorship law.\textsuperscript{313} Clear, predictable rules about the legal requirements for inventorship status allow parties to negotiate within known bounds and find agreeable terms on which to collaborate.\textsuperscript{314} Though parties may not know whether their work will result in a patentable product, clear joint inventorship rules at least allow them to assess the likelihood of a particular person becoming a joint inventor.\textsuperscript{315} In the absence of clear rules, there is uncertainty about the potential rights accruing to a particular collaborator—this inhibits any agreement on terms of collaboration.\textsuperscript{316} Thus, an additional and most important goal for joint inventorship rules is to provide clear rules that are predictable in application (this goal is hereafter termed “clarity”).\textsuperscript{317}

Prior to the 1984 amendments, some courts embraced the idea of an “all-claims” rule for joint inventorship.\textsuperscript{318} This rule represents one extreme in a range of possible rules, as measured by equity, ease

\textsuperscript{308} See supra notes 192–221 and accompanying text.
\textsuperscript{309} See supra notes 174–183 and accompanying text; cf. Ethicon, 135 F.3d at 1469–71.
\textsuperscript{310} See supra notes 281–284 and accompanying text.
\textsuperscript{311} See supra notes 292–294 and accompanying text.
\textsuperscript{312} See supra notes 71–77, 211–223 and accompanying text.
\textsuperscript{313} See supra notes 211–223 and accompanying text.
\textsuperscript{314} See Dreyfuss, supra note 14, at 1169 (discussing Suzanne Scotchmer, Protecting Early Innovators: Should Second Generation Products Be Patentable?, 27 RAND J. ECON. 322 (1994) (advocating ex ante collaboration agreements as the most efficient way to promote creative work)); cf. supra notes 211–223 and accompanying text.
\textsuperscript{315} See Dreyfuss, supra note 14, at 1169.
\textsuperscript{316} See id.; cf. supra notes 211–223 and accompanying text.
\textsuperscript{317} See Dreyfuss, supra note 14, at 1169; cf. supra notes 190–223 and accompanying text. See generally Robert W. Harris, Conceptual Specificity as a Factor in Determination of Inventorship, 67 J. PAT. & TRADEMARK OFF. SOC'Y 315, 315 (1985) (proposing “degree of specificity” as a factor in determining inventorship). Using the “degree of specificity” as a yardstick for inventive contribution clarifies joint inventorship determinations by requiring an inventive contribution be a specific portion of the invention. See Harris, supra, at 315.
\textsuperscript{318} See supra notes 100–110 and accompanying text.
of administration, promotion of collaboration, and clarity.\textsuperscript{319} The rule is very easy to administer but inflexible and so prone to misrepresent the importance of the contribution from each purported joint inventor.\textsuperscript{320} It seems to inhibit collaboration, as a person might be hesitant to join a product in which that person contributes significantly but could earn no patent rights.\textsuperscript{321} The current state of the law, essentially that contribution to "any claim" (or really any part of any claim), is at the opposite end of that continuum.\textsuperscript{322} The rule is easy to administer, but is inaccurate and inequitable in assessing inventive contribution.\textsuperscript{323} Its low threshold creates fear about an Ethicon-type scenario.\textsuperscript{324} Neither of these rules are particularly clear in their application until the patent is written and the claims defined; at the research stage, any team member could or could not be a joint inventor.\textsuperscript{325}

Efficacious rules for joint inventorship may achieve equity by avoiding extremes of claim counting, refraining from one catch-all standard for all fact patterns, and instead relying on case by case analysis.\textsuperscript{326} Such rules may achieve clarity if tailored to the context in which the invention was made.\textsuperscript{327} Such rules will be easy to administer if they use a bright-line standard, or at least a specific set of factors, for each situation.\textsuperscript{328} Joint inventorship rules classed by inventive entity, inventive context, and technical field satisfy these criteria.\textsuperscript{329} These rules might be thought of as entries in a table or matrix, with a sepa-

