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by
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Introduction

Spring was in the air at State U., and so too was the spirit of creativity among State U.'s professors.[1] Mechanical engineering professor *A* created a better mousetrap out of her custom-made Kevlar-boron composite material. History professor *B* finished a book about modern American culture titled *How Gilligan's Island, Not the Brady Bunch, Better Reflects America.* Computer science professor *C* completed a computer program that would choose a person's ideal mate based on that person's favorite frozen dinners.

In terms of capitalizing on these creations,[2] there are large disparities among *A, B,* and *C.* Assuming *A*'s mousetrap is patentable,[3] State U. owns all rights in it. *A* gets a cut of the potential profits but

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1. *Cf.* Richard Hovey, *Spring, in* THE HOME BOOK OF AMERICAN QUOTATIONS 393 (Bruce Bohle ed., 1967):

> Spring in the world!
> And all things are new!

2. Throughout this Note, "creations" is used as a blanket term encompassing patentable inventions and copyrightable works. *See* U.S. CONGRESS OFFICE OF TECHNOLOGY ASSESSMENT, INTELLECTUAL PROPERTY RIGHTS IN AN AGE OF ELECTRONICS AND INFORMATION 127-28 (1986) (defining "creators" as "scholars, poets, writers, artists, inventors, and others who produce intellectual works"). "Creations" also includes technological know-how not handled by patent or copyright regimes, but this Note does not focus on such creations. See *infra* note 10 for a discussion of "technological know-how."

3. Receiving patent protection is often an arduous task. *See* Graham v. John Deere Co., 383 U.S. 1, 19 (1966) ("He who seeks to build a better mousetrap today has a long path to tread before reaching the Patent Office.").

will have little say in determining how best to market the mousetrap.[4] *B* owns all rights in the book.[5] If the book becomes a bestseller, *B* keeps all the royalties; State U. gets nothing because most universities do not claim rights in copyrightable works.[6] *C* also owns all rights in his program because the predominant form of intellectual property ("IP")[7] protection for computer programs is copyright.[8]

Is there a reason for the disparity in treatment among *A, B,* and *C*? Why is *A* compensated less for creating with her hands while *B,* who creates with a pen, is compensated more? Note an anomaly: even though both *A*'s and *C*'s creations are utilitarian "technical" creations, only *C* owns all IP rights in his work. The facile answer is that the university IP policy to which these professors consented prescribes this differing treatment. But that begs the real question: *Why* do university IP policies treat different types of faculty creations differently?

The answer to this question is important because faculty creations significantly boost the American economy. American universities spend large amounts of money in pure and applied research.[9] All of this research produces a staggering number of inventions[10] and copy-

4. *See infra* notes 71-78 and accompanying text.

5. *See infra* notes 82-90 and accompanying text.

6. *See id.*

7. Throughout this Note, "intellectual property" ("IP") is treated as having only two components: patents and copyrights. Additional forms of IP exist, including trade secrets and trademarks. Trade secret law might serve as the best substitute for patent protection. However, patents and trade secrets are very different. Patentable inventions require novelty, nonobviousness, and originality. 35 U.S.C. §§ 101-103 (1988). Additionally, patents are designed for public disclosure. *See* 35 U.S.C. §§ 10-13 (1988). By contrast, any process, system, or device used in business to achieve a competitive edge is eligible for trade secret protection, provided that secrecy is maintained. RESTATEMENT (FIRST) OF TORTS § 757 cmt. b (1939). For a good summary of how trade secret law might be used by professors to protect their creations, see Pat Shockley, *The Availability of "Trade Secret" Protection for University Research,* 20 J.C. & U.L. 309 (1994).

8. Historically this has been true. *See* THORNE D. HARRIS III, THE LEGAL GUIDE TO COMPUTER SOFTWARE PROTECTION: A PRACTICAL HANDBOOK ON COPYRIGHTS, TRADEMARKS, PUBLISHING, AND TRADE SECRETS 42 (1985). However, over the last twenty years, more and more computer programs are receiving patent protection, at least when attached to a "process" that patent laws recognize. *See* L.J. KUTTEN, COMPUTER SOFTWARE: PROTECTION, LIABILITY, LAW, AND FORMS § 3.03[11], at 158 (1987).

9. In 1989, American universities spent $13.9 billion on academic research: 68% on basic research, 25% on applied research, and 6% on development research. *See* Pat K. Chew, *Faculty-Generated Inventions: Who Owns the Golden Egg?,* 1992 WIS. L. REV. 259, 307 (citing NATIONAL SCIENCE BOARD, SCIENCE AND ENGINEERING INDICATORS 108 (1989)).

10. In this context, "inventions" also includes technological know-how which may not qualify for patent protection but is still useful in manufacturing or in some other way. "Know-how" is defined as "a fund of technical knowledge and experience acquired by an enterprise in the use and application of an industrial technique." J.H. Reichman, *Overlapping Proprietary Rights in University-Generated Research Products: The Case of Computer Programs,* 17 COLUM.-VLA J.L. & ARTS 51, 89 n.192 (1992) [hereinafter Reichman, *Over-*

rightable works, both of which dramatically enhance America's productivity.[11] Therefore, any change in the current university IP regime that would increase creation would benefit society at large.

This Note proposes that this differing treatment is *not* justified. This Note proposes a fundamental change in the disposition of intellectual property rights in the university context, namely that professors, whether they specialize in technical subjects or liberal arts,[12] should own all IP rights in their creations.[13] This Note develops three main reasons for this position. First, all creations by university faculty should be valued equally because no genre of creation is intrinsically better than another,[14] and this equal valuation should be reflected in equality of treatment between technical and liberal arts professors. Second, if professors are allowed to own their patentable inventions outright, they will have an additional incentive to create socially useful

lapping Rights] (quoting 1 STEPHEN P. LADAS, PATENTS, TRADEMARKS, AND RELATED RIGHTS—NATIONAL AND INTERNATIONAL PROTECTION 321-24 (1975)).

11. *See, e.g.*, J.H. Reichman, *Computer Programs As Applied Scientific Know-How: Implications of Copyright Protection for Commercialized University Research*, 42 VAND. L. REV. 639, 644 (1989) [hereinafter Reichman, *Applied Know-How*] (noting that patenting results of university research contributes to the "nationwide drive for greater competitiveness on international markets"); Don Colburn, *Uneasy Partners in Discovery As Universities Warily Welcome Industry Dollars: Can Research Remain Pure?*, WASH. POST, Apr. 23, 1986, at Z10 (explaining how the "cutting-edge research of today's labs has the potential for immediate application"); Julia F. Siler et al., *Million-Dollar Professors: Should the Ivory Tower Be a Gold Mine?*, BUS. WK., Aug. 21, 1989, at 90 (discussing how two University of Chicago business school professors' interest in nonlinear programming led to the start of Investment Research, a company that helps pension funds invest their assets).

