A NUISANCE MODEL FOR PATENT LAW

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Abstract

The question of whether damages or an injunction should remedy patent infringement is a highly controversial issue that has been discussed at length in the academic literature. Traditionally, injunctions have been the presumptive remedy for infringement, but this presumption increases holdouts and inefficiency. However, scholars fear that granting damages instead of an injunction will reduce incentives for innovation. In eBay v. MercExchange, *the Supreme Court attempted to solve the problem by giving lower courts permission to grant damages instead of an injunction based on equitable principles. However, five years after* eBay, *lower courts overwhelmingly*

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continue to grant injunctions, in part because they lack a framework under which to decide when damages would be appropriate.

I propose using nuisance law from real property to create a framework where judges balance the harm to the patentee and the utility of the infringer's invention to decide whether to award damages or an injunction. A nuisance model for patent law would fit with the Supreme Court's mandate but would also provide more concrete guidance for lower courts. The article sets out a theoretical model for nuisance in patent law and then describes how the model might be applied in practice by discussing how harm and utility should be defined. Additionally, I show that a nuisance system in patent law is feasible by demonstrating how the life sciences industry has, in some circumstances, used a nuisance-type calculus to inform their decisions about whether to license or seek an injunction on a patent.

INTRODUCTION

At the core of the patent system is the right to exclude, a right enforced by the longstanding rule that injunctions should be the presumptive remedy for infringement. However, this presumption has slowly begun to crumble. Scholars campaign for a more flexible system,[1] Congress passes legislation to allow compulsory-licensing under some circumstances,[2] the media works the public into an uproar about hugely disproportionate settlements brought about by fear of injunctions,[3] and everyone whispers about the rise of patent trolls—companies who profit by manipulating the patent system.[4] In 2006, the Supreme Court tried to resolve the problem with its decision in *eBay, Inc. v. MercExchange, L.L.C.*, where it overturned the traditional presumption that a plaintiff who could prove infringement would get an injunction, and

1. *E.g.*, John M. Golden, *Principles for Patent Remedies*, 88 TEX. L. REV. 505, 517 (2010) (noting that injunctive powers can lead to deadweight social loss); Mark A. Lemley, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2036 (2007) (advocating damages instead of an injunction in certain, limited cases); Christopher M. Newman, *Patent Infringement as Nuisance*, 59 CATH. U. L. REV. 61, 69 (arguing that the accession doctrine could guide when damages, instead of an injunction, would be appropriate). *But see* Vincenzo Denicolo et al., *Revisiting Injunctive Relief: Interpreting* eBay *in High-Tech Industries with Non-Practicing Patent Holders*, 4 J. COMPETITION L. & ECON. 571, 597 (2008) (warning that courts should take a cautious approach towards damages and predominantly give injunctions); Henry E. Smith, *Institutions and Indirectness in Intellectual Property*, 157 U. PENN. L. REV. 2083, 2127 (arguing that information-cost theory suggests that courts should avoid moving too far towards compulsory licenses).

2. *E.g.*, 35 U.S.C. § 202 (2009) (the Bayh-Dole Act's provision for mandatory licensing of medical technologies); 42 U.S.C. § 2183 (2006) (the Atomic Energy Act's provision for mandatory licensing of nuclear technologies); 42 U.S.C. § 7608 (2006) (the Clean Air Act's provision for mandatory licensing of pollution-reducing technologies).

3. *E.g.*, Teresa Riordan, *Contest Over BlackBerry Patent*, N.Y. TIMES, June 7, 2004, http://www.nytimes.com/2004/06/07/technology/07patent.html (arguing that a patent infringement suit involving a RIM patent might halt the public's access to blackberry devices).

4. *E.g.*, Caroline Coker Coursey, *Battling the Patent Troll: Tips for Defending Patent Infringement Claims by Non-Manufacturing Patentees*, 33 AM. J. TRIAL ADVOC. 237, 237 (2009) (discussing the definition of patent trolls and how they could function as impediments to profit for companies that rely on innovation); Gerard N. Magliocca, *Blackberries and Barnyards: Patent Trolls and the Perils of Innovation*, 82 NOTRE DAME L. REV. 1809, 1810 (2007) (defining patent trolls and their impact on high-tech companies); J. Jason Williams et al., *Strategies for Combating Patent Trolls*, 17 J. INTELL. PROP. L. 367, 368 (2010) (discussing strategies for combating the risks and costs associated with litigation involving patent trolls).

encouraged courts to consider granting damages.[5]

The dramatic rhetoric pushed by the popular media might be overblown. But beneath the sensational discourse is a real sense that the patent system has changed, and traditional remedies are no longer up to the job. Robert Merges coined the expression that "for Jefferson, if you put technology in a bag and shook it, it would make some noise."[6] In an era where patents on biotech, chemical and electronic devices are common, we have come a long way from Jefferson's era of tangible patents.

The current efforts to reform the patent system are a step in the right direction, but empirical studies have shown that lower courts have not taken advantage of *eBay* and overwhelmingly continue to grant injunctions,[7] in part because they lack a framework under which to decide when damages would be appropriate.[8] So the debate about patent remedies continues. Proponents of damages point out that injunctions encourage holdouts, which leads to economic inefficiency.[9] Proponents of injunctions reply that a purely damage-based system would disincentivize innovation.[10]

Both sides are correct. What is needed is a middle ground: a system that can tailor its remedy so that injunctions remain common, but damages are awarded in situations characterized by holdouts and high transaction costs. Such a system should provide concrete guidance for lower courts so that they can carry out *eBay*'s mandate.

In this article, I argue that the patent system should be reformed by creating a nuisance-type model for intellectual property. This nuisance model would build off the real property system of private nuisance, which encourages courts to conduct a test that balances harm and utility, both to the parties and to society, to determine whether damages or an injunction would be the better remedy. In cases where an infringing invention has low utility but would harm the plaintiff, a court should almost certainly award an injunction because when society does not benefit significantly from the infringing product, there is no reason to go against the wishes of the patentee. However, in cases where an infringing invention has high utility, a court should consider the possibility of damages because society would benefit from access to the invention, although the patentee should still be compensated. I also suggest a test analogous to the real property distinction between trespass and nuisance as a threshold determination of whether nuisance balancing is worthwhile in any given case.

Part I draws on real property nuisance scholarship to discuss background doctrines relating to property and liability rules, including how transaction

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5. eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 388 (2006).

6. Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577, 585 (1999).

7. *See infra* note 76 (explaining that courts are very cautious in deciding to grant damages, but instead prefer to grant injunctions).

8. Maureen A. O'Rourke, *Toward a Doctrine of Fair Use in Patent Law*, 100 COLUM. L. REV. 1177, 1205 (2000).

9. *See infra* notes 31–35 and accompanying text (explaining the problem of holdouts). *See also* Golden, *supra* note 1, at 552 (explaining that a valuable system of patent remedies is necessary to a properly functioning patent system).

10. *See infra* notes 44–46 and accompanying text (arguing that holdouts, as opposed to a purely damage-based system, have the ability to promote innovation).

costs affect choice of remedy, the challenge of holdouts and the disadvantages of liability rules. Part II begins by describing real property nuisance doctrines, focusing on the *Restatement (Second) of Torts*' balancing test. It then applies this balancing test to intellectual property to create a nuisance model for patent law. The section explains the timeliness of a nuisance model and shows how it complements the Supreme Court's decision in *eBay*. Additionally, it discusses the requirement of substantial harm and ways to draw a line between trespass and nuisance in patent law. The section concludes by demonstrating that a nuisance model would encompass and organize the body of common-law and statutory loopholes that currently riddle patent law.

Part III seeks to fill in the details of how a nuisance model of intellectual property would work. In it, I propose a variety of possible frameworks to define "harm" and "utility," discuss the problem of determining damages, and suggest that temporary damages might sometimes be useful. I then argue that an intellectual property nuisance system should bring over the real property doctrine of "coming to the nuisance" as a way to deter patent trolls and manage information costs. Finally, I address the problem of self-help and suggest ways to build a system that would minimize self-help costs.

Although a nuisance system is a significant change from the injunction-based tradition of patent law, it is nevertheless a feasible change. The strongest support for the system's feasibility is evidence that it has been successfully utilized in real-world situations. Part IV provides a practical context for the theoretical model by describing three case studies from the life sciences industry. In each of these case studies, institutional pressures forced the patentees to look beyond patent law and form their own guidelines to distribute their intellectual property. As the case studies will show, the reasoning that the patentees use to determine how to share their intellectual property looks very similar to a nuisance-type balancing test. In situations where infringement of a patentee's product would provide little social utility and would greatly harm the patentee, life sciences patentees, of course, pursue injunctions.[11] However, in situations where other companies' use of their product would be of high social value, life sciences institutions are willing to license non-exclusively, even where an exclusive license would be more profitable. To use the language of nuisance, they accept damages in a high utility situation, even where they are harmed. The Article develops the case studies both to show that nuisance analysis can be viably applied to intellectual property as long as the proper incentives are present, and to provide guidance for how an intellectual property nuisance system might be applied to other industries.

Ultimately, I hope to accomplish two goals with this Article: First, to propose a practical solution to the problems facing the patent system. Second, to provide a model that is framed in language familiar to most lawyers which can be the foundation of a discussion about how to balance damage- and injunction-based remedies in patent law. A nuisance system is an innovative approach to solving the patent law problem, but is nonetheless feasible both

11. *See, e.g.*, John P. Walsh et al., *Science and the Law: Working Through the Patent Problem*, 299 SCI. 1021, 1021 (2003) (concluding that life sciences firms are prepared to go to court over competitor's infringement of key patents).

because it fits well with the current state of the law and because it has been successfully used in the life sciences industry.

I. PROPERTY RULES AND LIABILITY RULES

Coase theorizes that in a world with absolutely no transaction costs, initial allocation of rights is irrelevant because the interested parties will voluntarily transact until the right belongs to the party who values it most.[12] That is, if Blackacre initially belongs to *A*, but *A* values the land at only $500 whereas *B* values the land at $750, *A* will sell the land to *B* at a price somewhere between $500 and $750. Alternatively, if Blackacre initially belonged to *B*, and *A* values the land at only $500 whereas *B* values the land at $750, *B* will keep the land. Regardless of the initial allocation, the land will end up in the hands of the party who considers it more valuable.

However, in the presence of transaction costs, the act of transferring the land between *A* and *B* takes creates an additional expense which, if high enough, will hinder or prevent the transaction from occurring. If Blackacre initially belongs to *A*, and the respective value of Blackacre to both *A* and *B* remains the same as above, but it will cost *B* $300 to discover that *A* is willing to sell the property, to survey the land and to file the proper documents, then *B* will not be willing to spend more than $450 on the actual purchase of Blackacre—not enough to convince *A*, who values the land at $500, to sell. If it is socially desirable to derive the maximum amount of value from a piece of property,[13] then transaction costs impede a socially desirable transfer. Thus, although initial entitlements may not matter in a Coasian world, initial entitlements can determine ultimate distribution in a world where there are transaction costs.[14]

Because transaction costs can impede socially desirable transfers, they should influence the design of legal systems.[15] Much research has been done on the question of how transaction costs influence the choice of remedy, particularly the choice between property rules and liability rules.[16] If an entitlement is protected by a property rule, the state's role is limited to determining the initial assignment of the entitlement.[17] The assignee then becomes the owner of the entitlement and will not be forced to assign it to any

12. Robert P. Merges, *Of Property Rules, Coase, and Intellectual Property*, 94 COLUM. L. REV. 2655, 2656 (1994).

13. Newman, *supra* note 1, at 74.

14. *E.g.*, Richard A. Epstein, *Nuisance Law: Corrective Justice and Its Utilitarian Constraints*, 8 J. LEGAL STUD. 49, 77 (1979); Henry E. Smith, *Exclusion and Property Rules in the Law of Nuisance*, 90 VA. L. REV. 965, 966–967 (2004).

15. *See* Richard A. Epstein, *A Clear View of* The Cathedral*: The Dominance of Property Rules*, 106 YALE L. J. 2091, 2092 (1997) ("In a world in which transaction costs were zero . . . the choice between liability rules and property rules would be of little or no importance . . . .").

16. James E. Krier & Stewart J. Schwab, *Property Rules and Liability Rules:* The Cathedral *in Another Light*, 70 N.Y.U. L. REV. 440, 451 (1995) (arguing that it is a "virtual doctrine" that "when transaction costs are low, use property rules; when transaction costs are high, use liability rules"). Note that not all scholars concur with Krier and Schwab's "virtual doctrine." *See infra* note 24 and accompanying text.

17. Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1092 (1972).

other party, but may do so voluntarily.[18] In the language of remedies, a property rule means that the owner can enjoin anyone who infringes on his entitlement.[19] The property owner thus has total power to determine the price of the entitlement, and the price is determined ex ante, before the transaction occurs.[20] The government does not play a role in setting the price.

If an entitlement is protected by a liability rule, the government is still involved in the initial assignment of the entitlement, but a third party can take the entitlement from the initial owner without his permission as long as the third party is willing to pay an objectively determined value for the entitlement.[21] In the language of remedies, a liability rule means that the owner cannot enjoin someone who infringes on his entitlement, but that he will receive damages.[22] Damages are generally set ex post—after the third party has taken the entitlement and are determined by a court.[23] Mark Lemley points out that there is also a third option: a "zero-price" or no-liability rule by which a third party can take the entitlement and pay no damages at all.[24] Each of these rules—property rules, liability rules and no-liability rules—has an impact on transaction costs, and thus on what sort of transactions are possible.

Thus, the appropriate legal remedy is at least somewhat a function of the magnitude of transaction costs in a particular situation. When transaction costs are high, parties are unlikely to reach agreement themselves, even when the agreement is socially valuable,[25] so liability rules are preferred because they allow the court to set a price for the parties and force the transaction to go through.[26] In contrast, when transaction costs are low, the parties can sort things out for themselves and should not need the court's help to reach a deal. Therefore a property rule is most appropriate.[27] It is important to recognize

18. *Id*.

19. Jake Phillips, eBay's *Effect on Copyright Injunctions: When Property Rules Give Way to Liability Rules*, 24 BERKELEY TECH. L.J. 405, 413 (2009).

20. *Id*.

21. See *id*. ("A liability rule . . . depends not on the subjective valuation of the buyer and seller, but on an objective valuation by the state. Under this rule, one may infringe first and pay later at a price determined by a third party, usually a court." (footnotes omitted)).

22. *Id*. at 413.

23. *See id*. at 411 (explaining valuation under a liability rule).

24. Mark A. Lemley & Philip J. Weiser, *Should Property or Liability Rules Govern Information?*, 85 TEX. L. REV. 783, 786 (2007).

25. Phillips, *supra* note 19, at 413 ("[T]ransactions with significant public benefits that are not considered by the private parties at the bargaining table can also lead to market failure." (footnote omitted)).

26. Lemley & Weiser, *supra* note 24, at 786. Note that the term "rule" when used to describe damages is somewhat misleading because a liability rule is in fact more of a standard than a rule. Rules are simple, bright line logical equations that always result in outcome X when faced with situation Y. THOMAS W. MERRILL & HENRY E. SMITH, PROPERTY: PRINCIPLES AND POLICIES 405 (Robert C. Clark et al. eds., 2007). Standards are more complex devices that require a court to look the *purpose* of the law. *Id.* at 405–06. The debate between property rules and liability rules discussed in this paper closely parallels the debate between rules and standards (property rules are "rules" whereas liability rules are "standards"). For more information on rules and standards, see generally Colin S. Diver, *The Optimal Precision of Administrative Rules*, 93 YALE L.J. 65, 77–79 (1983); Isaac Ehrlich & Richard A. Posner, *An Economic Analysis of Legal Rulemaking*, 3 J. LEGAL STUD. 257, 274–75 (1974); Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557, 618 (1992).