\textsuperscript{319} Cf. supra notes 100–110 and accompanying text.
\textsuperscript{320} Cf. supra notes 100–110 and accompanying text.
\textsuperscript{321} Cf. supra notes 100–110 and accompanying text. Indeed, under this rule, control of claim drafting is paramount: a key feature of the invention could simply be written out of just one claim so as to usurp the feature for the named inventor of the remaining claims. Cf. supra notes 100–110 and accompanying text.
\textsuperscript{322} Cf. supra notes 38–40 and accompanying text.
\textsuperscript{323} See Ethicon, 135 F.3d at 1469–71; Sung, supra note 15, at 435–36; see also supra notes 174–187 and accompanying text.
\textsuperscript{324} See Ethicon, 135 F.3d at 1469–71; Sung, supra note 15, at 435–36; see also supra notes 174–187 and accompanying text.
\textsuperscript{325} See supra notes 174–187 and accompanying text; cf. supra notes 100–110 and accompanying text.
\textsuperscript{326} See Ethicon, 135 F.3d at 1469–71; see also supra notes 174–183, 254–256 and accompanying text.
\textsuperscript{327} See supra notes 281–284 and accompanying text.
\textsuperscript{328} Cf. supra notes 281–286 and accompanying text.
\textsuperscript{329} For example, courts have applied the rule of simultaneous conception and reduction to practice to experimental sciences because those sciences often develop and refine ideas, perhaps significantly, in testing a hypothesis. See supra note 42. Predictive sciences, however, use the rule by which conception and reduction to practice are separate steps. See supra note 42. The Federal Circuit might consider inventorship questions in a more customized fashion, as well.
rate set of legally important factors for every common class or situation existing in typical research environments.

For instance, distinct inventive entities include corporate research teams, research partners, researchers and assistants, faculty and postdoctoral students, and hired collaborators or consultants. Inventive context is closely related to inventive entity: was the invention a product of large corporate research and development teams or two inventors in a garage, a product of a single meeting or an extended agreement to collaborate? The following factors may be developed based on these distinctions. If large research teams are involved, a court should require less evidence of contribution from each team member.350 This is not to say that each team member must not "contribute to conception." If a team holds large meetings, performs research, and banter about ideas in a laboratory setting, then courts should require evidence of each member's contribution before concluding that each team member, in the context of that collaboration, did contribute to the final product.391 At the same time, in this research-team context, Congressional intent ought to control. Courts should raise a presumption that every inventor in that research team contributed.382 On the other hand, if there are only two partners involved in a research endeavor, then the likelihood of each partner contributing seems greater but depends closely on the relationship of the parties, including who initiated collaboration, or if the relationship is one of supervisor and subordinate.383 The latter situation, given the rule that following directions does not constitute contribution, ought to give rise to a presumption of non-inventorship.384 Two pertinent factors thus are the size of the inventive entity and the relationship of inventive entities. Another factor implicit in this analysis is the length of time during which collaboration took place, a short meeting less likely to produce (though not incapable of producing) joint contributive effort than a long period of cooperation.385

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350 See supra notes 70, 90-98 and accompanying text.
351 See supra notes 70, 90-98 and accompanying text.
352 See supra notes 71-76 and accompanying text.
354 Cf. supra note 52 and accompanying text.
355 Cf. Kimberly-Clark, 973 F.2d at 916-17 (requiring collaboration between joint inventors).
ture of the relationship between researchers should constitute another factor: a sales visit is less likely to produce deep inventive collaboration than a protracted partnership between two individuals. Also, the existence of a formal contract may specify certain employee duties that may or may not be relevant to the research. If the job description is to effect instructions given by a supervising researcher, then an inventive contribution is less likely than a simple following of orders.

Finally, the field of research is pertinent. Those who conduct experiments and tests in the pharmaceutical industry, for instance, are more likely to contribute to conception (especially under a theory of simultaneous conception and reduction to practice) than those who perform the same function in the predictive sciences, which make extensive use of modeling and computer analysis. Contribution to conception in an esoteric field entailing years of education is simply less likely for those without that background, whereas an invention concerning a non-technical idea is much more accessible. Thus, the factor of technical complexity ought to be considered in assessing inventorship.

Using these factors, and others courts may develop, it is apparent that the amount and nature of collaboration can influence a court's joint inventorship analysis. This result is desirable because it allows a research team to know clearly that if it maintains limited contact with an outside consultant (for instance) it will be that much harder (though not impossible) for the consultant to bring a successful § 256 action on any resulting patent. If the amount of contact increases beyond a particular level, as defined by developed precedent in this matrix organization, the research team should know that it should negotiate with the consultant as a potential joint inventor, possibly for

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336 Cf. supra notes 65-70 and accompanying text.
337 See supra note 51 and accompanying text.
338 See supra note 45.
339 See supra note 45.
340 Cf. supra note 45 and accompanying text. If conception is defined as the inventor's mental grasp of a complete and operative invention, including its theory of operation, then those with more education, experience, or training in a particular field would seem to have an inherent advantage in understanding and formulating, and therefore legally conceiving of, an invention in their particular field of expertise. See Ethicon, 135 F.3d at 1460.
341 See supra note 343.
342 No doubt courts consider, implicitly or intuitively, some of these factors already, but not consistently or explicitly as is needed for clear rules.
343 Cf. supra notes 211-221 and accompanying text.
an assignment of rights. If these factors were entries in a matrix of possible research fact patterns, and if the judiciary were sufficiently consistent and clear about their relative importance, one could choose a particular type of situation and understand which factors control, in a semi-custom fashion.