12. In this Note, "technical" encompasses engineering, life sciences, the so-called "hard" sciences, computer science, and other programs with a primary focus on or use of technology and natural phenomena. "Liberal arts," by contrast, covers fields with a focus on human activities, behavior, and institutions, such as history, sociology, and English.

Because of the nature of their research, technical professors are much more likely to create patentable inventions than are liberal arts professors. By contrast, both technical and liberal arts professors produce copyrightable works—scholarly articles, textbooks, and books aimed at the general public.

13. This Note uses the following phrases interchangeably: "control over one's creation," "ownership of a creation," and "ownership of IP rights in a creation." Granted, ownership of IP rights can be distinct from owning a physical manifestation of the creation. *See* 17 U.S.C. § 202 (1988) (copyright); 1 PETER D. ROSENBERG, PATENT LAW FUNDAMENTALS § 1.05, at 1-20 (2d ed. 1989) (patent). However, before the creator assigns her creation to someone else, she controls the creation, owns the creation, and owns any potential IP rights in the creation.

14. This is not to say that publication in the Smallville Law Review is equivalent to crafting a delivery mechanism for an AIDS vaccine. Within each genre of creation, a hierarchy of prestige and value exists. But ranking the genres themselves on a worthiness scale seems to go against a university's purpose, which is to encourage learning of all types, free of external pressures and valuations of worth. *See* DEREK BOK, BEYOND THE IVORY TOWER: SOCIAL RESPONSIBILITIES OF THE MODERN UNIVERSITY 18-20, 26 (1982); *infra* text accompanying note 161.

inventions.[15] This is consistent with the economic thrust of American IP law[16] and the evolving role of universities in conducting more market-oriented research.[17] Third, allowing professors to own the IP rights in their creations serves as "soft compensation," which will help to attract and retain faculty.[18] Rising costs and shrinking government support translate into meager pay hikes or even pay cuts for professors, especially at public universities.[19] The incentive of exclusive IP rights for these professors might reduce the attraction of industry positions.[20]

These changes may cost universities some *guaranteed* royalty revenue because professors can license their creations on their own and give nothing back to the university. However, retooled university technology transfer offices, which will handle the marketing of creations and the collecting of royalties from professors' creations, will compete favorably with the private sector to market professors' creations. Coupled with the additional number of creations that will be produced under this regime, universities may in fact receive *more* overall royalty revenue.[21]

Part I of this Note discusses how IP rights are allocated between the university and the professor in the absence of specific contractual terms. These default rules give ownership of all creations (patentable inventions or copyrightable works) to the professor. Part II discusses the variety of contractual approaches taken by universities to circumvent this common law and ensure their ownership of the IP rights in faculty creations. Part II also discusses the reasons why universities claim IP rights; some are moral, others are pragmatic. Part III establishes the normative case for faculty ownership of all IP rights in their creations. The reasons why universities claim IP rights are critiqued

15. *See* Chew, *supra* note 9, at 283-84 (noting the high number of patents awarded to universities adopting this approach); Reichman, *Overlapping Rights, supra* note 10, at 59-60; *infra* text accompanying notes 174-79 (telling the story of Stephen Wolfram).

16. The primary purpose of American intellectual property (IP) law is to encourage production of new creations. *See* JEREMY PHILLIPS & ALISON FIRTH, INTRODUCTION TO INTELLECTUAL PROPERTY LAW 22 (2d ed. 1990). Since society desires this production, it gives a monopoly to the creator. In other words, American IP law is incentive-based. *Id.* Thus, giving incentives to create, such as full faculty ownership, fits in with the grand scheme of American IP law. European IP law, on the other hand, grants rights in intellectual property because the creation was made from the sweat, toil, and inspiration of the creator. *Id.*

17. *See* Reichman, *Applied Know-How, supra* note 11, at 643-46.

18. Chew, *supra* note 9, at 283-84.

19. *See, e.g.*, Larry Gordon, *UC Plans to Hike Fees, Slice Pay 5%*, L.A. TIMES, Mar. 13, 1993, at A1, A23 (discussing a "temporary" 5% pay cut for faculty and staff).

20. This incentive is especially important to retain technical professors, who usually have more employment opportunities in the private sector than do liberal arts professors. *See infra* Part III.B.2.

21. *See infra* Parts III.A.3, IV.

here as well. Finally, Part IV presents the details of this Note's proposal that professors, not universities, own the IP rights in faculty creations. Part IV also refutes the concern that professors will spurn university technology transfer offices *en masse* in favor of other options.

I. The Default Rules for Ownership Rights in Faculty Creations

University IP policies are essentially contractual mechanisms for modifying the default rules that govern ownership rights in faculty creations.[22] This Part explains that the default rule for copyrightable works is that the professor owns the copyright in her work.[23] Similarly, the default rule for patentable inventions is that the professor owns all patent rights in her invention.[24]

A. Copyright

To qualify for copyright protection, a work must meet two requirements: it must be original[25] and it must be fixed in tangible form.[26] As these requirements are easily met in most cases, copyrights, unlike patents, are relatively easy to obtain.[27] A wide variety of works can be copyrighted, including computer programs[28] and industrial designs[29] as well as the traditional grist for the copyright mill: books, art, plays, and musical compositions.[30]

22. Universities are no different than other industrial employers in requiring their employees to sign agreements modifying the rights to ownership of their creations. Most employers require their employees to sign such agreements. *See* Steven Cherensky, Comment, *A Penny for Their Thoughts: Employee-Inventors, Preinvention Assignment Agreements, Property, and Personhood,* 81 CAL. L. REV. 595, 599 (1993).

23. *See infra* notes 42-47 and accompanying text.

24. *See infra* notes 58-63 and accompanying text.

25. 17 U.S.C. § 102(a) (1994). The originality requirement is very easy to satisfy; "even a slight amount [of originality] will suffice." Feist Publications, Inc. v. Rural Tel. Servs. Co., 499 U.S. 340, 345 (1991).

26. 17 U.S.C. § 102(a) (1994).

27. Reichman, *Overlapping Rights, supra* note 10, at 73. On the relative difficulty of obtaining a patent, see *infra* notes 49-53 and accompanying text.

28. *See* FINAL REPORT OF THE NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES ("CONTU") OF COPYRIGHTED WORKS 12-16 (1979); 17 U.S.C. § 101 para. 41 (1994) (reflecting CONTU recommendations by adding a definition of "computer program" to § 101).