27. Lemley & Weiser, *supra* note 24, at 786; Epstein, *supra* note 15, at 2094 (advocating for property rules as the default, and arguing that liability rules should be "limited to those circumstances in which property rules work badly; namely, cases where" transaction costs are too high). The question of when property and liability rules are appropriate has attracted a great deal of scholarship. *See, e.g.*, Carol M. Rose, *The Shadow of*

that the remedy available after litigation does not only affect parties when they litigate. The remedy available after litigation will also affect how parties negotiate before the possibility of litigation is even on the horizon.[28]

Traditionally, patent disputes have been resolved with property rules.[29] However, there is increasing concern that the default use of property rules enables patent owners to leverage their patents inappropriately, at a high cost to society, in holdout situations.[30] This section will begin by explaining how high transaction costs coupled with property rules lead to holdouts, and then describe how the problem of holdouts is lessened with a liability rule. Part II will then detail how real property nuisance law can be used in an intellectual property context to determine whether a property or liability rule is most suited for the situation at hand.

A. Holdouts

Holdouts occur when the owner of a patent behaves in such a way that he opportunistically leverages his right to exclude over another party's actions to extract a payment that far exceeds the value of his patent.[31] A common

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The Cathedral, 106 YALE L.J. 2175, 2176–77 (1996); Krier, *supra* note 16, at 440. The position I present in this article—that property rules are most appropriate when transaction costs are low, while liability rules are most appropriate when transaction costs are high—is the majority position. However, there is legitimate debate about this position, with some scholars arguing that liability rules should be used even in situations where transaction costs are low and other scholars arguing that property rules should be used even in situations where transaction costs are high. For scholarship favoring the use of liability rules, see, e.g., Ian Ayres & Eric Talley, *Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade*, 104 YALE L.J. 1027, 1036–72 (1995); Louis Kaplow & Steven Shavell, *Property Rules Versus Liability Rules: An Economic Analysis*, 109 HARV. L. REV. 713, 716 (1996). For scholarship favoring the use of property rules, see, e.g., Epstein, *supra* note 15, at 2092; Henry Smith, *Property and Property Rules*, 79 N.Y.U. L. REV. 1719, 1720 (2004).

28. Lemley, *supra* note 1, at 1992 ("[T]he primary economic effect of rules governing patent litigation arises through the effect of those rules on the licensing terms that are negotiated in the shadow of litigation.").

29. eBay Inc. v. MercExchange, L.L.C, 547 U.S. 388, 392 (2006).

30. *See, e.g.*, Lemley, *supra* note 1, at 2035–36.

31. *See, e.g.*, Newman, *supra* note 1, at 62. Note that although the term is frequently used, it is difficult to define precisely what is meant by "inappropriate" leveraging and holdout behavior. The term "holdout" (also called "holdup" in some articles) is itself vague: the most neutral definition of holdout behavior is a situation where a patent holder seeks or threatens to seek an injunction against an infringer. *See* Thomas F. Cotter, *Patent Holdup, Patent Remedies, and Antitrust Responses*, 34 J. CORP. L. 1151, 1160 (2009) (explaining that scholarship on patent holdouts uses this general definition as a starting place). However, the term "holdout" has come to be accompanied by a negative sense that the word connotes some sort of socially undesirable behavior where the patent holder is behaving inappropriately. Good definitions include Cotter, *id.* (defining a holdout as a situation where the patentee has "leverage to extract a greater share of the value derived from the manufacture, use, or sale of the end product than would be attributable to the economic value of the patent alone"), and Lemley, *supra* note 1, at 1992–93 (defining a holdout as a situation where "the threat of an injunction can enable a patent holder to negotiate royalties far in excess of the patent holder's true economic contribution"). These definitions have in common a sense that holdouts enable patent holders to unfairly take advantage of the infringer. However, any definition that incorporates the concept that holdouts are socially undesirable runs into the challenge of determining what sort of patent-leveraging behavior is socially undesirable. This is a contentious area as some scholars argue that holdout behavior is not in fact as undesirable as its detractors would have it. *See, e.g.*, Einer Elhauge, *Do Patent Holdup and Royalty Stacking Lead to Systematically Excessive Royalties?*, 4 J. COMPETITION L. & ECON. 535, 537 (2008); Damien Geradin et al., *The Complements Problem Within Standard Setting: Assessing the Evidence on Royalty Stacking*, 14 B.U. J. SCI. & TECH. L. 144, 145 (2008); John M. Golden, "*Patent Trolls" and Patent Remedies*, 85 TEX. L. REV. 2111, 2145–47 (2007); J. Gregory Sidak, *Holdup, Royalty Stacking, and the Presumption of Injunctive Relief for Patent Infringement: A Reply to Lemley and Shapiro*, 92 MINN. L. REV. 714, 718 (2008). The problem is compounded because there is little good empirical evidence on holdouts. Denicolo et al., *supra*

example of this behavior occurs when *A* holds a patent on a component of *B*'s invention. *B* may have used the infringing component for a variety of reasons, many in good faith. *B* may have believed that her component did not actually infringe, or perhaps the timing was such that *A* had applied for but not been issued a patent at the time *B* began her design. More problematically, *A* may have deliberately delayed his patent to trap *B* into infringing, or sought to broaden his patent to include *B*'s application.[32]

Still unaware that she is infringing, *B* launches the product, and it is a wild success. Once the product is on the market, *A* sues *B* for infringement. There are many other components that could substitute for *A*'s component in *B*'s device (in other words, *B* could create a workaround), but *B* has already invested in the manufacturing infrastructure, her advertising campaign has produced a public expectation that the device will look a certain way, and she has put time and energy into creating the a device that is compatible with *A*'s component. *A* has *B* over a barrel. *B* must settle for much more than *A*'s component is worth, and certainly more than *A* would have licensed it for, had *B* negotiated for a license before beginning product design. Legally speaking, there is no doubt that *B* is in the wrong.[33] *B* was infringing. *B* should have conducted additional research during product design to ensure that none of the components infringed someone's patent. However, simply because *B* is in the wrong, it does not follow that the outcome is socially beneficial.

The threat of holdouts is particularly great when industry standards come into play. An industry standard is "any set of technical specifications that either provides or is intended to provide a common design for a product or process."[34] The advantage of industry standards is that they ensure that any design works compatibly with any other design. The disadvantage of industry standards is that they narrow the range of design options. In the context of intellectual property, this means that there is an increased opportunity for holdouts, because the industry has made irreversible investments in that standard, and cannot easily change it.[35]

To illustrate, take the example of a company that charges four-and-a-half times as much in royalties for licenses on its patents when the product is being used to comply with industry standards, not because those patents cost more to develop, but because the companies seeking to license the patents have such limited options that they will pay the higher price.[36] Another example is a

note 1, at 597. The debate on how to define holdout behavior is closely analogous to the debate on how to define patent trolls. *See infra* notes 39–43 and accompanying text.

32. Henry Smith argues that this sort of deliberate delay is the most problematic troll behavior. Smith, *supra* note 1, at 2126. For a similar outline of scenarios that can lead to inadvertent infringement, see Lemley, *supra* note 1, at 1995.

33. However there are many instances where *B* may not *actually* be infringing, but may be so afraid of the risks of going to court that he would rather settle. Lemley, *supra* note 1, at 2009 ("In the real world, it is common for patent defendants to settle cases for more money than the patentee could have won in damages and license fees, simply to avoid the threat of an injunction shutting down the core product.").

34. Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CALIF. L. REV. 1889, 1896 (2002).

35. *See* Lemley, *supra* note 1, at 2016.

36. *Id.* at 2009. *But see* Denicolo et al., *supra* note 1, at 592–96 (arguing that Lemley's claim is incorrect and in fact the disparate royalty rate resulted because the more expensive product was made up of a greater number of patented components).

company that participated in a standard-setting committee that eventually adopted a standard which the company then claimed infringed on one of its patents.[37] The company was then, as it had planned, in a very strong position to leverage its patent. The default to property rules in patent law creates a situation where patent holders can prey opportunistically on companies boxed in by industry standards.

A slight variation on the holdout problem is the situation where a workaround is not an option because there is simply no effective way to create product *B* without infringing on patent *A*. Under the current patent system *A* can enjoin *B* and force *B* to either pay whatever sum of money *A* demands, or to wait until *A*'s patent expired. Is this a socially beneficial outcome? It depends. If product *B* has little social value, then surely it is worthwhile to grant patentee *A* the power to enjoin for whatever reason, because injunctive powers further inventors' incentives to innovate. However, if product *B* has enormous social value, the calculus changes. To take an extreme example (discussed in more detail in Part IV.C, *infra*), imagine a situation where the patent holder on a life saving drug can no longer produce it because of a problem with its manufacturing facilities. Other companies have the manufacturing facilities and the knowledge to produce the drug, but they cannot produce it because they cannot infringe on the patent. The patients cannot wait until the patent expires. Is it socially beneficial to let them die? A pure property rule would uphold the patent in this case. A liability rule would allow the other companies to manufacture the drug, as long as they paid the patentee a reasonable price for infringing.[38]

Another problem associated with holdouts is the rise of a particular type of party evocatively named the "patent troll."[39] The classic characterization of

37. Cotter, *supra* note 31, at 1188–89. Note that in this case the court refused to allow the company to sue for infringement when the infringer was using its product to apply the industry standard. *In re* Dell Computer Corp., 121 F.T.C. 616, 620 (1996).

38. Under the traditional patent regime, there are a variety of common law exceptions that could be used to avoid the overly harsh result produced by a pure property rule. *See infra* Part II.B.

39. The term "patent troll" was developed to replace the even more negatively charged term "patent extortionist." Marc Morgan, Note, *Stop Looking Under the Bridge for Imaginary Creatures: A Comment Examining Who Really Deserves the Title* Patent Troll, 17 FED. CIR. B.J. 165, 166 (2008). For general literature about patent trolls, see Ashley Chuang, Note, *Fixing the Failures of Software Patent Protection: Deterring Patent Trolling by Applying Industry-Specific Patentability Standards*, 16 S. CAL. INTERDISC. L.J. 215, 220–21 (2006). There is a fierce debate over what types of entities should be defined as "patent trolls." Henry Smith points out the challenge in defining patent trolls: "[T]he broadest definitions seem overly broad: they would include any non-practicing entity (NPE)—a company that does not itself manufacture products using the patented invention." Smith, *supra* note 1, at 2126. This is problematic because it includes all companies that focus only on research and development, not on manufacturing, such as universities. *Id.* Mark Lemley proposes that we solve the definitional problem by deserting our search for a term that properly defines *companies* that engage in troll-like behavior, and instead look for *activities* that are troll-like. Mark A. Lemley, *Are Universities Patent Trolls?*, 18 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 611, 630 (2008) ("What we ought to do instead is abandon the search for a group of individual companies to define as trolls. We don't need to focus on identifying bad actors. In my view, troll is as troll does. . . . Instead of singling out bad actors, we should focus on the bad *acts* . . . ."). Of course, Lemley's focus on the act rather than the entity does not get around the problem of defining troll-like activities. Anne Layne-Farrar and Klause Schmidt point out that if troll-like behavior is defined as a situation where an entity engages in holdup to extract excessively high royalties, we must still "determine whether royalties are 'excessive,' and . . . distinguish between a hold-up and aggressive, but legitimate, bargaining." Anne Layne-Farrar & Klaus M. Schmidt, *Licensing Complementary Patents: "Patent Trolls," Market Structure, and "Excessive" Royalties*, 25 BERKELEY TECH. L.J. 1121, 1122 (2010). For additional discussion on the difficulty of defining patent trolls, see Golden, *supra*

patent trolls is that they are businesses devoted to leveraging the type of holdout described above, without any intent to practice the patents they own.[40] There are some reports of patent trolls buying up unenforced or underenforced patents solely because the patents might be enforceable against deep-pocket infringers.[41] However, others have pointed out that patent trolls have been improperly smeared with a bad name and a bad reputation when they in fact serve a useful role in the patent industry. For example, some scholars suggest that patent trolls enhance innovations by serving a sort of venture capital role to capital-poor inventors by creating a market for patents and inventions.[42] Furthermore, patent trolls perform an important function by sorting through the mass of patents owned by independent inventors and determining which are the most valuable—patent trolls develop an expertise at distinguishing between useless and useful patents, and pay innovators accordingly.[43]

Moreover, not all agree that holdouts—by patent trolls or otherwise—have entirely negative consequences. The ability to leverage an invention is one incentive for innovating in the first place.[44] Moreover, we do not want to rescue parties too quickly lest we decrease their incentives to carefully research whether they are designing an infringing product, and, if so, to get a license from the patent holder.[45] Forcing companies to pay a huge price for a small component of their invention may not be socially beneficial in any one individual case, but the deterrent effect on inventors in the aggregate may justify the cost. Furthermore, increasing obstacles to enforcing patents may lead people to avoid patenting their inventions to begin with—preferring to keep them secret so that they could never be compelled to license.[46] Any system of patent law seeking to counteract the disadvantages of holdouts must try to do so in a way that maintains their benefits.

B. Disadvantages of a Flexible Approach to Remedies

Property rules have the disadvantage of allowing holdout situations, but property rules remain the dominant remedy because liability rules also have substantial drawbacks. A clear downside to using liability rules is the problem of increased information costs. Information costs include the cost to a party to determine what assets are protected by law under what circumstances, and how

note 31, at 2112 n.7; James F. McDonough III, *The Myth of the Patent Troll: An Alternative View of the Function of Patent Dealers in an Idea Economy*, 56 EMORY L.J. 189, 197–200 (2006).

40. Chuang, *supra* note 39, at 215–16.

41. *Id.* at 221–22.

42. Sannu K. Shrestha, *Trolls or Market-Makers? An Empirical Analysis of Nonpracticing Entities*, 110 COLUM. L. REV. 114, 116 (2010). *See also* McDonough, *supra* note 39, at 190 ("[T]rolls act as a market intermediary in the patent market. Patent trolls provide liquidity, market clearing, and increased efficiency to the patent markets—the same benefits securities dealers supply capital markets."); Morgan, *supra* note 39, at 172–76. However, although patent trolls have positive characteristics, positive views of their function are definitely in the minority. McDonough, *supra* note 39, at 193 ("The general attitudes towards trolls are almost uniformly negative.").

43. Shrestha, *supra* note 42, at 128.

44. Newman, *supra* note 1, at 66.

45. *Id.*

46. *See* Golden, *supra* note 1, at 552 (explaining that a valuable system of patent remedies is necessary for a properly functioning patent system).

that will affect the party.[47] If the boundaries of legal protection are clear, information costs will be low. As the boundaries of legal protection become more uncertain, information costs become correspondingly higher.

No remedy will completely eliminate information costs because the space protected by a patent will always be somewhat ill-defined at its borders.[48] However, the remedy of choice can create information costs. A property rule has low information costs because a potential infringer knows that the penalty for infringement will be an injunction.[49] A party need only determine *whether* she will infringe, not what the penalty will be.[50] However, a liability rule has higher information costs because courts and parties must determine what the damages are likely to be. A nuisance system, which incorporates both property and liability rules, has even higher information costs because it evaluates entitlements on a case-by-case basis; therefore a party must determine whether she will infringe, whether property or liability rules will be used, and, if the latter, what the damages will be.[51] An ideal legal system should be designed with an awareness of information costs and an eye towards minimizing them.

A further concern with liability rules is their tendency toward undercompensation.[52] This is not a problem with property rules because the holder of the entitlement can charge whatever she wishes for the privilege of using it. This is not the case, however, for liability rules. With liability rules, a third party—typically either the government or the courts—determines the cost of infringement. This leads to undercompensation for several reasons. Not only does the government have a hard time properly evaluating the monetary value of the entitlement because the government generally has less information than the parties, but government valuation can never take into account the plaintiff's subjective loss.[53] Subjective loss includes the emotional value the plaintiff puts on the entitlement (the market value of a wedding ring is almost

47. *See, e.g.*, Clarisa Long, *Information Costs in Patent and Copyright*, 90 VA. L. REV. 465, 470 (2004). Note that the argument for information costs has its roots in real property analysis, and rests on an assumption that information costs are low when the boundaries of legal protection are clear. However, some dispute the premise that the notion of clear boundaries can even apply to intellectual property, where the boundaries of a claim are almost never as clear as in real property. *See* Michael A. Carrier, *Why Modularity Does Not (and Should Not) Explain Intellectual Property*, 117 YALE L.J. POCKET PART 95 (2007), *available at* http://yalelawjournal.org/the-yale-law-journal-pocket-part/intellectual-property/why-modularity-does-not-and-should-not-explain-intellectual-property/ (explaining that differences in IP statutes are responsible for the differences in their respective information costs); Michael W. Carroll, *One Size Does Not Fit All: A Framework for Tailoring Intellectual Property Rights*, 70 OHIO ST. L.J. 1361, 1397 (2009) (explaining that when dealing with intellectual property, information costs are dependent on the type of transaction in question).