These factors, admittedly, cannot be developed completely in the abstract. But the Federal Circuit could begin to create multiple rules as cases come before it, filling in an abstract matrix, instead of relying on the usual "contribution to conception" muddiness which supposedly guides all decisions in all fact patterns. The Federal Circuit could create as many or as few factors or rules as needed. This approach does not necessarily entail an amendment to § 116. That section imposes only negative criteria—circumstances that do not disqualify one from inventorship. It does not prohibit the imposition of particular positive criteria unless they impinge on the negative criteria in the text of the statute. For instance, as long as the Federal Circuit does not require joint inventors each to contribute the same amount to an invention, or to contribute to every claim in the patent, additional requirements are not in conflict with the statute.

Such an approach should not mean the standard for joint inventorship would vary (at least any more than it currently does), or that it would espouse a particular bias against certain roles in the inventive process. It would allow a court to customize the factors it uses for each type of situation, however, and thereby create more consistent, more understandable, and more predictable results. Ultimately, the goals of an efficacious joint inventorship standard are in tension: total equity requires tailored solutions, whereas perfect clarity requires bright-line tests, and the promotion of collaborative research remains a mix of the two. The proposed matrix approach is a hybrid solution, and perhaps a compromise, which may come closest to fulfilling all goals.

Cf. supra notes 211–221 and accompanying text.
See supra notes 38–55 and accompanying text.
See supra notes 38–40 and accompanying text.
See supra notes 38–40 and accompanying text.
See supra notes 38–40 and accompanying text.
See supra notes 38–40 and accompanying text.
See supra notes 174–183 and accompanying text; cf. Ethicon, 135 F.3d at 1469–71. The goal of equity is arguably better served by judicial case-by-case development of joint inventorship law rather than a rigid, bright-line statutory enactment.
Cf. supra notes 218–221 and accompanying text (noting that uncertainty in the scientific community is largely driven by a lack of stable guidelines).
This approach has the benefit of providing a solution tailored in scope to the fact pattern of Ethicon. If joint inventorship problems occur primarily within the researcher-technical assistant environment, then joint inventorship rules of this sort can specifically target that situation. In 2000, over seventy-eight percent of issued patents were assigned to one owner, typically an employer, avoiding the Ethicon scenario. The appropriate solution for a researcher-technical assistant environment may not be appropriate for other situations that occur in the development of patentable work under the aegis of one employer.

Finally, development of joint inventorship case law also has advantages over a statutory amendment. Of the goals for joint inventorship rules discussed above, clarity seems suited to statutory reform, particularly if Congress were able to provide a definitive list of criteria for joint inventorship that would bind courts. But this approach harbors a number of pitfalls worth noting.

First, it is important to recognize that the Federal Circuit occupies a jurisprudentially unique role. In 1982, Congress created it largely because of differing standards in patent law among the federal appellate courts. The new court’s charge was, and remains, to mold a uniform body of patent law. Thus, in clarifying joint inventorship standards, the Federal Circuit is actually fulfilling its assigned mission. Accordingly, Congress has already exhibited a reluctance to

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352 Cf. supra notes 152–173 and accompanying text. The twists and turns of the Ethicon fact pattern are not necessarily common.

353 Cf. supra notes 152–173 and accompanying text.

354 Tech. Assessment & Forecast Branch, U.S. Patent & Trademark Office, Technology Assessment and Forecast Report A1–1 (2001), http://www.uspto.gov/web/offices/ac/ido/oeip/taf/spat.pdf (over seventy-eight percent of patents of United States origin granted in 2000 were assigned to a corporation). As the value of intellectual property increases in both monetary worth and prestige, and as more and more inventive work is done in a collaborative setting, many institutions, from universities to journals, are becoming more careful to order their policies towards collaborators. See also Dreyfuss, supra note 14, at 1184–89.

355 Cf. supra notes 152–173 and accompanying text.

356 See supra notes 305–311 and accompanying text.


enact particular positive criteria for inventorship.\textsuperscript{361} It codified only negative criteria in the 1984 amendments, even though the same cases from which it drew those criteria also contained positive criteria.\textsuperscript{362} At the time, the new Federal Circuit had just begun to function and Congress wanted to prevent it from moving in an unfavorable direction based on contemporary case law.\textsuperscript{363} Now that the Federal Circuit sits with over twenty years of precedent, Congress should exhibit even greater deference to its specific expertise on this issue.\textsuperscript{364}