29. *See* Mazer v. Stein, 347 U.S. 201, 218 (1954) (allowing copyright of works of art that also have some utilitarian function); 17 U.S.C. § 101 para. 36 (1994) (defining these "useful articles"); 17 U.S.C. § 113 (1994) (responding to *Mazer* by acknowledging limited copyrights in designs for useful articles).

30. 17 U.S.C. § 102 (1994).

A copyright generally vests in the "author" of the particular work.[31] In most cases, the creator of the work is also the "author."[32] However, American copyright law does recognize an alternative basis for authorship in certain cases, based on who commissioned the work. This alternative basis for ownership comes from the economic foundation of American copyright law.[33] If a work is a "work for hire," then the hiring party (the employer) is considered the author and owns the copyright.[34] Section 101 of the Copyright Act has two definitions of "work for hire," but the most relevant definition in the university context is "a work prepared by an employee within the scope of his or her employment."[35] Thus, if an "employee" creates a work within the scope of her employment, the employer, not the employee, is the "author."

In *Community for Creative Non-Violence v. Reid,*[36] the United States Supreme Court interpreted "employee" in light of common law

31. 17 U.S.C. § 201(a) (1994).

32. The "author" must conceive of the copyrightable expression and authorize fixation in tangible form (or fix it herself). Andrien v. South Ocean County Chamber of Commerce, 927 F.2d 132, 134 (3d Cir. 1991). Under this definition, "author" and "creator" are the same.

33. American copyright law, like other American intellectual property regimes, is more concerned with protecting *economic* rights than protecting *personal* rights, unlike European IP law. *See* Gilliam v. American Broadcasting Cos., 538 F.2d 14, 24 (2d Cir. 1976); *supra* note 16. The clearest example of the differing philosophies between the American and European approaches is with regard to the moral rights doctrine. This doctrine gives the artist the right of attribution and also the right to prevent any modifications to the work even after the artist has sold the work. ROBERT A. GORMAN & JANE C. GINSBURG, COPYRIGHT FOR THE NINETIES: CASES AND MATERIALS 477 (4th ed. 1993). Because European IP regimes emphasize the author's rights, moral rights are widely recognized, especially for artistic and sculptural works. American IP law has been much more grudging. *See Gilliam,* 538 F.2d at 24 (noting, however, that courts have provided protection of the author's personal rights through the application of contract or tort law theories).

34. 17 U.S.C. § 201(b) (1994).

35. *See* 17 U.S.C. § 101 para. 40(1) (1994). The second definition of a work for hire is a list of nine discrete types of works specially ordered or commissioned for use:

(1) contribution to a collective work;
(2) part of a motion picture or other audiovisual work;
(3) translation;
(4) supplementary work;
(5) compilation;
(6) instructional text;
(7) test;
(8) answer material for a test; or
(9) atlas.

Id. para. 40(2). However, even if the work falls into one of the above categories, the parties must also expressly agree in a signed writing that the work is considered a work for hire for the work to be truly a work for hire. *Id.*

36. 490 U.S. 730 (1989).

agency principles.[37] The *Reid* court balanced a number of factors[38] to determine whether the creator was an "employee" or an "independent contractor" within the "work for hire" definition.[39] However, some lower courts have considered the last two *Reid* factors—the provision of employee benefits and the tax treatment of the hired party—to be the key factors in the *Reid* balancing test.[40] Based on these two

37. *Id.* at 740-41.

38. The factors are:

(1) the hiring party's right to control the manner and means by which the product is accomplished;
(2) the skill required;
(3) the source of the instrumentalities and tools;
(4) the location of the work;
(5) the duration of the relationship between the parties;
(6) whether the hiring party has the right to assign additional projects to the hired party;
(7) the extent of the hired party's discretion over when and how long to work;
(8) the method of payment;
(9) the hired party's role in hiring and paying assistants;
(10) whether the work is part of the regular business of the hiring party;
(11) whether the hiring party is in business;
(12) the provision of employee benefits; and
(13) the tax treatment of the hired party.

Id. at 751-52.

39. In *Reid,* a nonprofit organization devoted to helping homeless people (CCNV) commissioned a sculptor (Reid) to create a sculpture to "dramatize the plight of the homeless," but the agreement was not in writing and copyright was not mentioned. *Id.* at 733-34. CCNV members gave some suggestions to Reid about aspects of the sculpture, which Reid accepted. *Id.* at 734. After the sculpture was finished, CCNV wanted to take the statue on a national tour to raise money for the homeless, but Reid objected, claiming the sculpture was not strong enough to undergo the trip. *Id.* at 735. Reid filed for copyright protection for the sculpture, and CCNV contested this filing in federal court. *Id.*

The District Court ruled that Reid was an "employee" of CCNV because CCNV motivated the sculpture's production. *Id.* at 735-36. Thus, the court deemed the sculpture a work for hire under § 101 para. 40(1) and held that CCNV owned the copyright. *Id.* The Court of Appeals for the District of Columbia reversed, and the Supreme Court upheld this reversal. *Id.* at 736.

Using the factors listed *supra* in note 38 (which were not explicitly contained in the Copyright Act), the Court acknowledged that CCNV had some creative input but emphasized that all the other factors pointed toward Reid's being an independent contractor. *Id.* at 752-53. For example, Reid owned his own tools, he was in a skilled profession, and CCNV did not pay his payroll or Social Security taxes. *Id.* Therefore, Reid was an independent contractor, not an employee. Thus, under § 101 para. 40(1), CCNV was not the "author." *Id.* at 753. Paragraph 40(2) did not apply in this case because there was no writing to indicate that the work was considered a work for hire. *Id.*

40. *See* Aymes v. Bonelli, 980 F.2d 857, 863 (2d Cir. 1992) (commenting that "the importance of these two factors is underscored by the fact that every case since *Reid* that has applied the [*Reid*] test has found the hiring party to be an independent contractor where the hiring party failed to extend benefits or pay social security taxes"). *But see* 1 MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 5.03[B][1][a][iii], at 5-20 to 5-32 (1994) [hereinafter NIMMER] (criticizing *Aymes* for improperly "elevat[ing]

factors, professors are employees rather than independent contractors because universities provide extensive benefits for professors and treat professors as employees for tax purposes.[41] Therefore, courts should find that faculty works are "works for hire" and give ownership of copyrights to the university.

Nevertheless, influential judges and many commentators have concluded that the works of university professors are not works for hire under the Copyright Act.[42] These judges and commentators have imputed a "teacher exception" to the work-for-hire doctrine, allowing university professors to own the copyright in their work, contrary to the express language of the work-for-hire statutes.[43] The concept that

these factors [into all but] a bright line rule for resolving the work for hire analysis" and ignoring the teachings of *Reid*).