48. Lemley & Weiser, *supra* note 24, at 793–94.

49. Smith, *supra* note 14, at 978 (explaining that a property right affirmatively informs the potential infringer to "keep out").

50. *See id.* at 984 (discussing the advantages of potential infringers only knowing whether they will infringe). Note that determining whether a product infringes is still no small task. *See* Stewart Sterk, *Property Rules, Liability Rules, and Uncertainty about Property Rights*, 106 MICH. L. REV. 1285, 1297–98, 1331–34 (2008) (discussing the costs of determining infringement in intellectual property).

51. Smith, *supra* note 14, at 986 (discussing the possible problems faced by courts in a system that follows a property or liability system).

52. *E.g.*, Epstein, *supra* note 15, at 2093 ("The risk of undercompensation in such situations is pervasive given the inability to determine with accuracy the losses, both economic and subjective . . . ."); Lemley & Weiser, *supra* note 24, at 788.

53. Robert C. Ellickson, *Alternatives to Zoning: Covenants, Nuisance Rules, and Fines as Land Use Controls*, 40 U. CHI. L. REV. 681, 739 (1973).

always far less than the amount one would have to pay to induce its owner to sell) and plans the plaintiff may have had for the entitlement (the plaintiff may wish to use the patent in future inventions, and forcible licensing might interfere with that agenda).[54] Moreover, even if courts could award precisely the correct value in damages, a nuisance system creates some uncertainty as to what remedy will be awarded, which may lead a patent holder to settle for an amount less than they believe their patent to be worth.[55]

Yet another cost of liability rules is the expense associated with self-help. This cost arises when individual property owners, unsure whether they can obtain the necessary protection from the legal system, take protection into their own hands. In a real property context, self-help might mean putting a fence around a property to keep out intruders. In an intellectual property context, self-help might mean that an inventor chooses not to patent an invention and instead opts to keep the means of creating the invention a secret because patenting means she must disclose information about her invention and risk someone trying to duplicate her product.

Self-help costs are minimized in a system where property owners can be sure that they will get the maximum level of protection for their invention, and they increase as the level of protection for property (or the certainty of that protection) decreases. No system is perfect: even under a property rule, property owners will still take self-help measures to prevent illegal takings, but self-help costs will increase under a liability rule because property owners will seek to prevent legal, but unwanted, takings that might only be compensated by damages.[56] The problem of self-help in intellectual property is a serious one, because one of the goals of the patent system is to encourage disclosure so that future innovations can be built on existing ones. A system that increases self-help measures and secrecy might impede technological innovation.[57] Moreover, inventors might choose to use their inventions in suboptimal ways because they seek to keep the invention secret.[58] Self-help is a problem even under current patent laws[59] and a nuisance system should seek to reduce self-help as much as possible.

An additional concern with liability rules is that they provide an additional incentive to forum shop.[60] Forum shopping occurs when parties

54. The latter is less of a problem in intellectual property than real property because intellectual property is nonrivalrous.

55. Golden, *supra* note 31, at 2125 (noting that there can be "a substantial risk that uncertainty as to court-awarded damages, information asymmetries, resource constraints, and the expected cost of patent litigation will cause a patent holder to settle a patent dispute for an amount substantially less than the value of the direct contribution that a patented invention makes to the worth of an accused device or process").

56. Newman, *supra* note 1, at 80–81.

57. Golden, *supra* note 1, at 522.

58. *Id.* ("In an effort to maintain secrecy, an inventor or innovator might restrict an invention to in-house use; license its use only in a highly restrictive manner; or, in an effort to prevent reverse engineering, use the invention only in nonstandardized embodiments that are hard to maintain, repair, or integrate with other technologies.").

59. Golden points out that many innovators are reluctant to patent inventions because they do not want to disclose information. *Id.* However, he also points out that many feel that because scientists and engineers do not read patents, patents do not contribute to flow of information. *Id.*

60. This fear has traditionally followed the introduction of systems of equity. *See* Kristin A. Collins, *"A Considerable Surgical Operation": Article III, Equity, and Judge-Made Law in the Federal Courts*, 60 DUKE

attempt to place the litigation in the court most favorable to their case. Because patent infringement actions can often be brought in almost any federal court, forum shopping is already rampant in patent cases, with plaintiffs searching for courts with reputations for speedy resolutions ("rocket-dockets") or plaintiff friendliness.[61] Although the Federal Circuit's ruling in *In re TS Tech* has provided a path for defendants who wish to transfer their cases to a different forum,[62] it remains to be seen how much influence that recent decision will have. Because liability rules will increase the variability between courts, they may incentivize forum shopping.

II. NUISANCE

In real property, the term "nuisance" is used to describe several not-quite commensurate doctrines, which unfortunately has resulted in a theoretical framework which is unclear and disorderly.[63] The challenge for nuisance theory is that while academics speak in terms of a tort-like balancing test, courts in practice do not conduct a formal cost-benefit analysis, but instead look primarily at whose rights have been invaded.[64] When this article speaks of nuisance law, it will be referring to the former definition: a law that balances various factors to determine the appropriate outcome.[65] A test for balancing is codified in the *Restatement (Second) of Torts*:

> One is subject to liability for a private nuisance if . . . the invasion is . . . unreasonable.[66]
>
> An intentional invasion of another's interest in the use and enjoyment of land is unreasonable if (a) the gravity of the harm outweighs the utility of the actor's conduct . . . .[67]

The Restatement then lists several factors that judges should consider when measuring harm and utility.[68]

L.J. 249, 326 (2010) (discussing fears of forum-shopping that followed the introduction of federal equity law in Louisiana in the mid-eighteenth century).

61. Elizabeth P. Offen-Brown, *Forum Shopping and Venue Transfer in Patent Cases: Marshall's Response to* TS Tech *and* Genentech, 25 BERKELEY TECH. L.J. 61, 62 (2010).

62. *In re* TS Tech USA Corp., 551 F.3d 1315, 1318 (Fed. Cir. 2008).

63. Smith, *supra* note 14, at 970.

64. *Id.* at 969–70.

65. It is, of course, problematic for a proposed intellectual property nuisance system to use a balancing test when judges deciding real property cases do not actually use that test. However, because this article is intended primarily to spark discussion and interest about the idea of an intellectual property nuisance system rather than to suggest it be implemented immediately, this particular challenge to implementation will not be discussed at length in this article.

66. RESTATEMENT (SECOND) OF TORTS § 822 (1977). In this article, I deal only with the concept of private nuisance. However, real property law distinguishes between private nuisance and public nuisance. Public nuisance has a broader scope than private nuisance and deals with invasions of a right common to many people. *Id.* § 821B cmt. a. The Restatement defines public nuisance as an "unreasonable interference with a right common to the general public." *Id.* § 821B. Traditionally, public nuisance has involved a general right to public health and protection. *Id.* § 821B cmt. b. Therefore, it is conceivable that an intellectual property system of nuisance might make some use of the concept of public nuisance when the case concerns technologies vital to public health (in fact, many statutory compulsory-licensing schemes already in place involve such technologies. *See infra* notes 100–07 and accompanying text. However, for the sake of simplicity this article will not address public nuisance.

67. RESTATEMENT (SECOND) OF TORTS § 826 (1977).

68. *Id.* § 827–28.

Academics fall into two camps on the overall goal of balancing harm and utility.[69] The Posner camp seeks to balance harm and utility to determine which activity would best maximize value.[70] The Calabresi camp seeks to use the balancing test to determine which party is the cheapest-cost-avoider, or which party can most easily take precautions to avoid expected liability, and place the burden of liability on that party.[71] This Article speaks primarily in terms of Posnerian value maximization but recognizes that there is a role for Calabresi's approach as well, particularly given the high information costs in patent law.

A party creating a nuisance is only liable if his conduct is "intentional and unreasonable."[72] In the event that the conduct is not unreasonable, there is no liability, even if the party has technically infringed in some way. This no-liability space in nuisance law matches Mark Lemley's concept of "zero-price" rules in patent law where a party can infringe and pay no damages at all.[73]

A. A Nuisance Model for Intellectual Property

Real property nuisance developed in response to the problem that, absent nuisance law, prospective plaintiffs had no remedy for damage caused by a nearby property.[74] A nuisance model for intellectual property would deal with the opposite problem—that because plaintiffs are presumptively awarded injunctions, there is too strong a remedy available for a patent owner hurt by infringement. The time is ripe for a system that deals with that problem.

Since the Supreme Court's 2006 decision in *eBay Inc. v. MercExchange*,[75] there is no longer a presumption that the remedy for infringement will be an injunction.[76] Instead, Justice Thomas instructs courts to consider whether (1) the plaintiff has suffered irreparable injury; (2)

69. Smith, *supra* note 14, at 967.
70. *Id*. at 967–68.
71. *Id*. at 968.
72. Or "unintentional and otherwise actionable." RESTATEMENT (SECOND) OF TORTS § 822.
73. Lemley & Weiser, *supra* note 24, at 786.
74. Ellickson, *supra* note 53, at 720–21.
75. eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 390 (2006).
76. Evidence of the traditional presumption that an injunction is the proper remedy for patent infringement can be found in the Federal Circuit's opinion in *MercExchange, L.L.C. v. eBay Inc.*, 401 F.3d 1323, 1338 (2005) ("[T]he general rule is that a permanent injunction will issue once infringement and validity have been adjudged."). *See also eBay*, 547 U.S. at 395 (Roberts, J., concurring) ("From at least the early 19th century, courts have granted injunctive relief upon a finding of infringement in the vast majority of patent cases."). However, lower courts have been cautious in their transition from the traditional rule. Injunctions are still the remedy for the vast majority of patent cases. *See, e.g.*, MERRILL & SMITH, *supra* note 26, at 56; Rachel M. Janutis, *The Supreme Court's Unremarkable Decision in* eBay Inc. v. MercExchange, L.L.C., 14 LEWIS & CLARK L. REV. 597, 605–07 (2010). A 2008 study found that there were thirty-three district court decisions that used the *eBay* framework to determine what remedy was appropriate. Of these, twenty-four granted injunctions and ten denied them. Benjamin Petersen, *Injunctive Relief in the Post-*eBay *World*, 23 BERKELEY TECH. L.J. 193, 196 (2008). A second 2008 study found thirty-six district court cases that used the *eBay* framework. Of these, twenty-eight granted injunctions and eight denied them. Douglas Ellis et al., *The Economic Implications (and Uncertainties) of Obtaining Permanent Injunctive Relief after* eBay v. MercExchange, 17 FED. CIR. B.J. 437, 441–42 nn.35–36 (2008). Moreover, these statistics probably overstate the impact of *eBay* because disputes where the remedy was clearly an injunction would settle before going to court, whereas the disputes which might possibly be remedied by damages would settle less frequently because the state of the law is sufficiently uncertain that parties could not easily predict the outcome of litigation (though of course, this might also promote settlements).

damages are inadequate compensation for that injury; (3) an injunction is warranted, considering the balance of hardships between the parties; and (4) an injunction would not go against the public interest.[77] However, both Justice Roberts' and Justice Kennedy's concurring opinions (joined by the remaining Justices) caution against completely overturning the use of injunctions in patent cases. Roberts warns that "there is a difference between exercising equitable discretion pursuant to the established four-factor test and writing on an entirely clean slate."[78] Kennedy cautions that the effect of applying the four-part test should still lead predominantly to injunctions.[79] However, Kennedy also notes that patent litigation today often looks quite different from patent litigation historically—in particular, he raises the specter of patent trolls—and therefore a less injunction-heavy approach to remedies might be appropriate.[80] A nuisance approach to patent law fits perfectly within this framework because it reflects the balancing mandated by Justice Thomas' third and fourth factors. Moreover, because an injunction would still be the remedy in many cases, a nuisance system also takes into account Justices Roberts's and Kennedy's pleas for a cautious approach to remedy reformation.[81]

In the nuisance model I propose for intellectual property, a court would weigh the gravity of the harm to the patentee, the utility of the infringer's conduct and the public interest, and award either an injunction or damages. In a "low harm, low utility" situation, an injunction is appropriate. Society would not benefit overly from access to the infringing product; therefore there is no reason to go against the wishes of the patentee (who evidently does not want his product used—at least not at the prices the infringer is willing to pay). In a "high harm, low utility" situation, an injunction is also appropriate. This sort of scenario might occur when an infringer seeks to build a product that would directly compete with the patentee's product. The social utility of another almost identical product would be low,[82] and the damage to the patentee of a

77. *eBay*, 547 U.S. at 392.

78. *Id.* at 395 (Roberts, J., concurring).

79. *Id.* at 396 (Kennedy, J., concurring) ("To the extent earlier cases establish a pattern of granting an injunction against patent infringers almost as a matter of course, this pattern simply illustrates the result of the four-factor test in the contexts then prevalent.").

80. *Id.* Justice Kennedy's take on the evolution of patents has an interesting parallel in nuisance law. Ellickson argues that at one time there was an automatic injunction rule in nuisance law. Ellickson, *supra* note 53, at 720. He attributes much of the doctrinal confusion associated with nuisance law to courts' efforts to maneuver around this rule in cases where there was probably a nuisance, but injunctions were clearly not the best solution for society; for example, in *Bove v. Donner-Hanna Coke Corp.*, 258 N.Y.S. 229 (N.Y. App. Div. 1932), a court refused to grant an injunction against a heavily polluting factory because it was reluctant to interfere with a major source of jobs during the depression. Ellickson, *supra* note 53, at n.148. Because courts had to choose between an injunction or a finding of no nuisance, they often erred towards the latter, even when there clearly *was* a nuisance, in order to avoid shutting down socially beneficial businesses. Ellickson believes that this problem was resolved by *Boomer*'s holding that injunctions were not automatically required in nuisance cases. *See* Boomer v. Atlantic Cement Co., 257 N.E.2d 870, 875 (N.Y. 1970). Perhaps *eBay* will eventually have the same effect on patent law.

81. I realize that many would disagree with my contention that a nuisance system for intellectual property is a "cautious" approach. However, judges using the system in accordance with the Supreme Court's guidance may still end up giving injunctive relief in the vast majority of circumstances. Moreover, as discussed below in Part II.B, *infra*, the nuisance system has much in common with common law doctrines and statutory exceptions already in place.

82. While it is true that society would benefit because the price of the product would be brought down if the patentee's monopoly was broken, allowing reduction in price to be considered socially useful would ensure

competing product would, evidently, be extremely high. Conversely, in a "low harm, high utility" situation, damages are appropriate. This might occur when an infringer wants to use a patented product as part of an invention in a completely different industry that the patentee has no intention of entering. Because there would be little harm to the patentee's business, but a great benefit to society, allowing damages instead of an injunction would do little to disincentivize primary innovation, and would simultaneously promote secondary innovation. Similarly, damages would be appropriate in a "high harm, high utility" situation. This situation would occur, for example, when an infringer develops an invention that saves lives, but significantly harms the patentee's market share. Society benefits from the invention, but the patentee should be compensated. Because this is a high harm situation, it might be appropriate to give treble damages under the assumption that the infringing product is sufficiently useful that it will either (1) have a big enough market to pay the damages and remain profitable, or (2) be sufficiently valuable to society that the government will step in and pay damages.[83]

When the harm is extremely low, my nuisance model includes a "no-liability" zone paralleling the real property "substantial harm" requirement. An infringing invention might fall into this category when a researcher wants to use a patented product for foundational research but not to develop a commercially viable product.[84] A no-liability zone would reduce administrative costs and increase efficiency.[85] However, the no-liability zone is limited by the text of the Patent Act, which requires that a court, when considering damages, award "in no event less than a reasonable royalty for the use made of the invention by the infringer . . . ."[86] This provision would limit the types of infringement that could fall into the no-liability zone to activities that would generally produce no royalty to give back to the original patent holder—for example, research. Although it is possible that the statute does not mandate reasonable royalties in all situations—for example, the common law reverse doctrine of equivalents allows infringers to continue using their infringing invention without paying damages to the patentee[87]—liability for any infringing use that could produce royalties seems like a sensible boundary to a "no-liability" zone.