Furthermore, although statutory codification of inventorship standards could embrace bright-line tests and thus provide clarity, they would inevitably appear rigid.\textsuperscript{365} If equity is an important goal, then a rigid system that mechanically omits or includes inventors does not appear promising.\textsuperscript{366} This is especially problematic when considering the myriad of plausible fact patterns that could culminate in inventive conception.\textsuperscript{367} Defining a single standard would be as challenging as defining conception itself and would likely bind future fact patterns to rigid criteria. It is questionable why an inventor should have to conform to any inflexible statutory standard, when the patent code already sensibly indicates that "[p]atentability shall not be negatived by the manner in which the invention was made."\textsuperscript{368} And if the promotion of collegial and collaborative research is a goal, then a statute would have to strike a delicate balance: if the bar were set too high, collaboration would suffer as incentives to participate in group doctrine be left to contextual court analysis. \textit{Hearings, supra} note 76, at 157-58 (statement of Professor Herbert F. Schwarz from the University of Pennsylvania). Professor Schwarz, testifying before the House Subcommittee, explained: "To the extent that the proper interpretation of § 116 is not well-settled, any disagreement can be resolved by the new Court of Appeals for the Federal Circuit." \textit{Id.} at 158. In hindsight, Professor Schwarz's approach would seem to have avoided the statutory bind the Federal Circuit confronted in \textit{Ethicon}. See \textit{id.}

\textsuperscript{361} See \textit{supra} notes 86-89 and accompanying text.

\textsuperscript{362} See \textit{supra} notes 86-89 and accompanying text.

\textsuperscript{363} See \textit{supra} note 76 and accompanying text.

\textsuperscript{364} See \textit{Hearings, supra} note 77, at 157-58 (statement of Professor Herbert F. Schwarz advocating that Congress defer to the Federal Circuit to create appropriate precedent on joint inventorship).

\textsuperscript{365} Cf. \textit{supra} notes 76-77 and accompanying text (noting that the original 1984 amendments were codified precisely to constrain courts). On this issue, see also \textit{Hearings, supra} note 77, at 157-58 (statement of Professor Herbert F. Schwarz).

\textsuperscript{366} See \textit{supra} note 309 and accompanying text.

\textsuperscript{367} A simple review of cases cited in this Note reveals invention springing both from many years of research by engineers who may never have met, as in \textit{General Motors}, 467 F. Supp. at 1150-51, and from a relatively benign call to a salesman, as in \textit{Pannu}, 155 F.3d at 1346.

research diminished;369 if the bar were too low, then of course joint inventors gain nothing new.

Finally, rigid bright-line tests best serve the goal of easy administration, but not necessarily much more than a matrix approach would.370 A statutory amendment, then, really only satisfies one of the four goals for joint inventorship standards. In addition, overly rigid criteria, at an extreme, could run afoul of the constitutional and statutory provisions for inventorship.371 The text of the Constitution seems to embrace a theory of natural rights for inventors, granting Congress the power to secure "for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."372 In 35 U.S.C. § 101, Congress has effected that power by providing that "[w]hoever invents or discovers . . . may obtain a patent." Omitting true inventors from patents because their actions do not fit a preconceived notion of the inventive process is objectionable as antithetical to this basic principle of awarding actual inventors rights in their works.373

CONCLUSION

Currently, the law of joint inventorship provides a low and uncertain threshold for inventorship. Its vague standard fosters inequities when applied to all-or-nothing joint ownership rules, provides opportunities for dubious legal defenses, and inhibits collaboration among researchers. Ideally, fixing these problems involves modification of the rules for joint inventorship, not joint ownership. Amending the rules for joint inventorship is more practical than amending those for joint ownership and addresses both in-court and out-of-court effects. Revised joint inventorship standards should be equitable, easy to ad-

369 See Sung, supra note 15, at 421, 435; see also supra notes 311–312 and accompanying text.
371 See U.S. Const., art. I, § 8, cl. 8; 35 U.S.C. § 101; Fasse, supra note 1, at 155–56 n.13 (explaining that only actual, true inventors, as opposed to those who exploit the ideas of other, have natural rights in their inventions).
372 U.S. Const., art. I, § 8, cl. 8; see Fasse, supra note 1, at 155–56 n.13.
373 See U.S. Const., art. I, § 8, cl. 8; 35 U.S.C. § 101; see Fasse, supra note 1, at 155–56 n.13 (explaining that actual inventors have natural rights in their inventions and reviewing framers intent on the issue).
minister, promote collaboration, and most of all, clear. Clear standards aid collaborative, patent-producing research (the kind that Congress intended to promote with the 1984 amendments) because they allow parties to assess the potential for inventorship rights in a given collaborative environment. The Federal Circuit might effect these goals by using a matrix approach. The court can develop multiple rules for joint inventorship, as cases demand, in which the rules for determining inventorship are specific and adapted to contextual concerns, such as inventive entity, inventive context, and technical field. Such an approach is in harmony with the joint inventorship statute, Congressional intent, and public interest in the promotion of collegial, collaborative, and productive research.

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