41. *See* Rivera v. Hospital Universitario, 762 F. Supp. 15, 17 (D.P.R. 1991) (discussing the employer-independent-contractor issue in the medical malpractice context); Bilenas v. Commissioner, 47 T.C.M. (CCH) 217, 219 (1983); Sherri L. Burr, *A Critical Assessment of* Reid*'s Work for Hire Framework and Its Potential Impact on the Marketplace for Scholarly Works,* 24 J. MARSHALL L. REV. 119, 139 (1990). If all thirteen *Reid* factors are given equal weight, as Nimmer advocates, four factors weigh for the conclusion that professors are employees, four factors weigh for the conclusion that professors are independent contractors, and the remaining five do not weigh decisively for either side. Burr, *supra,* at 140. However, this categorization ends up being irrelevant to the issue of ownership of copyright. If professors are independent contractors, then they as creators own the copyrights in their works. *See supra* note 32 and accompanying text. If professors are employees, then the "teacher exception" to the work-for-hire doctrine gives them ownership of the copyrights in their works. *See infra* notes 45-47 and accompanying text.

42. Hays v. Sony Corp. of Am., 847 F.2d 412, 416-17 (7th Cir. 1988) (opinion by Judge Richard Posner); NIMMER, *supra* note 40, § 5.03[B][1][b][i] & n.94, at 5-34 to 5-35; Laura G. Lape, *Ownership of Copyrightable Works of University Professors: The Interplay Between the Copyright Act and University Copyright Policies,* 37 VILL. L. REV. 223, 246 (1992). *But see* Leonard D. DuBoff, *An Academic's Copyright: Publish and Perish,* 32 J. COPYRIGHT SOC'Y 17, 26 (1985) ("[A]cademicians are likely employees, and their publishing activities . . . generally fall within the scope of their employment, thus probably depriving them of the copyright in their scholarly works."); Todd F. Simon, *Faculty Writings: Are They "Works Made for Hire" Under the 1976 Copyright Act?,* 9 J.C. & U.L. 485, 508 (1982-1983) (arguing that unless the courts create an exception, faculty are subject to traditional "work-for-hire" analysis under the Copyright Act).

Judge Easterbrook's opinion in Weinstein v. University of Illinois, 811 F.2d 1091 (7th Cir. 1987), does not clarify matters. At first, he claims that 17 U.S.C. § 201(b), coupled with 17 U.S.C. § 101 para. 40(2), are "general enough to make every academic article a 'work for hire' and therefore vest exclusive control in universities rather than scholars." *Id.* at 1094. Later, he acknowledges the "tradition" that faculty members own the copyrights in their academic work and that "this 'tradition' covers scholarly articles and other intellectual property." *Id.* Thus, Judge Easterbrook seems to adopt the view later taken by Judge Posner in *Hays*: the work-for-hire statute literally seems to cover academic works, but that is not the proper result, and the courts should and will not reach it. *See infra* notes 45-47 and accompanying text.

43. The 1976 Copyright Act dramatically reworked many copyright statutes, including the work-for-hire statutes. *See* 17 U.S.C. §§ 101, 201 (1994); Russ VerSteeg, *Copyright and the Educational Process: The Right of Teacher Inception,* 75 IOWA L. REV. 381, 387-88

professors own the copyright in their own work is one of ancient heritage and has been recognized in the pre-1976 case law.[44] In *Hays v. Sony Corp. of America*,[45] Judge Posner, a former university professor himself, endorsed the continued existence of the teacher exception for three primary reasons: it is an "ancient tradition"; the absence in the legislative history of any congressional motive to eliminate the exception; and "the havoc that [eliminating the teacher exception] would wreak in the settled practices of academic institutions."[46] Because little case law from other circuits exists on this issue, Posner's explanation, although dicta, is essentially the law.[47]

To summarize, courts have recognized a teacher exception that exempts faculty-written copyrightable works from the work-for-hire doctrine. Since professors are thus "authors" of their works, professors own the accompanying copyrights.[48]

B. Patent

Obtaining a patent is much more difficult than obtaining a copyright. There are four requirements for obtaining a utility[49] patent. The

(1990) (asserting that the 1976 Copyright Act "put a new spin" on the definition of "author" by establishing the "work-for-hire" doctrine). Before 1976, "work-for-hire" was not defined in the Copyright Act, but in 1976, paragraph 40 of § 101, defining "work for hire," was added. *Id.* However, "the legislative history of the [1976 Copyright] Act indicates that Congress did not intend to change the law regarding work for hire when a regular employment relationship exists." *Id.* at 388.

44. *See* GORMAN & GINSBURG, *supra* note 33, at 267-68 (collecting cases).

45. 847 F.2d 412 (7th Cir. 1988).

46. *Id.* at 416.

47. "[W]e might, if forced to decide the issue, conclude that the exception had survived the enactment of the 1976 Act." *Id.* at 416-17; *see also* VerSteeg, *supra* note 43, at 405.

48. *See supra* note 32 and accompanying text. However, if graduate assistants helped prepare the work and the intent on all sides was that "their contributions be merged into inseparable or interdependent parts of a unitary whole," the resulting work may be a "joint work." 17 U.S.C. § 101 para. 20 (1994) (defining "joint work"). The graduate assistants would be co-authors with the professor and share equally in ownership of the copyright, regardless of the relative contributions of any particular author. *See* 17 U.S.C. § 201(a) (1994); Childress v. Taylor, 945 F.2d 500, 508 (2d Cir. 1991) (stressing that even if one author is "dominant," joint authorship is still possible). For an exhaustive discussion of joint authorship problems, see Scott C. Brophy, *Joint Authorship Under the Copyright Law*, 16 HASTINGS COMM. & ENT. L.J. 451 (1994).

49. In this Note, "patents" refers to utility patents because they are the most common type of patent issued. In fact, the overwhelming majority of all patents are utility patents. *See Authorization of Funds for the Patent and Trademark Office: Hearing on S. 793 Before the Subcomm. on Patents, Copyrights, and Trademarks of the Senate Comm. on the Judiciary*, 102d Cong., 1st Sess. 124 (1991) (statement of Harry M. Manbeck, Jr., Commissioner of the U.S. Patent and Trademark Office).

There are two other types of patents: design patents and plant patents. *See* 35 U.S.C. § 171 (1988) (design); 15 U.S.C. § 161 (1988) (plant). The requirements for these types of patents are slightly different than for utility patents. The requirements for design patents

alleged invention must be novel,[50] be nonobvious,[51] have utility,[52] and be within a class of patentable subject matter.[53] Except for a few narrowly confined exceptions, inventors themselves must apply for the patents.[54] The inventor is the person who comes up with the original inventive concept and "reduces it to practice."[55] Patent law, unlike

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are novelty, originality, nonobviousness, and ornamentality. 35 U.S.C. § 171. The requirements for plant patents are novelty, distinctness, asexual reproduction, and improvement over similar plants. 35 U.S.C. § 161 (1988); Yoder Bros., Inc. v. California-Florida Plant Corp., 537 F.2d 1347, 1378-79 (5th Cir. 1976) (defining nonobviousness in terms of improvement). For a general discussion of design patents, see Leonard Michaelson, *The Nature of the Protection of Artistic and Industrial Design*, 37 J. PAT. OFF. SOC'Y 543 (1955). A counterpart for plant patents is Raymond A. Magnuson, *A Short Discussion on Various Aspects of Plant Patents*, 30 J. PAT. OFF. SOC'Y 493 (1948).