While the possibility of a liability rule is likely to concern inventors, who would be understandably worried about the prospect that others might take their work without their permission, a liability rule would actually not be a

damages would be granted in most cases, completely negating the incentive to innovate that the patent system was put in place to protect.

83. For example, in the case of a drug that cures a rare disease. It is unquestionably socially valuable but has only a very small market. The patent statute gives courts the power to grant treble damages, but does not impose any restrictions on when treble damages are appropriate. 35 U.S.C. § 284 (2006).

84. This is similar to the common-law research exception. *See infra* notes 89–94 and accompanying text.

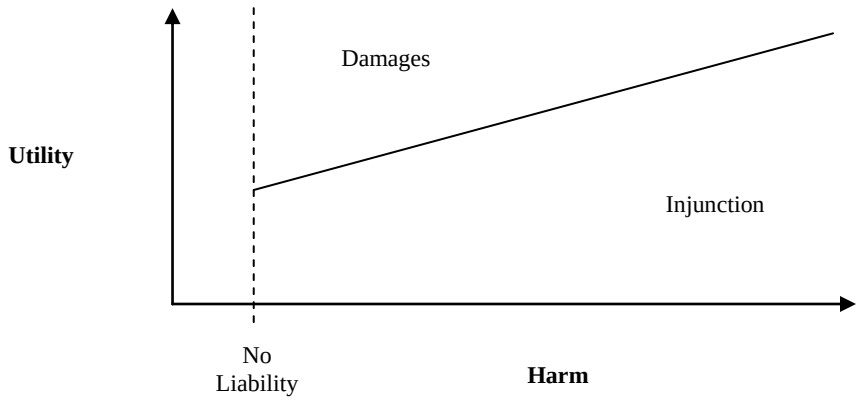
85. Ellickson, *supra* note 53, at 737 (arguing that a substantial harm requirement in the real property nuisance system eliminates inefficient cases because plaintiffs will litigate any case where the cost of litigating is lower than the expected benefit from winning; however, the plaintiff will not factor in the cost to the defendant or to the justice system).

86. 35 U.S.C. § 284.

87. *See infra* Part II.B.

disadvantage to inventors, in the aggregate. As Epstein argues, in the context of real property, when a rule applies evenly across a uniform group, each individual suffers because he loses something, but each individual gains because he is now able to take advantage of his fellow group member's property in a way that he was not before.[88] This is particularly true in intellectual property because inventions build on each other. Therefore, although an inventor may lose a small amount of control over his invention, he gains because he is more freely able to use the inventions of others. As long as a party both innovates and sells, his average outcome should be neither gain nor loss. Patent trolls, however, would lose under such a rule. Because they do not innovate, they do not gain from a liability rule; however, they do stand to lose some potential profit. Given the current concern about patent trolls, this inequitable effect is a positive consequence of a nuisance system.

Figure 1: A Nuisance Model for Patent Law



B. Common Law Doctrines and Statutory Exceptions

One of the great advantages of a nuisance system is that its flexibility can pull a system with several loopholes and safety valves into one coherent doctrine. In this section I will go through some common law and statutory exceptions to patent law and discuss how they fit into a nuisance framework.

The *Experimental Use Exception* is a common law doctrine developed from Justice Story's pronouncement that "it could never have been the intention of the legislature to punish a man, who constructed such a machine merely for philosophical experiments, or for the purpose of ascertaining the sufficiency of the machine to produce its described effects."[89] The precise

88. Epstein, *supra* note 14, at 78.

89. Rebecca S. Eisenberg, *Proprietary Rights and the Norms of Science in Biotechnology Research*, 97 YALE L.J. 177, 220 (1987) (emphasis omitted) (quoting Whittemore v. Cutter, 29 F. Cas. 1120, 1121 (C.C.D. Mass. 1813)).

reach of this little used exemption[90] is unclear;[91] however, it allows researchers to use a patented invention as long as they are not developing a commercializable product, or if their research concerns reproducing published claims about the efficacy of the patented invention.[92] Since the Federal Circuit's decision in *Madey v. Duke*, the exemption has become extremely narrow,[93] and to the extent that it still exists, it fits easily into the nuisance system because research falling into one of the exemptions would also likely fall into the no-liability zone of the nuisance framework.[94]

The *Reverse Doctrine of Equivalents* is a rarely used[95] common law doctrine that allows an infringer to continue using a patented invention without paying royalties if the infringing invention is so different from the infringed invention that it works in a "substantially different way, but nevertheless falls within the literal words of the claim."[96] A nuisance framework would essentially swallow up this doctrine.[97] Under the reasoning of a nuisance framework, a new invention consisting of "a combination of old ingredients which produce new and useful results"[98] would have high utility and would therefore be a good candidate for a liability rule. The key difference in outcome between a nuisance scheme and the reverse doctrine of equivalents is that damages would be the remedy under the former, whereas there would simply be no liability at all under the latter. The former is preferable, because it allows judges to favor the infringer while producing a less harsh remedy for the patentee. Moreover, giving judges a more nuanced option may help prevent overprotection.[99]

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90. *See id.* at 222 (clarifying that one additional reason the exemption is rarely used is because the research use must be sufficiently harmful to the patent holder that the patent holder chooses to take the researcher to court).

91. *Id.* at 220.

92. *Id.* at 224.

93. Madey v. Duke Univ., 307 F.3d 1351, 1362 (Fed. Cir. 2002). The court in *Madey* emphasizes that the experimental use exception is "very narrow and strictly limited." *Id.* It rejects the District Court's definition that the exception covered uses that "were solely for research, academic, or experimental purposes," *id.* at 1361 (quoting Madey v. Duke Univ., 266 F. Supp.2d 420, 425 (M.D.N.C. 2001)), and instead holds that the defense is limited to "actions performed 'for amusement, to satisfy idle curiosity, or for strictly philosophical inquiry.'" *Id.* at 1362 (quoting Embrex, Inc. v. Serv.Eng'g Corp., 216 F.3d 1343, 1349 (Fed. Cir. 2000)). For more information on *Madey*'s effect on the experimental use exception, see Michelle Cai, Madey v. Duke University: *Shattering the Myth of Universities' Experimental Use Defense*, 19 BERKELEY TECH. L.J. 175, 183–88 (2004); Robert A. Migliorini, *The Narrowed Experimental Use Exception to Patent Infringement and its Application to Patented Computer Software*, 10 COMP. L. REV. & TECH. J. 135, 143–46 (2006).

94. It will surely be argued that use of a patented invention to attempt to replicate a published claim about its efficacy might be quite harmful to the patent owner if the claims are false. However, courts should not give credence to this argument because if a party is falsifying claims about their invention, they should not be able to hide behind the protection of the patent system.

95. A Westlaw search for federal cases containing the terms "reverse doctrine of equivalents" and "patent" turns up only 160 results, most of them finding against use of the doctrine.

96. Graver Tank & Mfg. Co. v. Linde Air Prod. Co., 339 U.S. 605, 608–09 (1950).

97. The rationale for the nuisance framework—dealing with holdout situations—is much the same as the rationale for the doctrine of reverse equivalents. *E.g.*, Robert Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 TENN. L. REV. 75, 75 (1994) ("The reverse doctrine can be understood . . . as a judicial response to the likelihood of a breakdown in bargaining between inventors who pioneer a new technology and those who later develop key improvements. . . . [T]he reverse doctrine serves as a judicial 'safety valve,' releasing pressure that builds up when pioneers and improvers fail to agree to a license.").

98. *Graver Tank*, 339 U.S. at 608.

99. When a court must choose between an injunction or no liability at all, it may lean towards

A variety of *statutory exemptions* create compulsory licensing schemes in an effort to prevent holdouts from blocking socially valuable technology.[100] One example is the Bayh-Dole Act's provision for march-in rights, which allows a federal agency to force a patent holder to license his or her invention to third parties.[101] The Clean Air Act also has a provision for mandatory licensing.[102] When an invention is necessary to control air pollution, the Attorney General can order licensing provided that there are "no reasonable alternative methods to accomplish such purpose," and the patentee is not making the invention "reasonably available."[103] The Atomic Energy Act allows compulsory licensing of certain nuclear devices.[104] Some scholars have sought to expand the model of statutorily created compulsory licensing to other mandatory licensing regimes.[105]

As this article argues throughout, compulsory licensing is an important "safety-valve" to get around patent rights when they present an insurmountable obstacle to a goal that is clearly vital for social good. However, piece-meal legislation is not the way to do it. Legislation will inevitably lag behind the development of technology, and a system of scattered legislation will surely increase information costs.[106] Moreover, Congress has been consistently reluctant to legislate compulsory licensing schemes,[107] and while the increased openness towards liability remedies in intellectual property might signal a shifting political climate, it seems unlikely that Congress will begin enthusiastically mandating licensing schemes. A better solution is a nuisance system. A nuisance system would group together all of the compulsory licensing legislation into one coherent scheme, as it would for common-law exceptions, which would lower information costs and increase predictability and uniformity.

III. APPLICATION OF A NUISANCE MODEL

The prior section described the general contours and theoretical framework of an intellectual property nuisance system. This section attempts to fill in some of the blanks by presenting some concrete problems that would be faced by such a nuisance system, and proposing solutions and strategies to make the system's implementation more practical.

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overprotection to ensure the property right is fully protected. Lemley & Weiser, *supra* note 24, at 794.

100. *E.g.*, 35 U.S.C. § 202 (2009).

101. *Id.*

102. 42 U.S.C. § 7608 (2006).

103. *Id.*

104. 42 U.S.C. § 2183 (2006).

105. *See, e.g.*, Miri Yoon, *Gene Patenting Debate: The Meaning of* Myriad, 9 J. MARSHALL REV. INTELL. PROP. L. 953, 970–71 (2010) (proposing legislation for compulsory licensing of human gene patents based on Bayh-Dole march-in rights).

106. *See supra* text accompanying notes 47–51. Of course, information costs will not be increased if the legislation is never actually used—like the Bayh-Dole's march-in rights (*see infra* note 275)—but presumably the legislation was passed with the intent that it in fact be used at some point. I recognize that nuisance schemes are also have high information costs.

107. JAY DRATLER, JR., LICENSING OF INTELLECTUAL PROPERTY § 3.03 (12th ed. 2005).

A. Defining Harm and Utility

An essential, but challenging, consideration for the design of a nuisance system is how to define "harm" and "utility." This article does not seek to provide definitive answers, only to put forth a number of suggestions to spark discussion. One option is to have no definition at all, and leave the terms open for the courts to narrow over time. The downside to this approach is that it will increase uncertainty, particularly early on. Moreover, some scholars have suggested that lack of a defined framework for determining when damages are appropriate is one reason that courts are reluctant to deviate from their practice of presumptive injunctions.[108] A second option is to use the factors outlined in *eBay* which, while they do not precisely address the question of how to measure harm and utility, do provide a good framework by which judges could organize their analysis.[109]

A third option is to borrow the factors from copyright's fair use doctrine, a possibility which has been explored by Maureen O'Rourke.[110] These would provide a useful basis for a nuisance balancing test because the body of law already developed in copyright could be a guide for both lawyers and judges and thereby reduce some of the uncertainty that would inevitably develop if a new system were implemented.[111] The factors cover both harm to the plaintiff and utility of the defendant's infringing work.[112]

A fourth option—one favored by the author—would be to import the factors for defining harm and utility from real property nuisance as codified by the Restatement, which are broad and equally applicable to intellectual property. While many of the Restatement factors are vague and would create some uncertainty, others are more specific and could be adapted productively to an intellectual property nuisance framework. The factors that are important

108. O'Rourke, *supra* note 8, at 1205.

109. The Court lists four factors the plaintiff must satisfy in order to qualify for a permanent injunction: (1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balancing of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction. Ebay Inc. v. Mercexchange, L.L.C., 547 U.S. 388, 391 (2006).

110. O'Rourke, *supra* note 8, at 1205 n.118. The fair use factors are "(1) the purpose and character of the use; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work." *Id.* (citing 17 U.S.C. § 107 (1994 & Supp. Ill 1997)).

111. This is not to say that copyright law would be used as strict precedent—but it could certainly serve as a guide, as long as it was used while mindful of the differences between patent and copyright. Although both patent and copyright are grouped in intellectual property law, there are significant differences between them. For example, the laws target different audiences. Anyone hearing a song or reading a book can copy it and violate copyright law, whereas generally competitors are the ones most likely to infringe on a complex invention. Henry E. Smith, *The Language of Property: Form, Context, and Audience*, 55 STAN. L. REV. 1105, 1175–76 (2003). Another difference between copyright and patent is when the boundaries of the property are drawn: patent holders must delineate the boundaries of their invention in an application before they can receive the patent, whereas copyright holders do not need to describe their work or define its limits unless the issue is litigated. Long, *supra* note 47, at 499–501. For further discussion about the differences between patent and copyright, see *id.* at 495–533; O'Rourke, *supra* note 8, at 1181–87; Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1799–1814 (2007).

112. O'Rourke alters these factors slightly to come up with a fair use scheme for patent law. Her factors are (1) the nature of the advance represented by the infringing work; (2) the purpose of the infringing use; (3) the nature and strength of the market failure that frustrates licensing; (4) the impact of the use on incentives and social welfare; (5) the nature of the patented work. O'Rourke, *supra* note 8, at 1205–09.

in determining the gravity of harm are as follows:

> (a) the extent of the harm involved;
>
> (b) the character of the harm involved;
>
> (c) the social value that the law attaches to the type of use or enjoyment invaded;
>
> (d) the suitability of the particular use or enjoyment invaded to the character of the locality; and
>
> (e) the burden on the person harmed of avoiding the harm.[113]

The Restatement also lists several factors that are important in determining the utility of the defendant's conduct. They are as follows:

> (a) the social value that the law attaches to the primary purpose of the conduct;
>
> (b) the suitability of the conduct to the character of the locality; and
>
> (c) the impracticality of preventing or avoiding the invasion.[114]

The factors that take into account the character and social value of both the plaintiff's and defendant's conduct could be used to pinpoint holdout scenarios (which lack social value) and ensure that plaintiffs in those cases get damages, not an injunction. Considering the social value of the infringing conduct also provides the court with a good opportunity to look at how much value is added by the infringing invention beyond the value of the patented invention.[115] An invention that adds little value is likely to also be of little use to society, and possibly also of great harm to the patentee because it would almost certainly be a close or direct competitor.

The factors that take into account the burden on the particular party of avoiding the harm reflect Calabresi's "cheapest-cost-avoider" model of liability.[116] The logic behind Calabresi's model could also apply to intellectual property.[117] It makes sense to consider what opportunities existed for the parties (particularly the infringer) ex ante, and to look at the ease of a workaround solution. These factors would help identify situations where a workaround would be difficult or impossible, which are situations that pose an increased risk of socially harmful holdouts and thus are good candidates for a damages remedy.[118] The factors also fit well with a "coming to the nuisance" doctrine which I describe below.[119]

The factors that deal with the suitability of the conduct to the character of

113. RESTATEMENT (SECOND) OF TORTS § 827 (1979).

114. *Id.* § 828.

115. See Newman, *supra* note 1, at 86–93, for a fuller discussion of the accession doctrine as applied to intellectual property.

116. Smith, *supra* note 14, at 968.

117. *See* Newman, *supra* note 1, at 99–101 (providing a fuller discussion of cheapest-cost-avoiders and a nuisance system for intellectual property).

118. *See* Lemley, *supra* note 1, at 2037–2038 (arguing that if redesign costs are "high relative to the value that the patented technology has added to the infringing firm's products, no permanent injunction should be issued").

119. *See infra* Part III.D.

the locality may initially seem inapplicable to intellectual property, as patents obviously have no physical locality. However, I believe that a reasonable intellectual property equivalent would be to look at the suitability of the parties' behavior in the context of the prevailing standards of their industry. Ellickson equates the concept of location dependency with the idea of "unneighborly" behavior.[120] The life sciences case studies discussed in Part IV, *infra*, clearly demonstrated that industries can have their own "neighborhood" standards for determining when sharing of intellectual property is important.[121] Moreover, some industries may have standards for utility that simply do not exist in other industries.[122] Many scholars have suggested that patent law take into account the variability between industries.[123] The Restatement factors allow judges to do so.