50. 35 U.S.C. §§ 101-102 (1988); *see also* Note, *Novelty and Reduction to Practice: Patent Confusion*, 75 YALE L.J. 1194, 1195 (1966), *reprinted in* PAUL GOLDSTEIN, COPYRIGHT, PATENT, TRADEMARK AND RELATED STATE DOCTRINES: CASES AND MATERIALS ON THE LAW OF INTELLECTUAL PROPERTY 387 (3d ed. 1993) ("If knowledge of the subject sought to be patented has already been made available to the public [and thus there is no novelty], then a patent grant would serve no useful purpose, but would injure the public by removing existing knowledge from the public domain.").

51. 35 U.S.C. § 103 (1988). An invention is obvious and therefore ineligible for a patent if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *Id.*

52. 35 U.S.C. § 101 (1988). The test for utility varies by class of subject matter: mechanical machines are usually presumed to be useful, while chemical compositions must show that some "specific benefit exists in currently available form." Brenner v. Manson, 383 U.S. 519, 534-35 (1965); *see* 1 DONALD S. CHISUM, PATENTS: A TREATISE ON THE LAW OF PATENTABILITY, VALIDITY, AND INFRINGEMENT § 4.01, at 4-2 (1994).

53. There are 5 classes of patentable subject matter for utility patents:

(1) processes (which includes a new use of known processes, machines, manufactures, compositions of matter, or material);
(2) machines;
(3) manufactures;
(4) compositions of matter; and
(5) new and useful improvements of items falling in categories (1)-(4).

35 U.S.C. §§ 100-101 (1988).

54. 35 U.S.C. §§ 115-118 (1988). The "narrowly confined exceptions" are described in Sections 116-118 of the Patent Code. Section 116 deals with joint inventors. If one joint inventor does not wish to make a patent application or is unreachable, the other inventor can make the application in both their names. Section 117 allows legal representatives of deceased or mentally incapacitated inventors to apply for patents. Section 118 allows anyone with sufficient proprietary interest in the invention (like an assignee) to make the patent application if the inventor:

(1) refuses to execute the patent application; or
(2) cannot be found or reached after diligent effort.

35 U.S.C. §§ 117-118 (1988).

55. Cherensky, *supra* note 22, at 602. "Reduction to practice" is a term of art in the patent field and signifies that "the conception is embodied in readily utilizable form," which is necessary to receive a patent. GOLDSTEIN, *supra* note 50, at 407-08.

copyright law,[56] has no "invention for hire" doctrine—the "inventor" must be a natural person.[57]

Applying this doctrine in the university context, we see that because the professor originated the inventive concept and reduced it to practice, the professor is the inventor and would seem to own all patent rights in the invention.[58] However, in certain cases equitable principles embodied in state law force inventor-employees to assign their patents to their employers.[59] More specifically, if employees are *hired to invent,* rights in the invention, once obtained by the inventor-employee, must go to the employer.[60] But if the inventor-employee was not hired to invent, she owns the patent rights outright.[61] At most, the

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There are three ways to reduce an invention to practice. First, the inventor could successfully employ the invention in its intended setting. Second, the inventor could file a patent application, which is considered a constructive reduction to practice. Third, the inventor could produce a document which specifies sufficient detail about the invention so that a person skilled in the relevant art could recreate the invention. *Id.* (claiming that *In re* Borst, 345 F.2d 851 (C.C.P.A. 1965), created the last method of reduction to practice).

56. *See supra* notes 25-27 and accompanying text.

57. *See* Cherensky, *supra* note 22, at 603.

58. Note that a university cannot be a joint inventor with the professor because the university is not a natural person and cannot contribute an inventive concept. *See id.* However, unlike the university, graduate students who work for professors often do contribute inventive concepts. Allocating rights and royalties among professors and their graduate aqsistants is a tricky endeavor and is outside the focus of this Note. For an informative look at the problem of joint inventorship, see W. Fritz Fasse, *The Muddy Metaphysics of Joint Inventorship: Cleaning Up After the 1984 Amendments to 35 U.S.C. § 116,* 5 HARV. J.L. & TECH. 153 (1992).

59. *See* Cherensky, *supra* note 22, at 615-16; Chew, *supra* note 9, at 264.

60. See United States v. Dubilier Condenser Corp., 289 U.S. 178, *amended,* 289 U.S. 706 (1933) for this general proposition. Although *Dubilier* is not binding on states because it enunciates federal common law, it has been tremendously influential and has been followed in virtually every state. *See* Chew, *supra* note 9, at 265 n.21. Although the invention in *Dubilier* was patentable, the principles enunciated by the Court have been followed for nonpatentable inventions as well. *See id.* at 262 n.8.

In *Dubilier,* the hired parties were two government researchers employed by the Federal Bureau of Standards. *Dubilier,* 289 U.S. at 183. Chew likens these researchers to university professors. *See* Chew, *supra* note 9, at 262. While performing their usual work (investigating aircraft problems), they invented a way of improving radio reception and also "the idea of energizing a dynamic type of loudspeaker from an alternating current house-lighting circuit." *Dubilier,* 289 U.S. at 185. They were not hired to invent these inventions. *Id.* The Court stated that because these inventors were not hired to invent, the employer received only a shop right, "but the employer in such a case has no equity to demand a conveyance of the invention, which is the original conception of the employee alone, in which the employer played no part." *Id.* at 188-89. The Court made no distinction (or more precisely, said that it was up to Congress to make a distinction) between government and private employees—the same rules apply to both. *See id.* at 189-91, 198-99. Thus, generally, employers only have a shop right in their employees' inventions.

61. *See* Chew, *supra* note 9, at 264. The inventor is presumptively the owner of the patent rights in her invention. *See* 35 U.S.C. §§ 111, 152 (1988); Cherensky, *supra* note 22, at 604. Once the patent application has been filed or even after the patent has been issued,

employer could receive a shop right—a royalty-free license to use the invention.[62] The employer can receive this shop right only if it makes a "noninventive contribution," which is money, laboratory space, or other supplies that enable the invention to come to life.[63]

What does all of this mean in the university context? First, we must decide whether professors are "hired to invent." Since professors are usually hired to teach and do general research in areas substantially of their own choosing, not to create particular products, they have not been "hired to invent."[64] Courts have interpreted "hired to

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the inventor can and usually does assign the patent rights to anyone, including a corporation. 35 U.S.C. § 261 (1988); Cherensky, *supra* note 22, at 604.

62. JASPER S. COSTA, THE LAW OF INVENTING IN EMPLOYMENT 4 (1953).

63. *See* Reichman, *Overlapping Rights, supra* note 10, at 66 & n.68; Chew, *supra* note 9, at 269-70 & n.41.

64. Chew, *supra* note 9, at 271. What factors determine whether employees are "hired to invent"? *See* RESTATEMENT (SECOND) OF AGENCY § 397 cmts. a-c, illus. 1-2 (1957) (listing several relevant factors); Paul C. Van Slyke & Mark M. Friedman, *Employer's Rights to Inventions and Patents of Its Officers, Directors, and Employees,* 18 AM. INTELL. PROP. LEGAL ASS'N Q.J. 127, 141 (1990) ("The key factor in determining whether an employee was hired to invent is the specificity of the task assigned to the employee. Where . . . the employee is hired to 'do research' for the employer, title will . . . remain with the employee/inventor."). Professors customarily are not hired for specific tasks—they have more general missions, such as "doing research." Being hired to perform research, even focused research on a particular practical problem, is not the same as being hired to invent.

The one case that seems to hold to the contrary is Speck v. North Carolina Dairy Foundation, 319 S.E.2d 139 (N.C. 1984). In that case, Dr. Speck and his assistant created a process by which acidophilus bacteria (a type of bacteria that aids digestion) could be added to milk without causing a sour taste, thus making it possible to market acidophilus milk on a large scale. *Id.* at 140-41. When the Dairy Foundation, Speck's employer and a subsidiary of North Carolina State University, claimed that Speck had no royalty rights in this process, Speck sued. *Id.* at 142-43. Although Speck signed the university patent policy, which provided that the university would take title to the invention in exchange for granting a 15% royalty to the inventing professor, the policy did not apply because the bacteria process was not patented but was kept as a trade secret. *Id.* at 141-44. There was no written university policy regarding faculty-created trade secrets. *Id.* at 143-44.

The North Carolina Supreme Court used common-law principles to find that Dr. Speck was hired to invent, so the invention belonged exclusively to the university and Speck had no valid royalty claims. *Id.* at 143. This decision did not hinge on the status of the bacteria process as a trade secret; common-law ownership principles do not depend on the form of IP protection used to protect the creation. *See, e.g.,* Chew, *supra* note 9, at 265 n.22 (citing examples of employer-employee disputes over rights to employee creations, involving various creations and IP protections).

However, *Speck* has been much criticized, especially with regard to the court's implication that university professors are usually "hired to invent." *See* Christopher G. Browning, Jr., Note, *The Souring of Sweet Acidophilus Milk:* Speck v. North Carolina Dairy Foundation *and the Rights of University Faculty to Their Inventive Ideas,* 63 N.C. L. REV. 1248, 1258 (1985); Chew, *supra* note 9, at 301-02; Reichman, *Overlapping Rights, supra* note 10, at 104. *Speck* is best understood as holding that under those particular facts, Dr. Speck and his assistant were hired to invent a particular product. Applying *Speck* to inventions created by regular university professors performing general research is debatable and probably incorrect.

invent" narrowly, giving the benefit of the doubt to employees rather than employers.[65] Thus, professors own the patent rights in their inventions outright.[66]

Second, we must decide whether the university obtains a shop right in faculty-created inventions. Since professors typically use money and laboratory space provided by the university, the university has made a noninventive contribution and thus deserves a shop right.[67] Shop rights have some value because they allow internal use by the university, including use by other professors at the university.[68] However, possessing shop rights does not allow the university to sell the invention to the outside world,[69] and as Willie Sutton, the most pithy of robbers, once said about banks, "that's where the money is."[70]

In summary, university professors own their inventions and the accompanying patent rights; universities must be content with a shop right.

II. How University IP Policies Change these Default Rules

The ownership rules described in Part I prescribe that professors own the copyrights in their copyrightable works and the patents on their patentable inventions. However, university IP policies, generally imposed through employment contracts, change this prescription, usually to the professors' detriment. This Part discusses how these policies operate and how they vary.

65. *See* United States v. Dubilier Condenser Corp., 289 U.S. 178, 188-89, *amended,* 289 U.S. 706 (1933); University Patents, Inc. v. Kligman, 762 F. Supp. 1212, 1219 (E.D. Pa. 1991).

66. *See* Chew, *supra* note 9, at 271; Reichman, *Overlapping Rights, supra* note 10, at 66-67.

67. *See* Chew, *supra* note 9, at 269-70.

68. *But see id.* at 270 (discounting the benefits universities obtain from having shop rights).

69. COSTA, *supra* note 62, at 31.

70. Willie Sutton was literate enough to write an autobiography, albeit with help. WILLIAM SUTTON, WHERE THE MONEY WAS (1976) (written with Edward Linn). Oddly enough, the fame of this quotation, universally attributed to Sutton, was not enough to put it into BARTLETT'S FAMILIAR QUOTATIONS (Justin Kaplan ed., 16th ed. 1992). However, people continue to use this quotation and attribute it to Sutton. *See, e.g.,* Patrick R. Kane, *Rehabilitation—The Prison System: "Warehouse Rehabilitation" Federal Bureau of Prisons,* 34 HOW. L.J. 496, 496-97 (1991); Dana Priest, *"Non-Defense" Projects Targeted: Pentagon Supports Some, Not All, Against GOP Attack,* WASH. POST, Feb. 10, 1995, at A1 (quoting Senator Tom Harkin).

A. Mode of Operation

Many university IP policies are dictated by written agreements when employment begins.[71] Other universities implement their IP policies (especially if they are revising these policies) through faculty handbooks, which generally act as enforceable employee contracts.[72] Although these agreements and handbooks seem to have defects when analyzed from a contract law standpoint,[73] courts have consistently upheld them.[74]

These policies typically require professors to assign creations and any accompanying IP rights to the university in exchange for a specified percentage of any royalties the university may receive.[75] At many schools, the royalties paid to professors are a flat percentage of the total revenue received (ranging from 15% to 50% at major research universities), but at others royalties are paid on a sliding scale based on net income received by the university.[76] At many schools, a percentage of royalty revenue goes to the professor's department.[77] This

71. *See* Reichman, *Overlapping Rights, supra* note 10, at 69; Lape, *supra* note 42, at 248.

72. *See* Lape, *supra* note 42, at 248-50 & n.105.