Additionally, some industries, particularly ones with strong regulatory bodies, already have guidelines about when mandatory licensing is appropriate. A good example is the NIH's regulation of the life sciences industry. The NIH distinguishes between research tools and products, and researchers who use NIH funding to develop the former are required to "ensure that their intellectual property strategy for [research tools] . . . enhances rather than restricts the ultimate availability of the resource."[124] Moreover, the NIH has sought to create criteria to help define what sorts of inventions fall into the 'research tools' designation.[125] Using industry guidelines as a factor in a nuisance analysis might help create some of the predictable, bright lines that are so helpful in legal models.[126]

Another option for defining utility is to eschew lists of factors and look

120. Ellickson, *supra* note 53, at 733.

121. For example, a mouse geneticist stated that "[y]ou are basically obligated to send a mouse even if it's onerous." Fiona Murray, *The Oncomouse That Roared: Resistance & Accommodation to Patenting in Academic Science* 18 (Mar. 2006), http://fmurray.scripts.mit.edu/docs/THE_ONCOMOUSE_THAT_ROARED_FINAL.pdf.

122. For example, utility can be defined in the medical science community in terms of potential lives saved or extended, but this criterion would generally be inappropriate in the oil industry.

123. Golden recognizes "the fact that, for any patent regime covering a range of technologies, the ideal and actual values of the incentives created by that regime are likely to be substantially technology dependent." Golden, *supra* note 1, at 527. Burk and Lemley agree that courts "can, and should, apply the general rules of patent law with sensitivity to the characteristics of particular industries." Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1641 (2003).

124. Principles and Guidelines for Recipients of NIH Research Grants and Contracts on Obtaining and Disseminating Biomedical Research Resources: Final Notice, 64 Fed. Reg. 72,094 (Dec. 23, 1999).

125. The NIH criteria defining research tools are "(1) The Primary usefulness of the resource is as a tool for discovery rather than an FDA-approved product or integral component of such a product; (2) the resource is a broad, enabling invention that will be useful to many scientists (or multiple companies in developing multiple products), rather than a project or product-specific resource; and (3) the resource is readily useable or distributable as a tool rather than the situation where private sector involvement is necessary or the most expedient means for developing or distributing the resource." *Id.* at 72,094.

126. However, there are also dangers in using industry guidelines as a factor in the analysis. It could result in a patchwork set of standards across industries (though of course this can lead to additional flexibility, which can be beneficial), there will inevitably be technologies at the intersection of different industries, and it will be challenging to define which standards should apply. Sharply separating industries might stifle inter-industry collaboration (for example, would-be collaborators from different industries might be working under different assumptions about how their intellectual property will be protected—although this is undoubtedly also a problem under the current patent system), courts will have to determine what size of group can constitute an industry (too many industries could become unwieldy, too few industries makes it harder to maintain flexibility), and it will be difficult to define industries.

instead at monetary value, as is sometimes done in real property nuisance tests. A monetary test would ask whether the infringing product would be profitable enough to be able to pay court determined royalties to the plaintiff.[127] This has the advantage of letting the market determine the utility of a product; however, this approach raises questions of whether courts can properly determine royalties, how to calculate the number of different patents upon which an invention infringes, and how to measure the profits that can be derived from a novel product not yet on the market.

Yet another guideline for defining harm and utility would ask courts to consider how many different patents are incorporated into the infringing product, because a product building on a large number of patents is more likely to be the target of a holdout. Additionally, a judge could consider whether the patent holder is claiming lost royalties or lost profits. If it is the former, the plaintiff is probably not a manufacturer and is therefore less likely to have suffered irreparable harm, in which cases damages might be sufficient. If the latter, the plaintiff is probably a manufacturer and is therefore more likely to have suffered irreparable harm (or at least harm that is more difficult to quantify), in which case an injunction might be most appropriate.[128] Further factors for measuring harm could include whether the markets for the patented and infringing inventions overlap, whether the patentee has a good faith future plan for the invention that would be harmed by licensing, and perhaps whether the patentee has an emotional attachment to his intellectual property that is likely to make him value it significantly more than a reasonable buyer.[129] It is also very important that the court consider harm to society, a factor which would look at whether granting damages would significantly impair future incentives to innovate. [130]

B. Damages

The question of how to calculate damages is a challenge for any liability rule.[131] Since the problem of damages is not unique to the nuisance model, this article does not seek to answer the question of how best to calculate damages, but merely notes that there are many options. Scholars have proposed measures such as damages based on the value that the patent adds to the infringing

127. Or perhaps double or treble damages, if the system wanted to ensure that the invention was *extremely* useful.

128. Lemley, *supra* note 1, at 2036 (noting that it is extremely difficult to determine the amount of damages that can compensate for lost profits).

129. For example, an individual who holds just one patent may not want to license it, even where it would be economically sensible, whereas a firm that holds thousands of patents will not feel a similar attachment.

130. Note that calculating damages this way would be one way to address the problem of patent trolls—refusing to grant patent trolls an injunction would rarely hurt the incentives of the average "reasonable innovator." Additionally, many innovators are motivated not by dreams of injunction-backed patents, but by grants or a variety of other incentives. See Carroll, *supra* note 47, at 1408–09, for a list of incentives to innovate. However, there may not be any clear way to determine what incentives motivated an innovator. *Id.* at 1409. *But see* Peter Lee, *Contracting to Preserve Open Science: Consideration-Based Regulation in Patent Law*, 58 EMORY L.J. 889, 966 (2009) (giving an incentive based analysis of when patent protection is justified).

131. *E.g.*, Cotter, *supra* note 31, at 1175–76; Denicolo et al., *supra* note 1, at 604–07; Golden, *supra* note 31, at 2150; Lemley, *supra* note 1, at 2017–25.

invention[132] or restitution damages.[133] Alternatively, real property nuisance schemes calculate damages by measuring injury to the plaintiff,[134] a model that could also be applied to intellectual property. Regardless of the system chosen, it should be designed to ensure that damages would be similar no matter when in the development process the patentee sued. This would reduce the problem of holdouts, because patentees would have less incentive to wait until the infringer had sunk substantial costs into their product and then hold them hostage.[135] Additionally, courts should take the difficulty of calculating damages into account when choosing an appropriate remedy— all else being equal, situations where damages are difficult to calculate should favor an injunctive remedy.[136]

Note that many of the factors used to evaluate whether damages or an injunction should be granted overlap with factors generally thought to be useful in calculating damages. This is helpful because courts already have experience calculating damages in patent cases, and, while the analysis will obviously not be entirely the same, a nuisance analysis using the same factors could likely use much of the same reasoning. Moreover, the overlap between a decision on whether or not to award damages and a decision on the amount of damages saves administrative time and costs because the court could use much of the information gathered for the first analysis to conduct the second. Additionally, lawyers are already familiar with the proof required and standards set for assessing damages, therefore a nuisance system might be implemented with minimal disruption if the proof requirements and standards were reasonably similar to those already in place for assessing damages.

The *Georgia-Pacific* factors are the standard test for damages in patent cases. Several of the factors are highly relevant for determining what type of remedy is appropriate under a nuisance analysis. Factor five is "[t]he commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter."[137] Factor five is obviously useful to assess harm (because a competing product will, on the whole, be more harmful than a non-competing product) and utility (because an infringing product that competes directly with the patented product is unlikely to add a great deal of utility to society since a similar product is already available). Factor eight is "[t]he established profitability of the product . . . its commercial success; and its current popularity."[138] If applied to the infringing product, factor eight is directly relevant to a utility analysis because it is one way of measuring the

132. Newman, *supra* note 1, at 115 n.227.

133. Wendy J. Gordon, *On Owning Information: Intellectual Property and the Restitutionary Impulse*, 78 VA. L. REV. 149, 277 (1992).

134. 58 AM. JUR. 2D *Nuisance* § 277 (2010).

135. In fact, they would have incentive to bring suit or try to negotiate a license earlier in the development process, because a finished invention would likely have a much higher "utility" than an invention in progress.

136. Smith, *supra* note 14, at 1006 ("[T]he difficulty of determining damages relating to use can also push in the direction of injunctions . . . .").

137. Georgia-Pacific Corp. v. U.S. Plywood Corp., 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

138. *Id.*

utility of an infringing product.[139] Factor nine is "[t]he utility and advantages . . . over the old modes or devices, if any, that had been used for working out similar results."[140] This factor, like factor eight, is directly relevant to the utility analysis if applied to the infringing product. Likewise for factor ten, which assesses "[t]he nature of the . . . invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention."[141] Factor eleven examines "[t]he extent to which the infringer has made use of the invention; and any evidence probative of the value of that use."[142] This can be directly applied to a utility analysis because it goes to the value added by the infringer. Moreover, it also applies to calculating harm because an infringer who uses the entirety of the invention might be more likely to have produced a product that directly competes with the patentee.[143]

This is not to say that a nuisance analysis should look entirely the same as a damages analysis, because that would be to say that where a patentee would receive low damages, damages are appropriate, but where a patentee would receive high damages, an injunction would be appropriate.[144] If that model was used, it would not account for situations where an infringing product was "high harm; high utility," such as fabrazyme.[145] Therefore, nuisance balancing can borrow from—but not be conflated with—the damage calculation.

C. Temporary Damages

A court using a nuisance model should not be limited to two options: damages or an injunction. Instead, courts can sometimes get the best results by combining the two strategies. In a situation where a defendant can redesign her product to avoid infringing on the plaintiff's patent, courts should grant the plaintiff an injunction, but grant the defendant some time to redesign her product before the injunction comes into effect. The defendant should of course pay damages during the redesign period.[146]

This strategy, however, has its downsides. First, it would be

139. Assuming, of course, that the product is already on the market, which will of course not always be the case. However, the problem of patent holdouts occurs most readily when an infringing product is already being produced.

140. *Georgia-Pacific Corp.*, 318 F. Supp. at 1120.

141. *Id.*

142. *Id.*

143. Note that this will not always be the case; for example, an electronic device might incorporate a thousand patented inventions in their entirety, one of which is patented by the plaintiff, but this does not mean that the infringing invention is at all in competition with the plaintiff's invention.

144. This correlation happens because many of the *Georgia-Pacific* factors would be inverted to apply to the infringer; thus, where the traditional *Georgia-Pacific* factors were not satisfied (as applied to the patentee), they would likely be satisfied in their inverted form with respect to the infringer.

145. *See supra* Part II.A.

146. Other scholars have also suggested this system. *E.g.*, Lemley, *supra* note 1, at 2038 ("If the infringing firm claims that it can design around the patent, the court should issue a stay of its permanent injunction that is long enough to permit the infringing firm to complete the redesign, if there is one, in an efficient and timely manner."). Note, however, that a major challenge to a system of temporary damages is the time-sensitive nature of patents. *See* Denicolo et al., *supra* note 1, at 602–03 (arguing that because the court system moves slowly and patents have expiration dates, such a system will encourage infringers to stretch out litigation for as long as possible).

administratively challenging for courts to determine how much time the defendant should get to redesign her product.[147] Moreover, courts would have to continually supervise the process to ensure that it was conducted equitably and that the defendant in fact completes the redesign at the requisite speed and pays royalties throughout.[148] Additionally, issuing a stay would diminish an infringer's motivation to begin the redesign before the outcome of the litigation.[149] However, Mark Lemley argues that we should not be overly concerned about this last issue because the patentee will nevertheless get damages during the redesign period.[150] Moreover, he notes that the disincentive to begin redesign earlier is beneficial in cases where the patent is weak and will probably be found invalid.[151]

In addition to Lemley's arguments, an efficient system could minimize this disincentive to begin redesign early by giving defendants such a short redesign period that it is more economically efficient for them to begin the redesign process before the completion of litigation. Moreover, defendants will nevertheless be incentivized to begin redesigns early because it will put them in a better bargaining position for settlement negotiations. Furthermore, it is in the best interests of a defendant to begin redesign before litigation is completed because she will always fear the possibility that the court will grant an immediate injunction (and perhaps courts should be encouraged to do so where a defendant has been particularly lazy in beginning the redesign process, or where she has acted in bad faith). Finally, judges should favor granting a stay to defendants who can show that their redesign can be completed in a timely and feasible manner. Making this showing will often require the defendant to begin the redesign process before the judgment. Perhaps it would be efficient for courts to set a very high bar for evidence that redesign is possible to encourage companies to get started as soon as they are made aware that they are infringing.[152]

D. Coming to the Nuisance

Real property nuisance law recognizes "coming to the nuisance" as a defense to a charge of nuisance.[153] This doctrine is codified in the Restatement: "The fact that the plaintiff has acquired or improved his land after a nuisance interfering with it has come into existence is not in itself sufficient to bar his action, but it is a factor to be considered in determining whether the nuisance is

147. *See* Cotter, *supra* note 31, at 1175–76 (expressing concern that it may be expensive for courts to supervise compulsory licensing programs).

148. *See id* (arguing that administrative costs would be quite high if ongoing judicial supervision was necessary).

149. Lemley, *supra* note 1, at 2038.

150. *Id.*

151. *Id.* Weak patents are a pervasive problem. A 1998 study calculated that 46% of litigated patents were found invalid. John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185, 205 (1998).

152. Then again, this might also lead to useless expenditures from companies who act under the fear of litigation from plaintiffs who hold weak, probably non-enforceable patents. Empirical work should be done before enacting any such provision.

153. *E.g.*, Epstein, *supra* note 14, at 72–73 (citing various cases as illustrative of the limited role of affirmative defenses in private nuisance actions).

actionable."[154] Just as it is possible to deliberately buy worthless land downwind from a pig farm with the intention of suing the pig farmer for nuisance damages, it is possible to buy an un- or under-enforced patent which has been unknowingly infringed by a commercially valuable product with the intent of holding the owner of the infringer product over a barrel with the patent. Indeed, there have been some reports that patent trolls have bought up unenforced or under-enforced patents solely because the patents might be enforceable against deep-pocket infringers.[155]

An intellectual property take on the real property "coming to the nuisance" doctrine would help solve these sorts of situations. Such a rule would allow judges to take into account willful behavior where a party bought a patent for the express purpose of suing another party in a non-competing field. The rule would not preclude parties from buying patents that they knew were being infringed, because they could still use the patent to develop an invention of their own, license the patent to others or sue the infringer for royalties. They would simply be less likely to get an injunction. Judges faced with a party who "came to the nuisance" could choose to award damages (rather than an injunction), or give the party no remedy at all, in situations where the actions were in particularly bad faith.[156] Of course, the reverse doctrine should apply as well. If a defendant built her invention knowing that it infringed on the plaintiff's patent, but chose not to negotiate for a license or use a workaround, the plaintiff should be entitled to an injunction.[157]

In a patent context, the party who "got there first" would be the one who had the information first. This approach could dovetail nicely with the cheapest-cost-avoider analysis applied to real property nuisance law.[158] Moreover, a "coming to the nuisance" scheme could be adapted to incorporate stricter disclosure requirements, or an increased burden on the party who could most cheaply gather the relevant information.[159] Generally, an infringer would have much better information about whether a patented product was used in his invention.[160] However, in patent troll scenarios where the patent was bought

154. RESTATEMENT (SECOND) OF TORTS § 840D (1979).

155. Chuang, *supra* note 39, at 220–21.

156. For a discussion of the good faith requirement in patent law, see Smith, *supra* note 1, at 2129–2131 (suggesting that bad-faith injunctions should be given more leeway in patent law than boundary-encroachment law); Mark A. Lemley & Ragesh K. Tangri, *Ending Patent Law's Willfulness Game*, 18 BERKELEY TECH. L.J. 1085, 1092–93 (2003) (stating that an accused infringer that may have acted in good faith originally becomes a willful infringer when it discovers it is infringing on a valid patent).

157. This may pose some difficulty because it might incentivize parties to stick their heads in the sand and avoid searching for information—which goes counter to one goal of the patent system, which is full disclosure so that later inventors could build on prior inventions.

158. *See, e.g.*,. Guido Calabresi & John T. Hirschoff, *Toward a Test for Strict Liability in Torts*, 81 YALE L.J. 1055, 1060 (1972) (discussing how strict liability analysis uses a cost-benefit analysis); MERRILL & SMITH, *supra* note 26, at 968 (discussing how "cheapest-cost-avoider analysis" can progress from nuisance and strict-liability law into accident law).