73. The clear result reached by courts is not without question, however. Professors often fail to realize the true import of university IP policies and the drastic effects these policies have on ownership rights. *See* Chew, *supra* note 9, at 289; Cherensky, *supra* note 22, at 622 (asserting that preinvention assignments present "arguable cases" of substantive and procedural unconscionability). In addition, professors are given little or no consideration for the agreement. *See* Cherensky, *supra* note 22, at 623-24.

74. *See* Cherensky, *supra* note 22, at 620-21 n.113 (citing the very few cases that hold differently); Chew, *supra* note 9, at 286.

75. Lape, *supra* note 42, at 264 (describing various university copyright policies); Reichman, *Overlapping Rights, supra* note 10, at 69 (discussing professors' assignment of patent rights to their university employers).

76. *Compare* CALIFORNIA INSTITUTE OF TECHNOLOGY, FACULTY HANDBOOK, ch. 7, at 6 (1984) [hereinafter CALTECH POLICY] (granting the creator of a copyrightable work a flat 15% of the proceeds) *and* UNIVERSITY OF ILLINOIS, THE GENERAL RULES CONCERNING UNIVERSITY ORGANIZATION AND PROCEDURE, art. III, § 1(f) (1994) [hereinafter ILLINOIS POLICY] (granting 50% of the first $200,000 cumulative net income and 25% thereafter) *with* UNIVERSITY OF CALIFORNIA, UNIVERSITY OF CALIFORNIA PATENT POLICY, pt. II.C (1990) [hereinafter U.C. POLICY] (granting the inventor of a patentable invention 50% of the first $100,000 of cumulative net royalties, 35% of the next $400,000, and 20% thereafter).

77. *See, e.g.*, UNIVERSITY OF CALIFORNIA, BERKELEY, OFFICE OF TECHNOLOGY LICENSING, AGREEMENT CONCERNING DEVELOPMENT OF TECHNOLOGY AND DISTRIBUTION OF INCOME, ch. 4, at 1 (1994) [hereinafter BERKELEY POLICY] (granting the department of the faculty creator 50% of adjusted net royalties). U.C. Berkeley's system of IP rights is somewhat unique. Creators of "technology," the blanket term used to encompass software, patentable inventions, and the like, may opt to use either the U.C. Berkeley policy or the University of California policy described in note 76. Letter from Scott A. Taper, Jr., Licensing Associate, U.C. Berkeley Office of Technology Licensing, to author (July 12, 1994) (on file with author). Thus, inventors who wish to benefit their department opt for the U.C. Berkeley policy, but inventors who do not wish to benefit their department opt for the

encourages departments, which are generally strapped for money, to support practical, market-oriented faculty creations. Usually, professors have little influence over the marketing and licensing of the creation—the university technology transfer office ("TTO") has full control.[78]

B. The Scope of IP Policies

University IP policies differ widely in their scope. These policies regulate faculty creation in two ways: they regulate what types of IP are covered, and they regulate the level of university involvement necessary for the university to claim IP rights. Some university policies expressly claim for the university almost all IP rights (copyright and patent alike),[79] while others expressly disclaim most, if not all, rights in any faculty-created intellectual property.[80] The majority position among university policies occupies the middle ground by claiming substantial rights in patentable inventions but few or no rights in copyrightable works.[81]

University of California policy because, on average, the royalties due the inventor will be higher under this policy. *See* U.C. POLICY, *supra* note 76, at pt. II.C.

78. *See, e.g.*, BERKELEY POLICY, *supra* note 77, at 1 (disclaiming any liability if the university fails to generate income from the creation, thus making it difficult for inventors to police the university); Lape, *supra* note 42, at 263 (stating that none of the universities surveyed gave professors unilateral control over who exploits the creation and only a few schools gave any control). Note that at most universities that claim rights in faculty creations, university TTOs have monopoly status, so the professors must use the TTO to disseminate their product.

79. *See* Chew, *supra* note 9, at 280 (discussing "supra-maximalist" universities that claim ownership of all faculty inventions); Lape, *supra* note 42, at 257-58 (discussing universities that claim ownership to faculty works if any university resources were employed in the creation process).

80. The University of Wisconsin, Madison, is the most notable university to take this position, especially with regard to patentable inventions. UNIVERSITY OF WISCONSIN—MADISON, PATENT POLICIES AND PROCEDURES 1 (1984) [hereinafter WISC. POLICY] ("[Our] tradition of not claiming proprietary rights in any invention generated by faculty, staff, and students under funding containing no patent restrictions remains unchanged."). The exception with regard to funding restrictions is discussed in Part III.A.4 in connection with the Bayh-Dole Act. There are other universities that claim rights in very few inventions. For example, Harvard University claims rights only in inventions affecting medicine and public health. Chew, *supra* note 9, at 282-83.

Many universities do not have copyright policies, and absent a university copyright policy, the professor has full ownership. *See supra* notes 42-47 and accompanying text.

81. *See* Lape, *supra* note 42, at 251 ("Universities have long claimed ownership of the patentable inventions of faculty members, but traditionally have not claimed their copyrightable works."); Reichman, *Applied Know-How*, *supra* note 11, at 648. *But see* Rochelle C. Dreyfuss, *The Creative Employee and the Copyright Act of 1976*, 54 U. CHI. L. REV. 590, 592 (1987) (observing that universities have begun to assert copyright claims in an attempt to offset declining revenue in other areas).

(1) Copyright

Most universities do not have formal copyright policies.[82] The long-standing tradition of universities to refrain from claiming any rights in faculty-created copyrightable works obviated the need for university copyright policies.[83] However, in the last twenty years, more and more universities have begun adopting copyright policies.[84] This increase arose primarily from the money-making potential inherent in a new variety of copyrightable works: computer programs, videotapes, multimedia, and other technologically oriented works.[85]

Very few universities grant professors rights in all copyrightable works.[86] Instead, universities that have copyright policies tend to claim faculty works only if they were created with university resources[87] or if they are not "traditional."[88]

Details of these policies vary widely among universities.[89] However, most universities have no formal copyright policies and thus cannot claim copyrights in faculty creations.[90]

(2) Patent

University patent policies are much more common and have a longer history than do university copyright policies.[91] The primary

82. *See* Lape, *supra* note 42, at 251-52.

83. *See* Hays v. Sony Corp. of Am., 847 F.2d 412, 416 (7th Cir. 1988); Weinstein v. University of Ill., 811 F.2d 1091, 1094 (7th Cir. 1987). Note that in this context, when the university "claims rights," it is claiming rights through *contractual* means. This is much different than the university having initial ownership of the copyright through the "work for hire" doctrine. *See supra* Part I.B.