159. For a discussion of information gathering and efficiency in property, see RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW §3.6 (2d ed. 1972). Henry Smith suggests that courts could take into account ease of access to information. *See* Smith, *supra* note 1, at 2129 ("A patent that is very unclear or difficult to find, particularly if a result of the patentee's deliberate lack of clarity, could be a factor weighing against an injunction."). This would also have the salutary result of discouraging weak or unclear patents.

160. Golden, *supra* note 31, at 2132. However, the infringer will not always have better information. *See* Merges, *supra* note 12, at 2658 ("[A]n infringer may have no way of knowing that her own independent invention is an infringement, or that, at the time she makes her investment decisions, a patent even exists.").

for the express purposes of threatening an established product, the plaintiff would likely have easier access to information.

E. Self-Help

As described above,[161] the problem of "self-help" arises when a patent owner believes that he will not be sufficiently protected by the legal system and therefore takes additional measures to protect his property—for example, by not patenting his invention, but manufacturing it clandestinely so that competitors will not be able to access the secret of its production. This is problematic because one of the goals of the patent system is openness of information, where protection for a limited time is exchanged for a full description of how to manufacture the invention, so that later innovators will be able to build on it.

A nuisance system, by giving patentees less protection than a purely injunction based system, might lead to an increase in such self-help practices. This is a valid concern. However, a nuisance system can deal with the problem of self-help in several ways. First, because judges are empowered to take harm to society into account in their determination of the proper remedy, they can take concerns about self-help into consideration, and avoid giving damages where such a grant will lead others in similar situations to rely on self-help, rather than patents.[162] Furthermore, the doctrine of "coming to the nuisance" might also help incentivize disclosure because making information about one's innovation widely available would be one way to avoid becoming prey to patent trolls. Additionally, an even stronger safeguard against self-help is built into the structure of the nuisance system. Infringements on goods that are highly useful to society are more likely to be remedied through damages, rather than an injunction, because it is good for society to encourage downstream innovation. The owner of the patent for the highly socially useful good would presumably prefer an injunction. However, the patent holder will not resort to self-help measures because his or her good is extremely valuable; therefore in many cases it would simply not be profitable for them to use it only in-house, or license it very selectively in an attempt to maintain secrecy. Even if the patentee ends up getting royalties, perhaps at a lower rate than expected, a good that is so socially useful that it is compensable only through damages in a nuisance system would be one where even those limited damages would be worth substantially more than secrecy.[163]

This is clearly demonstrated in the case of platform technologies, such as rDNA.[164] The rDNA technology was so useful that no one company could possibly discover all of its uses. Although injunctive powers (and an exclusive license to one company) would have been the most profitable, absent that option, freely licensing the product and receiving royalties was almost

161. *Supra* Part I.B.

162. Unless, of course, the benefit of granting damages in the particular situation outweighs the harm of additional self-help measures. Such is the benefit of a flexible system.

163. Of course, the nuisance system would have to be calibrated to ensure that it comes out with this result—a system that awarded damages on relatively few occasions might be more desirable in this case.

164. *See infra* Part IV.B.

certainly more profitable than not publishing or patenting the technique and having Stanford's own researchers use it secretly.

IV. CASE STUDIES

Patent law is not the only rule that guides when innovators may wish to share—or may be obligated to share—their inventions. Individuals, groups and industries create their own norms and rules for information sharing.[165] In the field of biology, it is widely recognized that openness of information is desirable;[166] therefore biologists, and the lawyers who construct their systems to share (or exclude) information, have long created a variety of formal and informal rules governing flow of information that require more sharing of intellectual property than mandated by patent law.[167] These systems, although not enforced by courts, nevertheless closely resemble a nuisance framework in that they create informal guidelines to balance harm and utility, and encourage patent holders to make decisions about when to share information based on the outcome of the balancing test.

This section seeks to highlight the similarities between information-sharing decision making in the life sciences and an intellectual property nuisance system. It then seeks to show that the presence of a functional nuisance-style system in the life sciences bodes well for its viability in other industries. I will begin by describing basic principles that underlie how information is shared in the life sciences industry, and then move on to three specific case studies as examples of nuisance style calculus and to demonstrate how an intellectual property nuisance system might work in practice.

The National Institute of Health (NIH) plays a vital role in the life sciences industry. It provides funding to over half of federally funded research in the United States[168] and gives grants to projects across life sciences disciplines.[169] With money comes influence: the NIH is a major player in the flow of life sciences information. It has published guidelines for information

165. Often individuals, groups and industries come together to contract into some form of liability rule, as an alternative to the injunction-scheme dictated by law. In this way, these groups can create a hybrid regime that combines liability and property rules to meet their needs. *See, e.g.*, Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CALIF. L. REV. 1293, 1294 (1996); Peter Lee, *Contracting to Preserve Open Science: Consideration-Based Regulation in Patent Law*, 58 EMORY L.J. 889, 889 (2009).

166. *See, e.g.*, Eric G. Campbell et al., *Data Withholding in Academic Genetics: Evidence from a National Survey*, 287 JAMA 473, 473 (2002) (beginning a study on information withholding by noting that "[w]ithout the free exchange of published scientific information and resources, researchers may unknowingly build on something less than the total accumulation of scientific knowledge or work on problems already solved"); Rochelle Cooper Dreyfuss, *Does IP Need IP? Accommodating Intellectual Production Outside the Intellectual Property Paradigm*, 31 CARDOZO L. REV. 1437, 1438 (2010) (arguing that intellectual property raises the cost of innovation by imposing exclusive rights on knowledge); Lee, *supra* note 165, at 889 (arguing that patents can hinder key scientific discoveries and the creation of life saving drugs).

167. *See, e.g.*, Lee, *supra* note 165, at 889 (arguing that the life sciences industry uses a de-facto contractual model of intellectual property because grants of money from funding agencies are conditioned on allowing the results of the research to be published immediately and used freely); *id*. at 891 (stating that California Institute for Regenerative Medicine gives money for stem cell research only if grantees agree to make any patents resulting from the grant money readily accessible for non-commercial research).

168. Chester J. Shiu, Note, *Of Mice and Men: Why an Anticommons Has Not Emerged in the Biotechnology Realm*, 17 TEX. INTELL. PROP. L.J. 413, 427 (2009).

169. *Id.*

release in various situations, generally promoting openness when the information was obtained as a result of public funding.[170]

In addition to the NIH, information flow in the life sciences is governed by industry standards and community expectations. Researchers are expected to publish their results, and if approached by another researcher for further information or for a sample of the material results of the research, they are expected to provide. A 2002 survey found that 84% of genetics faculty members had requested information from other researchers in the past three years.[171] The ideal "'Do unto others as you want them to do unto you' works in science, too."[172] However, it is acceptable to draw a line between requests from nonprofit and for-profit entities. Well-known MIT biochemist Gerald Fink researches and produces new strains of bacteria. It is his policy to provide these strains to academic researchers at no cost, but he charges a fee to provide the bacteria to commercial researchers.[173]

The idea of open information sharing with other researchers is not, however, always followed. A 1997 survey found that 10% of life sciences faculty admitted to withholding research results or materials from other scientists.[174] However, the survey authors acknowledged that the true number of researchers withholding data is probably higher, since respondents are likely to skew their answers towards those they feel are more socially respectable.[175] A survey a few years later found that 47% of geneticists who had requested information in the past three years had been denied on one or more occasions.[176]

There are no institutional sanctions for this sort of behavior; although the NIH has the power to sanction those who disobey their guidelines, it is rarely used and applies only to those receiving NIH funds. But peer sanctions sting: "In a small community, shame is almost more powerful than any other types of sanctions."[177] There is an expectation of "collegial behavior."[178]

Since the passage of the Bayh-Dole Act encouraging academic researchers to patent their discoveries, there has been a trend away from academic openness and towards more rigid enforcement of the patentee's right to exclude.[179] However, the free flow of information remains important in the life sciences industry. The following case studies explore instances when a company or industry rejects the inflexible system of patent law and develops

170. For example, the NIH guide for Grants and Contracts includes a rule that grantees must publish their research quickly and must make any material results of their research (for example, bacterial strains), available to the research community at large. *See* Principles and Guidelines for Recipients of NIH Research Grants and Contracts on Obtaining and Disseminating Biomedical Research Resources: Final Notice, 64 Fed. Reg. 72,090, 72,092 (Dec. 23, 1999).

171. Campbell et al., *supra* note 166, at 477.

172. Jon Cohen, *Share and Share Alike Isn't Always the Rule in Science*, 268 SCI. 1715, 1718 (1995).

173. NAT'L RESEARCH COUNCIL, SHARING LABORATORY RESOURCES: GENETICALLY ALTERED MICE 1 (1994), *available at* http://www.nap.edu/catalog.php?record_id=9156#toc.

174. David Blumenthal et al., *Withholding Research Results in Academic Life Sciences*, 277 JAMA 1224, 1226 (1997).

175. *Id*. at 1228.

176. Campbell et al., *supra* note 166, at 477.

177. Cohen, *supra* note 172, at 1718.

178. Murray, *supra* note 121, at 23.

179. Lemley, *supra* note 34, at 615.

its own rules to create an alternative system of intellectual property sharing.

A. The Oncomouse

Because mice and humans are genetically similar, the mouse is a valuable model organism on which to study human diseases and test drugs. In the early 1980's, scientists became good at inserting genes into mice to create lines of mice that expressed the gene the scientists wanted to study. These mice, called transgenic mice, are created by injecting a foreign gene into a mouse embryo.[180] When the transplanted gene is an oncogene (a gene related in some way to cancer), the transgenic mouse is called an "oncomouse."[181] The first oncomouse was created at Harvard and patented in 1988.[182] The patent was then licensed exclusively to DuPont[183] although DuPont did not immediately begin enforcing the patent.[184]

There are not many mouse geneticists, so the research community is small and friendly.[185] About a hundred mouse geneticists formed a group called the "Mouse Men of America" which "exchanged information and mouse stocks and got together at scientific meetings."[186] The Mouse Men published *The Mouse Newsletter* which kept the group apprised of each other's research.[187] From the very beginning of mouse research (the 1930s), an informal convention required scientists to share their mouse lines freely. A geneticist explained that "[y]ou are basically obligated to send a mouse even if it's onerous . . . . [K]eeping mice is a pain but that is the expectation."[188]

This culture of sharing is important because it is physically challenging to make a transgenic mouse from scratch. To develop an oncomouse line, it is not enough to have access to the published paper describing the theory behind the method. It takes "magic hands" to make the mouse,[189] and even if a scientist could make a mouse, developing a stable breeding line of transgenic mice requires even more training and knowledge.[190] Thus scientists lacking those skills had to send to their colleagues for mice. The more skilled mouse-makers provided mice in exchange for co-authorship on a paper, or simply for prestige and a reputation for collegiality.[191]

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180. Murray, *supra* note 121, at 19.

181. *Id.* at 20.

182. Eliot Marshall, *NIH Cuts Deal on Use of OncoMouse*, SCI., Jan. 28, 2000, at 567.

183. *Id*. This seems to be because DuPont had provided some funding for the initial research, although licensing the patent to DuPont was not a requirement of the funding. Geneticist Philip Leder, who led the development of the oncomouse noted that "[t]he work that we did was supported, actually, by an industrial concern, DuPont. They made a significant investment in that research and this is one of the products that . . . did emerge from it, and they are incentivized to make further investments in this process by virtue of the return that they will receive [from the patent]." Murray, *supra* note 121, at 21 (citation omitted). DuPont had provided Leder with more than $6 million in grants. *Id*. He was also funded by the NIH. *Id.*

184. Marshall, *supra* note 182, at 567.

185. Murray, *supra* note 121, at 3.

186. *Id.* at 18 (citation omitted).

187. *Id.*

188. *Id.* at 18.

189. *Id*. at 20.

190. *Id.*

191. *See id.* at 22, 25 (explaining how some newer mouse-makers would send a mouse for the "price" of collaboration or co-authorship, and others would trade merely for prestige).

Although the industry strives for openness, there are well acknowledged reasons for withholding access to information or material (mice). A survey of all geneticists (not just mouse geneticists) listed, in order of most common, reasons given for withholding: the effort required to produce materials, a desire to protect graduate students, post-doctoral fellows and junior faculty's ability to publish, the need to protect the geneticist's own ability to publish, the high financial cost of providing the materials, the likelihood that other person will never reciprocate, the need to honor requirements of industry sponsors, the need to preserve patient confidentiality, and the need to protect commercial value of results.[192]

While traditional patent law operates under the premise that the determinative factor in deciding whether an injunction is warranted should be simply whether there has been an invasion, the calculus the researchers use here is quite different. They use nuisance-type reasoning. The researchers do not seem to much mind an invasion of their intellectual property,[193] but they do a cost-benefit balancing analysis to determine whether or not they should accommodate the request. Although there is no "damages" option, merely an "injunction" option (if the researcher declines to provide the material), the geneticists' analysis still resembles nuisance balancing—in situations where the scientist decides to withhold material, presumably she would desire to hold the power of injunction, whereas in situations where she grants material, she would presumably be happy with damages.[194]

Like geneticists as a whole, mouse geneticists as a specific community also choose to use nuisance balancing over a simple determination of whether their rights have been invaded. Most mouse work is funded by the NIH; thus the NIH's requirement that the mice be made freely available applies. However, some mouse geneticists choose to make their own rules.[195] Nobel Prize winner Susumu Tonegawa is known in the community as someone who does not share his mice.[196] His refusals are not arbitrary. He explained that the mice "have been handled case by case depending whether the requester's project is directly in competition with the project of the postdoctoral fellows . . . . [Giving mice to direct competitors] would not only dismay and discourage young investigators but also can potentially jeopardize their careers."[197] He turned down one colleague who was a direct competitor, but later gave the researcher mice to be used for a specific experiment that did not

192. Campbell et al., *supra* note 166, at 478.

193. I use the term intellectual property roughly because generally the researcher will not have a patent on the material that they are providing, but in a sense the material is de facto patented because the requester cannot make it themselves, so they have no recourse but to request it.

194. I recognize that this dichotomy does not quite track onto the factors described above, because the factors involving cost could easily be remedied by some sort of payment. However, the basic principle stands: researchers are making decisions through balancing, rather than by asking whether a right has been invaded. Their reasoning process looks less like conventional patent law, and more like the Restatement version of nuisance law. Note that this is also an example of groups contracting to form a private remedies scheme.

195. Cohen, *supra* note 172, at 1716 (explaining that some geneticists decide to not share mice until after they publish, or share mice more selectively).

196. *Id.* Because he is funded by the NIH and thus required to make his mice freely available, he violates NIH guidelines by not doing so.

197. *Id.* at 1717 (quoting Tonegawa's written statement in response to questions from *Science*).

compete with Tonegawa's work.[198] Furthermore, he kept a particular line of mice out of the public mouse repository because his postdoctoral fellows had worked for almost a year-and-a-half to create the line, and he felt the privacy was necessary to protect them.[199]

However, Tonegawa did provide some researchers with mice, particularly when their work was unrelated to his, so he did not look merely at whether the requesters were invading his rights. Instead, he looked at the harm—the potential cost to the careers of his postdoctoral students (and probably to his own career as well)—and the unfairness that the postdocs might perceive if they had to immediately give up their hard won success. However, not everyone agrees with his calculus. Diane Mathis of Institute Genetique Biologie Moleculaire Cellulaire in France notes that although "it hurts" to give mice to direct competitors, "you're obliged to overcome the hurt" in the spirit of scientific cooperation.[200]

The diverging philosophies of Dr. Tonegawa and Dr. Mathis both fit within the nuisance framework because both use a cost-benefit analysis, but they approach the analysis from different directions. Tonegawa balances the harm to himself and his research. Mathis looks at the benefit to the larger scientific community. A proper nuisance system should balance both approaches. Tonegawa agrees that a better system is needed, and cites consistency and predictability as the most valued assets: "What is much needed . . . is a formulation of internationally acceptable and consistent guidelines for the distribution of these mice . . . . [A] period of controlled distribution should be permitted even after publication of initial results."[201]

The bickering over proper distribution etiquette became moot when DuPont, who owned the OncoMouse patent, decided to start enforcing it.[202] Previously, DuPont had not bothered the academic community, and the use of oncomice in cancer research had become widespread through the informal information sharing mechanisms described above. Many researchers used the mouse, though few, if any, had a license to do so. DuPont, however, had a different image of the oncomouse's potential. "In the market that DuPont envisioned, the Oncomouse would no longer be exchanged for prestige or co-authorships."[203] Instead, DuPont began charging researchers to use the mouse and attached three conditions to its use. First, scientists could not breed or share the mice (even if they had personally injected the foreign DNA into a normal mouse embryo to create the transgenic mouse).[204] Second, they had to provide DuPont with a yearly report on their research.[205] Third, DuPont claimed "reach through rights" to get royalties on future inventions developed using an oncomouse.[206] DuPont's aggressive approach to mouse licensing

198. *Id.*
199. *Id.*
200. *Id.* at 1718 (internal quotation marks omitted).
201. *Id.* at 1717 (quoting Tonegawa's written statement in response to questions from *Science*).
202. DuPont began enforcement in the mid-1990s. Marshall, *supra* note 182, at 567.
203. Murray, *supra* note 121, at 25.
204. *Id.*
205. *Id.* at 26.
206. *Id.* at 25.

caught on quickly and soon after, GenPharm International—who held a patent on "knock-out" mice (mice who lacked a particular gene)—followed suit with similar restrictions.[207]

The academic community was dismayed and furious. DuPont had the scientists over a barrel: because the oncomouse had become so deeply established in the years before DuPont had begun enforcing its patent, researchers could not simply stop using the mice.[208] Moreover, the mice were an extremely useful research technique and were leading to a steady flow of discoveries.[209] Not only could scientists often not afford to pay the price DuPont now charged for them to continue the research that they had started years ago, they were effectively prevented from working with other pharmaceutical and biotechnology companies. Because DuPont claimed downstream royalty payments, other companies were reluctant to partner with academics who had used the oncomouse, even when it had played only a minor role in the academic's research (because the oncomouse is used as a tool, not a product, it might be used to test a drug or to learn about the genes that drug targets).[210]

Additionally, the scientists resented DuPont's invasion of their community—they perceived DuPont as an "outsider" to mouse genetics, who was flouting their norms and destroying their traditions.[211] Klaus Rajewsky, a geneticist at the University of Cologne in Germany felt that "it was an enormous obstacle to free and open distribution of information and materials . . . . [I]t was a whole new way of doing science . . . [and] it really affected the way the mouse research community works."[212] Tyler Jacks, an MIT oncologist, stated that DuPont's demands "slow[ed] the progress of cancer science and . . . slow[ed] the development of potential anticancer agents."[213]

Scientists felt that the cost of this new, strict, patent enforcement was simply too high. They responded by breeding their own oncomice and boycotting DuPont, well aware that they were flouting the law.[214] They encouraged their institutions to challenge the patent, but recognized that it was unlikely to happen.[215] As one scientist noted, "I wish there had been a suit filed

207. *Id.* at 26.

208. *Id.* at 27.

209. *Id.*

210. Tyler Jacks, the MIT oncologist, notes that "[i]t is still the case that companies are hesitant to import genetically engineered strains for internal research and drug testing or to work with academics for this purpose, because they do not wish to pay the very high licensing fees that DuPont demands for both types of activity." Sam Jaffe, *Ongoing Battle Over Transgenic Mice*, 18 SCIENTIST 46, 47 (2004).

211. Murray, *supra* note 121, at 29. The concept that intellectual property rules can be based on community norms has interesting parallels to real property nuisance law, which draws on custom to determine what is reasonable. *See* Ellickson, *supra* note 53, at 728–33 (arguing that liability under nuisance law should be related to community standards); Henry E. Smith, *Community and Custom in Property*, 10 THEORETICAL INQUIRIES L. 5, 6 (2009) (discussing the use of custom in property law).

212. Jaffe, *supra* note 210, at 46.

213. *Id.* at 47.

214. Murray, *supra* note 121, at 27. This situation was not ideal, even though DuPont did not prosecute the scientists. Only a small number of scientists had the expertise to breed their own mice, and, because they had to do so independently, it impeded the push towards standardizing the oncomice used for research.

215. *Id.* at 28.

against DuPont but I am afraid if you do the calculation of how much that would cost compared to the []$1-2 million the license might cost a firm, it's good business strategy not to sue and no university will take this on."[216]

Eventually, the NIH stepped in on the researchers' behalf.[217] Using their considerable influence, they negotiated with DuPont and, after four years of negotiation,[218] released a joint memorandum of understanding under which researchers sponsored by the NIH could use the oncomice without being subject to DuPont's demands on the condition that they not use the mice for commercial purposes.[219]

In essence, the NIH (on behalf of the researchers) and DuPont had successfully negotiated using a nuisance framework. The oncomouse was obviously a very high utility tool, and the NIH emphasized the public health benefit that would come from open access to the mouse.[220] However, DuPont sought to make a profit on its patent, and stood to lose a great deal of potential revenue by granting unimpeded access to the mouse. To use a nuisance analogy, DuPont wanted to retain its injunction powers. Nevertheless, DuPont was obviously willing (when pressured by the NIH) to give up those powers in at least some situations to facilitate the public good.[221]

The negotiation between DuPont and the NIH resembles the balancing process a judge would conduct in court to determine if a nuisance should be subject to an injunction, to damages, or to no liability at all. In the end, DuPont and the NIH chose to use a combination of remedies, with DuPont holding injunctive powers against commercial uses, but only agreeing to no-liability against noncommercial uses.[222] Use of the oncomouse by non-commercial researchers is a high utility, low harm function (because the researchers could not afford to pay the fees and thus would either not use the mouse at all, or would simply not pay, so DuPont loses no revenue by allowing them to breed their own mice). Use of the oncomouse by commercial companies is high utility in isolation, but with scores of academic research also being conducted, the added utility of private research is lower (and in any event, private firms can afford to pay for the license, and so will use the oncomouse if necessary; therefore utility is not lost completely by giving DuPont injunctive powers). Moreover, the harm to DuPont of losing injunctive powers over its competitors would be enormously high.

B. Recombinant DNA

Recombinant DNA, or rDNA, is a technique to combine multiple DNA

216. *Id.* at 30.
217. *Id.* at 31.
218. *Id.*
219. Sasha Blaug et al., *Managing Innovation: University-Industry Partnerships & the Licensing of the Harvard Mouse*, 22 NATURE BIOTECHNOLOGY 761, 762 (2004).
220. *Id.*
221. Open access for non-commercial researchers is of course not exactly a liability rule, since the scientists did not have to pay DuPont if they bred their own oncomice. But, for the purposes of building a nuisance framework, it is comparable enough.
222. Blaug et al., *supra* note 219, at 762.

fragments into one hybrid piece of DNA.[223] Stanley Cohen and Herbert Boyer, molecular biologists at Stanford and the University of California, San Francisco, respectively, developed the technique in 1973 and applied for a patent in 1974.[224] Unlike the oncomouse technology, rDNA is an easy technique to use—any molecular biologist who read Cohen and Boyer's publication describing the process could replicate it.[225] However, this relatively simple process revolutionized the field of molecular biology.[226] Today, rDNA forms the basis for almost all genetic manipulation and is "the basic tool needed in genetic engineering."[227]

The vast utility of the technique was recognized immediately;[228] however, the researchers did not rush to patent it. The 1970s were a period of fierce debate about the appropriateness of patenting academic research that had been publically funded,[229] and there were ethical questions about whether medical inventions should be patented at all.[230] The general consensus in academia at the time was to divide research results into "techniques," which would not be patented even if they were commercially viable, and "products," which could be, and often were, patented.[231] Recombinant DNA is clearly a technique, not a product. When Neils Reimer, the head of Stanford's Office of Technology Licensing, approached Cohen about patenting the technique, Cohen was startled; he had "not . . . dreamed of the notion of patenting any of this."[232]

Once the technology had been patented,[233] concerns quickly arose about how it would be licensed. Recombinant DNA was too important—and potentially too dangerous—and Stanford was too exposed to public opinion for the institution to use the patent any way it wished.[234] This is not to say that using the patent to derive maximum profit was not considered. Reimers remembers receiving a letter from an alumnus complaining, "You've got a patent; you can dominate everything here. Why are you charging such a low royalty? You know Stanford could use the money. Charge a higher royalty."[235]

Stanford could have done so. They had the industry over a barrel because

223. Sally Smith Hughes, *Making Dollars Out of DNA: The First Major Patent in Biotechnology & the Commercialization of Molecular Biology, 1974–1980*, 92 ISIS 541, 541, n.2 (2001).

224. *Id.* at 541.

225. *See* Maryann Feldman et al., *Commercializing Cohen-Boyer 1980-1997* 10 (DRUID, Working Paper No. 05-21, 2005).

226. *E.g.*, Hughes, *supra* note 223, at 542.

227. *Id.* at 569 (internal quotation marks omitted).

228. *See* Maryann P. Feldman et al., *Lessons from the Commercialization of the Cohen-Boyer Patents: The Stanford University Licensing Program, in* INTELLECTUAL PROPERTY MANAGEMENT IN HEALTH AND AGRICULTURAL INNOVATION: A HANDBOOK OF BEST PRACTICES 1797, 1800 (A. Krattiger, et al. eds., 2007) (discussing Stanford's licensing policy for the patent and stating that a total of 468 companies licensed the technology).

229. Hughes, *supra* note 223, at 543.

230. *See, e.g., id.* at 547 (stating that the American Medical Association's Code of Ethics of 1847 expressed the view that the sick should have unrestricted access to medical inventions—a view incompatible with the patent process).

231. Feldman et al., *supra* note 225, at 3.

232. Hughes, *supra* note 223, at 548.

233. The process was unusual—it was completely open to the public, and subject to a great deal of controversy, which, while fascinating, is outside the scope of this article. *See id.* for more detail.

234. By which I mean simply exercise their right to exclude by suing infringers and licensing as they will.

235. Feldman et al., *supra* note 225, at 29.

the technique quickly became widespread. This happened because the technique was so easy to replicate after reading Cohen and Boyer's publication, and there was no expectation that it would be patented, so companies went ahead and began to use it. The first drug developed with the help of rDNA, somatostatin, was produced in 1977, very soon after the patent was granted.[236] Big pharmaceutical companies like Hoffman-La Roche, Merck and Eli Lilly were all using rDNA.[237]

Stanford chose not to leverage the rDNA for financial gain.[238] Instead, Stanford realized right from the beginning that they were dealing with an unprecedented situation. Patents for processes were uncommon. Patents for processes with this much potential were even more uncommon. Kathleen Ku, then a licensing associate at the Stanford Office of Technology Licensing and later its director, remembered that "Stanford was trying to license an invention for which products had never been sold and which would apply to many diverse, established industries, in addition to the newly emerging biotechnology industry."[239] Stanford sought input from its faculty, the community at large, and the relevant regulatory bodies to create a workable scheme for using the patent. The university had four guiding goals: (1) to promote the public-service mission of the institution; (2) to incentivize development and commercialization of rDNA technology; (3) to ensure rDNA was safely used; and (4) to derive profit to fund their education and research programs.[240]

Stanford—and the people and institutions vital in shaping the eventual licensing scheme—had three primary concerns. First, the technology might be dangerous. Second, the technology had huge potential for social benefit: rDNA was a "platform technology" and no one institution could possibly develop all possible derivative applications.[241] Third, Stanford wanted to make money. Stanford, closely watched by the NIH, had to balance these concerns to create a practical licensing scheme for researchers to use rDNA. The set-up looks a lot like the sort of balancing that a judge might do when adjudicating a nuisance case. A judge would look to the gravity of harm to the owner (Stanford's concerns for its profits), the utility of the conduct (the innumerable possible uses for rDNA, which could best be developed through more open access), and harm to society (the potential dangers associated with rDNA and considerations of the utility of rDNA).[242] Stanford's best financial option was to take Genentech's offer for an exclusive license, raising revenue for Stanford,

236. *Id.* at 29.

237. *Id.* at 10–11.

238. Reimers admitted later that part of the reason for this was that Stanford was not sure how valid the patent really was: "[I]t was a bit flaky, whether we could make this or not, whether we had adequate coverage in the patent specification for prokaryotes, hosts, and eukaryotes, and whether we could get broad patent claims." Interviews by Sally Smith Hughes with Niels Reimers, Stanford University Office of Technology Licensing and the Cohen/Boyer Cloning Patents, at 22 (1997), *available at* http://content.cdlib.org/view?docId=kt4b69n6sc&brand=calisphere&doc.view=entire_text [hereinafter Hughes & Reimers Interview].

239. Feldman et al., *supra* note 228, at 1800.

240. *Id.* at 1798.

241. *Id.* at 1799.

242. *See* Epstein *supra* note 14, at 67–68 (discussing nuisance law balancing undertaken by judges).

but giving Genentech complete control over the patent.[243] The best option for developing the technology was completely open access. Stanford's task was to find a balance between these two extremes.

1. The Dangers of rDNA

Scientists reacted to news of the discovery of rDNA by realizing that "well, now we can put together any DNA that we want to."[244] This possibility worried people—and the NIH. Traditionally, universities had argued that their right to enforce a patent helped them monitor the safe use of the patented invention.[245] Stanford felt this argument would favor giving them control over the rDNA patent. Reimers wrote to the NIH to assure them that Stanford intended to "exercise great care in the administration of this invention, insofar as is feasible within the constraints of the patent grant which may be issued, to ensure against misuse of the invention."[246] Of course, even controlling the patent, Stanford was not in a position to regulate the use of rDNA; however, it could at least work some safety guidelines into licensing contracts. Reimer, writing to Mark Owens, the director of the UC Board of Patents, observed:

> Stanford and the University of California . . . cannot . . . by a license agreement, legislate morality, nor prevent a licensee from conducting research in an area of potential hazard, nor prevent an accident by a licensee in releasing a biologically hazardous substance. It does appear reasonable, however, to seek from licensees, prior to issuing a license, an expression of their understanding of the potential hazards involved and their agreement to take precautions to conform with both law, good sense, common ethics, and the NIH guidelines.[247]

The NIH agreed. They instructed Stanford to require licensed companies to provide "assurance of compliance with the physical and biological containment standards set forth in the [NIH] Guidelines in any production or use of recombinant DNA."[248]

Safety became an important factor in determining whether Stanford should grant Genentech an exclusive license (analogous to a court granting injunctive relief, because as the sole licensee, Genentech, would in fact have injunctive powers) or whether to keep the patent and license non-exclusively (analogous to a court granting damages). The traditional patent system does not consider questions of safety, and relies on separate regulatory frameworks to ensure it. However, there are situations—such as the development of rDNA[249]—where technology moves faster than any regulatory body. In such cases, a nuisance framework is much better equipped to assign control to the *safest* user than a traditional patent framework would be. In this case,

243. Feldman et al., *supra* note 228, at 1799.

244. Hughes, *supra* note 223, at 554.

245. *Id.* at 555.

246. *Id.*

247. *Id.* at 562–63.

248. *Id.* at 568. However, the NIH was not willing (or able) to enforce its rules, so they served as guidelines rather than requirements. *Id.*

249. Which is now considered completely safe—although there is always potential for it to be used inappropriately.

Stanford, a not-for-profit institution, was more likely to behave safely than for-profit Genentech.

Furthermore, because the majority of Stanford's biologists are funded by the NIH, the NIH has an opportunity to pressure Stanford to behave appropriately. The NIH still has leverage over private companies, but to a lesser extent. It is not always clear how incentives to behave safely would play out. However, a judge in a flexible nuisance system could look at those incentives, and the respective competence of the plaintiff and defendant institutions, as factors in deciding whether damages or an injunction would be appropriate. Such use of a nuisance system, while obviously applicable only in a very limited number of situations, would begin to approach patents not only as rights, but also as responsibilities.

2. Developing the Technology

The second goal Stanford balanced was a desire to develop the technology. Granting an exclusive license to a company would give that company a powerful incentive to commercialize rDNA. In fact, that was typically the University's strategy to encourage development of downstream technologies. However, rDNA, because of its enormous potential, required a different approach. Reimers responded to an interview question about whether he considered an exclusive license by noting:

> Typically, we licensed exclusively, because most university technology is undeveloped. And to encourage investment to develop a product, you need to give an exclusive license. That's very typical of university licensing. But when you've got a basic tool, such as this, you want it to get out broadly and nonexclusively. I did early on think that maybe we could give a field-of-use exclusive. But as I learned more about this recombinant DNA technology, I felt that this was something that we'd want to get out to everybody, as broadly as possible. I wanted to get it established early on as sort of the fundamental patent building block of the whole field.[250]

Moreover, even the private sector acknowledged that an exclusive license was not necessary to incentivize innovation because rDNA's utility was so high. Biotechnology company Cetus wrote to Stanford to urge them to license non-exclusively.[251]

> In the past exclusive licenses may have been seen as the only way to motivate industry to make the necessary investment commercially. This is clearly not the case here. Many companies have already asserted their intention to become involved in the field—it is difficult to understand how any significant biologically-based company could do otherwise.[252]

250. Hughes & Reimers Interview, *supra* note 238, at 21.

251. Feldman speculates that Cetus' enthusiasm for a non-exclusive license was derived at least somewhat from their fear that a competing company (probably Genentech) would get an exclusive license. Feldman et al., *supra* note, 225, at 6.

252. *Id.* at 5–6.

Once Stanford had made the decision to license non-exclusively, they had to determine a licensing scheme. This, too, was influenced by the goal of developing the technology. First, Stanford created a research exception. rDNA could be used by nonprofit companies without any license; however, if they subsequently developed a commercial product, Stanford would require them to buy a license.[253] A research exception ensured that academics across the country could freely use and develop the technology. Next, Stanford developed several "alternative" licenses for for-profit companies who could not afford a regular license: small distributors or resellers of rDNA received the license for a lower up-front fee, but had to pay higher royalties.[254] Companies using rDNA only for research and development were given the license for no up-front fee at all, only a discounted annual fee.[255]

What lessons does Stanford's search for the best way to develop the technology hold for a nuisance scheme? A key inference is that flexibility is vital to properly promoting innovation and product development (a fundamental goal of the patent system). As explained by Reimers, sometimes an exclusive license (or property rule) works best to promote innovation.[256] However, in the case of very high utility inventions, a non-exclusive license (or liability rule) works better, even when it is less profitable. A system of patent regulation that presumes an injunctive remedy does not always promote innovation. But neither would a system where damages were the only remedy. Instead, the ideal system can provide either an injunction or damages where appropriate. Moreover, it seems that utility—a balancing factor in the nuisance framework—is an indicator of whether a property rule or liability rule would best promote innovation. A nuisance balancing test factoring in utility seems likely to come up with a suitable remedy.

The complicated licensing scheme Stanford settled on after deciding to license non-exclusively also reflects nuisance-type thinking. In the case of the oncomouse, the key factor in determining a remedy was what *type of institution* was doing the research—for-profit or nonprofit. Stanford's research exemption for rDNA shows that this also factored into Stanford's balancing. However, Stanford added another factor: what *type of activity* the institution was conducting.[257] Type of activity is perhaps a brighter line than type of institution,[258] and, importantly, provides a way of assessing utility and harm that can be transferred into a commercial context, where both plaintiff and defendant are for-profit companies.

253. Feldman et al., *supra* note 225, at 1799.

254. *Id.* at 1803.

255. *Id.* (explaining that this form of license was designed for start-up companies that might not sell products within the patent's lifetime).

256. Hughes & Reimers Interview, *supra* note 238, at 45 ("By licensing it nonexclusively, I can get scientists throughout the world using the technology. Besides, if I can license the use of the organism nonexclusively, I think it's in the public interest that I do so.").

257. It might be more accurate to characterize 'type of institution' and 'type of activity' as rebuttable presumptions, rather than true factors. In other words, in most situations, a nonprofit will be presumptively treated a particular way, unless there is a particular reason not to do so.

258. *See, e.g.*, Lemley, *supra* note 39, at 615 (arguing that universities sometimes engage in patent holdups).

3. Profit

The last—but surely not least—factor balanced by Stanford was their desire to profit from the patent. Robert Rosenzweig, then Vice President of Public Affairs at Stanford, in an open letter to "Those Interested in Recombinant DNA," told his audience that "we cannot lightly discard the possibility of significant income . . . ."[259] An exclusive license would have been the most profitable. Feldman notes that had Stanford "taken only financial considerations into account, it is likely that they would have opted for much higher royalty rates or a more lucrative limited use exclusive license."[260] Instead, Stanford opted for licenses that were so cheap that even foreign companies—who did not need a patent because Stanford had not patented rDNA outside the United States—bought licenses.[261] Domestic companies also bought the license in large numbers, even though they probably could have gotten away with not using it. Because rDNA is a tool, not an end product, it is almost impossible to tell if a company infringed. The only viable way to discover infringing behavior was to conduct discovery as part of litigation and go through the company's internal records.[262]

Although Stanford could have chosen to charge high licensing fees and royalty rates, or to simply exclude companies from using rDNA as a way to maximize profit, this strategy may have in fact resulted in lower revenues because companies would have been incentivized to hide their use of rDNA. Ultimately, Stanford earned enough goodwill from its choice to provide non-exclusive, cheap licenses that rDNA patents became "the 'bambi' of the university community; nobody wanted to shoot bambi; it was a good will gesture to make out a $10,000 per year [the cost of the license] 'donation' to Stanford."[263] Stanford made $254 million from rDNA licenses.[264]

More than thirty years later, the licensing scheme has been studied in detail and has generally been pronounced as a successful balancing act. Hughes, who wrote a seminal history of rDNA's patent process, observed that "[t]he policy that Stanford ultimately created was a true compromise between those in academia, who opposed any academic commercialization of intellectual property, and those in industry, who saw any special treatment of recombinant DNA as unnecessary government meddling."[265] Maryann Feldman, who has also studied the rDNA licensing process in depth, declared that "the licensing of the [rDNA] patents by Stanford University represents one of the most successful university technology licenses."[266] Hopefully its success can continue to guide the process of forming innovating and flexible intellectual property systems.

259. Feldman et al., *supra* note 228, at 1798.
260. Feldman et al., *supra* note 225, at 29.
261. Peter Mikhail, Hopkins v. Cellpro*: An Illustration that Patenting and Exclusive Licensing of Fundamental Science is Not Always in the Public Interest*, 13 HARV. J.L. & TECH. 375, 382–383 (2000).
262. Feldman et al., *supra* note 225, at 11.
263. Mikhail, *supra* note 261, at 383.
264. Feldman et al., *supra* note 225, at 23.
265. *Id.* at 6–7.
266. Feldman et al., *supra* note 228, at 1797.

C. Fabrazyme

For years, Genzyme Corporation manufactured Fabrazyme, an enzyme replacement therapy that treated Fabry disease, a rare genetic condition.[267] Without enzyme replacement therapy, excess fat builds up in patients' body tissue, leading to kidney and heart failure.[268] The initial research and early clinical trials were funded by the NIH and done at Mount Sinai School of Medicine.[269] The Mount Sinai researchers then gave Genzyme an exclusive patent to continue the work and develop a commercially viable drug.[270] Genzyme was the only company to supply enzyme replacement therapy for the diseases, although other therapies were slowly making their way through the FDA approval process.[271]

In mid-2009, Genzyme's manufacturing system broke down.[272] First, Genzyme discovered viral contamination in their Allston, Massachusetts facility,[273] and, soon after, found steel and rubber particles in samples of the drugs.[274] These problems forced Genzyme to shut down the Allston plant and ration doses of the drug.[275] Patients made do on 50% doses—enough to keep them alive, but not enough to prevent symptoms like kidney distress, pain, and weight loss.[276]

Patients, angry about a series of overly optimistic projections from Genzyme about when they could resume getting full doses of the drug and worried about their health without it, sought help under a never used provision[277] of the Bayh-Dole Act.[278] The Bayh-Dole Act provides "march-in rights" which allows the federal government to require a patent holder to license their invention to third parties if "the head of the agency determines that the use of the invention by others is necessary for the practice of a subject invention."[279] The government has march-in rights only if the work has been

267. *Fabry Disease*, U.S. NAT'L LIBRARY OF MED., http://ghr.nlm.nih.gov/condition/fabry-disease (last visited Sept. 6, 2011); *Fabrazyme*, GENZYME.COM (2011), *available at* http://www.fabrazyme.com/hcp/pi/fz_us_hc_pi.pdf. *See generally Our Products*, GENZYME.COM, http://genzyme.com/business/biz_home.asp (last visited Sept. 6, 2011).

268. Richard Knox, *With a Life-Saving Medicine in Short Supply, Patients Want Patent Broken*, SHOTS: NPR'S HEALTH BLOG (Aug. 4, 2010, 11:48 AM), http://www.npr.org/blogs/health/2010/08/04/128973687/with-a-life-saving-medicine-in-short-supply-patients-want-patent-broken.

269. Virginia Hughes, *When Patients March In*, 28 NATURE BIOTECHNOLOGY 1145, 1147 (2010).

270. *Id.*

271. Walter Armstrong, *Shire on the Wire*, PHARMEXEC.COM (Feb. 1 2010), http://pharmexec.findpharma.com/pharmexec/Strategy/Shire-on-the-Wire/ArticleStandard/Article/detail/656051.

272. V. Hughes, *supra* note 269, at 1145.

273. Mark Ratner, *Genzyme Resumes Shipping as Sanofi-aventis Hovers*, 28 NATURE BIOTECHNOLOGY 994, 994 (2010).

274. V. Hughes, *supra* note 269, at 1145.

275. *Id.*

276. *Id.*

277. David S. Bloch & James G. McEwen, *Regulatory and Government Issues in IP Licensing*, 985 PLI/PAT 855, 884 (2009).

278. Petition by C. Allen Black, Jr., The Law Office of C. Allen Black, Jr., Ph.D, Petition to Use Authority Under Bayh-Dole Act to End Rationing of Fabrazyme, An Invention Supported by and Licensed by the National Institute of Health Under Grant No. DK-34035 (Aug. 2, 2010), *available at* http://keionline.org/sites/default/files/fabrazyme_petition_2aug2010.doc [hereinafter Black petition].

279. 35 U.S.C. § 202 (2009).

federally funded.[280] The proposed march-in scheme would allow other companies to use the patent as long as they paid Genzyme a 5% royalty.[281]

This petition—which, as of January 2011, has not been granted—uses an argument that looks a lot like nuisance-type reasoning.[282] The petition begins by citing the devastating consequences of Genzyme's failure to produce the drug,[283] a strategy that resembles what a defendant in a nuisance case might do: highlight the utility of infringing conduct. Genzyme presumably responded to the petition by citing the harm to its business and to future incentives to innovate of granting the petition. Health and Human Services Secretary Kathleen Sebelius, to whom the petition was addressed, presumably had to weigh these costs and benefits, playing the role of a judge in a nuisance case.

CONCLUSION

Although there are significant differences between the life sciences and other industries,[284] the feasibility of nuisance-type balancing in the life sciences suggests that it can be viably applied in other industries, albeit tailored to recognize the different needs of those industries.[285]

The life science case studies have in common a tight-knit community and a strong outside regulatory body. The influence of community values and pressure from the NIH or Congress probably made the sort of nuisance analysis highlighted in the case studies much more feasible. Absent these pressures, it seems likely that life scientists would act in a more self-interested manner and try to maximize their personal gains from their patents, in which case they would probably not have shared information as widely as seen in the oncomouse and rDNA examples. However, it is clear that sharing the technology above the level strictly required by the patent resulted in socially beneficial innovation. Essentially, the utility of the life sciences industry case studies is to demonstrate that when the proper incentives exist, organizations are willing and capable of successfully negotiating using a nuisance-like framework. The challenge is to create those incentives in other industries.

The key lesson from the case studies is that those studying patents make a grave error if they consider all patents to be alike and analyze them as an

280. *Id*.

281. V. Hughes, *supra* note 269, at 1147.

282. Black petition, *supra* note 278.

283. *See* Cover Letter from C. Allen Black, Jr., The Law Office of C. Allen Black, Jr., Ph.D, to Kathleen Sebelius, U.S. Dep't of Health and Human Servs., (Aug. 2, 2010), *available at* http://keionline.org/sites/default/files/fabrazyme_cover_2aug2010.doc ("The petitioners are representative of the entire class of Fabry disease victims and upon rationing [of Fabrazyme] have suffered a return of symptoms including neuropathy, proteinuria, digestive disorders, heart disease, renal disease, morbidity, and increased risk of premature death. Moreover, no newly diagnosed Fabry patients are eligible to receive therapy until the supply of drug is restored.").

284. *See, e.g.*, Chuang, *supra* note 39, at 246–48.

285. For example, royalty stacking is less problematic in the life sciences because a drug will typically be covered by only a small number of patents, whereas an invention in the technology industry may be covered by hundreds or thousands of patents. *Id.* at 247. An ideal nuisance framework would take into account both contingencies. For a discussion of the industry-specific nature of innovation, see generally Burk & Lemley, *supra* note 123, at 1581–89; Michael W. Carroll, *One for All: The Problem of Uniformity Cost in Intellectual Property Law*, 55 AM. U. L. REV. 845, 861–900 (2006).

amorphous, undifferentiated whole.[286] The heart of the patent system is the tradeoff between giving inventors incentives, thereby stifling competition, and optimal use of an invention.[287] But different patents result from different types of incentives, and society has greater or lesser needs for different products. A new patented design for a more effective broom would no doubt be considered essential by some people, but the vast majority of us could either pay higher prices for a time or do without. Brooms have social utility, and competition among broom makers surely enhances social good, but only to a limited extent. Billion dollar industries will not be held over a barrel. Moreover, the force driving the majority of broom manufacturers is probably the promise of financial gain. The traditional patent system therefore works perfectly to provide the appropriate balance of protection and public access. The life sciences case studies illustrate a different kind of patent. The inventors in many of these cases were not driven solely by financial gain. Moreover, society's need for these inventions is incalculable.

It stands to reason that the traditional patent system might break down in the face of such variation. While it is easy to draw some clear exceptions based on the case studies above,[288] and tempting to maintain the current patent system and add those few exceptions to account for these examples, innovations that do not fit the current patent system crop up too often—and too unpredictably—to carve out exceptions for each. A nuisance system with built in flexibility, while it would raise uncertainty, would be able to sort out these unusual cases as they arose. If adopted, the intellectual property nuisance system explored in this paper would empower judges to apply the pressure that the NIH and research universities apply in the life sciences industry.

Liability rules feature so prominently in academic literature partly because that literature tends to focus particularly on high-stakes cases.[289] This paper is no exception. The case studies are extraordinary situations that call for extraordinary remedies. It would not benefit patent law if damages were awarded in every case. In fact, damages might be appropriate in only a very small number of cases. However, the abundance of literature on the problem of holdouts suggests that it is crucial to have a system that can provide damages in that small number of extraordinary cases. A nuisance system is well suited to do so. It is flexible enough to account for a wide range of factors, yet can be made rigid enough to mechanically consign many low-stakes cases to an injunctive remedy. And beyond its practical uses, a nuisance system provides a framework within which to discuss patent remedies. Anyone who has been through the first year of law school is familiar with the concept of nuisance, so it offers a common vocabulary to those who may not

286. For articles that acknowledge the wide range of incentives to innovate, see Burk & Lemley, *supra* note 123, at 1589 ("There is no simple or universal correlation between the availability of patents and the incentive to innovate."); Golden, *supra* note 1, at 527 (noting "the reality that (1) there are a multiplicity of different behaviors that patent remedies will ideally help to optimize and (2) no regime of remedies is likely to create optimal incentives for all such behaviors").

287. See, *e.g.*, Merges, *supra* note 12, at 2658–61.

288. Perhaps there should be an exception for processes, or an exception for life saving technologies, or an exception for platform technologies (the list could go on and on).

289. Smith, *supra* note 14, at 979.

be experienced in the nuances and exceptions of the patent doctrine. Although a real property nuisance system cannot be perfectly transplanted to intellectual property, it provides both a language with which to discuss and a platform on which to build flexible, damage based innovations to traditional patent law.