84. Lape, *supra* note 42, at 251.

85. *See id.* at 254 n.130; Reichman, *Overlapping Rights, supra* note 10, at 80-82. Because of computer software's money-making potential, it has inspired the creation of university copyright policies. *See* Lape, *supra* note 42, at 254-55 n.130. Some universities do expressly claim ownership of computer programs through their copyright policies. *See id.* (collecting university policies). Others treat them *sui generis* or at least distinguish them from both copyrightable works and patentable inventions. *See, e.g.,* BERKELEY POLICY, *supra* note 77, at 1. A few lump computer programs into their patent policy, although many if not most programs are ineligible for patent protection. Reichman, *Overlapping Rights, supra* note 10, at 82 n.148 (citing Massachusetts Institute of Technology procedures). Schools with no copyright policy must necessarily treat computer programs like other copyrightable works, allowing the professor to own the program. *See supra* note 48 and accompanying text.

86. *See* Lape, *supra* note 42, at 259-62.

87. *See id.* at 257-58.

88. This is merely a polite way of saying that universities are claiming copyrightable works based solely on the works' money-making potential for the university. *See id.* at 264-65.

89. *Id.* at 256.

90. *See supra* note 81 and accompanying text.

91. Lape, *supra* note 42, at 251.

reason is the obvious money-making potential of patentable inventions, as opposed to the uncertain viability of traditional copyrightable works such as books and scholarly articles.[92] Although some resistance to university ownership of patents existed in the past,[93] in the last thirty years almost all universities have taken the position that patenting inventions does not interfere with scientific research.[94]

Several reasons for this shift exist. First, as government funds decrease, universities look upon patent royalties as a potential "cash cow" income stream, unaffected by changes in congressional or state research funding.[95] Second, without patent protection, the costly development needed to bring this research to market will not occur, thus hurting society.[96] Third, the feared overcommercialization of academia because of university patenting has not occurred.[97]

University patent policies vary in the level of university involvement required to claim rights in faculty inventions, but more uniformity among universities exists here than in the case of copyright policies. The majority position is that universities will claim rights in inventions created by professors using university resources or as part of their research.[98]

92. *See* Chew, *supra* note 9, at 272 (characterizing "the promise of wealth and treasures" as the spark behind university patent policies). Computer software and new multimedia technology spurred the creation of new university copyright policies because of the money-making potential, but because computer software began its boom much later than did patentable research, it is no surprise that university patent policies have existed far longer than university copyright policies. *See* Lape, *supra* note 42, at 253-54 n.130 (discussing what motivates the creation of university copyright policies for computer software).

93. The arguments were that patenting would prevent disclosure of reseapch results and might also distort the academic mission. Phyllis S. Lachs, *University Patent Policy,* 10 J.C. & U.L. 263, 263-66 (1983-1984).

94. *See id.* at 263; *see also* Reichman, *Applied Know-How, supra* note 11, at 644.

95. *See* Lachs, *supra* note 93, at 268-69; *see also* Reichman, *Applied Know-How, supra* note 11, at 644.

96. Very little technology transfer from academia to industry occurred prior to the advent of university patenting. *See* Lachs, *supra* note 93, at 266-68; *see also* Reichman, *Applied Know-How, supra* note 11, at 645-46.

97. See *infra* Part III.A.2 for an in-depth discussion of this issue.

98. Roughly speaking, universities fall into three main categories:

1. Universities that claim no patentable inventions—the professor who creates the invention keeps all patent rights.
2. Universities that claim inventions if professors use university resources or develop inventions in the scope of their employment.
3. Universities that claim *any* invention created by their professors.

This categorization is adapted from Chew, *supra* note 9, at 276. Universities that fall into category 3 suffer from the problem that, in many states, statutes designed to protect inventors often restrict the scope of the university policy: in essence, category 3 schools often become de facto category 2 schools. *See* Chew, *supra* note 9, at 287-88 n.111 (citing statutes from California, Illinois, and North Carolina, among others); *see also* Reichman, *Overlapping Rights, supra* note 10, at 69. Very few major research universities fall into category 1. *See supra* note 81 and accompanying text.

III. The Case for Faculty Ownership of IP Rights in Their Creations

Part II found that the majority of university IP policies change the default ownership rules for patentable inventions but not for copyrightable works.[99] Thus, professors who create patentable inventions usually have no control over the licensing of their inventions and receive only a small, contractually predesignated percentage of any royalties because they do not own their inventions.[100] Professors who create copyrightable works, on the other hand, usually have full control over the marketing of their works and can negotiate their own royalties with outside buyers without involving the university.[101] This Part has two primary contentions: the justifications universities provide for owning *any* IP rights (patent or copyright) in faculty creations are suspect; and professors, universities, and society in general would benefit if faculty members owned all IP rights in their creations.

A. Why the Justifications for University Ownership of Faculty Creations Are Suspect

Generally, four reasons are commonly offered for university ownership of IP rights in faculty creations:

1. Because universities provide the resources for faculty creations, they have inherent rights in these creations.
2. Universities should own the IP rights in faculty creations to prevent corruption and conflict-of-interest problems among professors looking to strike it rich.
3. Universities badly need the royalty revenue from licensing faculty creations, so they must own the IP rights in these creations.
4. Under federal law (the Bayh-Dole Act in particular),[102] the university must own the IP rights in faculty creations.

These rationales for university ownership have varying levels of validity, but in the aggregate, they are not convincing.

(1) Use of University Resources

Universities often justify their claim of complete ownership of patentable inventions or certain copyrightable works (not just shop rights) by emphasizing the professors' use of university resources.[103]

99. *See supra* text accompanying notes 90 & 98.

100. *See supra* notes 75-76 and accompanying text.

101. *See supra* note 98 and accompanying text.

102. *See infra* Part III.A.4.

103. *See, e.g.*, CALTECH POLICY, *supra* note 76, ch. 7, at 5 ("Inventions made by employees . . . with the use of [Caltech] facilities may be patented. . . . Such patent properties are to be assigned to [Caltech] . . . ."); ILLINOIS POLICY, *supra* note 76, at 13 ("Inventions shall belong to [Illinois] if conceived or reduced to practice: . . . (2) through the use of any person of [Illinois] resources . . . ."); M.I.T. TECHNOLOGY LICENSING OFFICE, GUIDE TO

Apparently, this is a claim of equity—because professors are using our pencils, we must own the drawing, universities say.[104]

However, universities are not contributing the essentials of creation—the momentary flash of genius accompanied by the quiet, dogged determination needed for production of a masterpiece or a major scientific breakthrough. On the contrary, the professors are.[105] Universities make only moderate contributions to the creative process, and in fact they may receive moderate rewards even without claiming ownership of the creation: a shop right[106] in the creation (if applicable)[107] and a heightened reputation in the academic world for having creative professors.[108] After all, universities hire professors to do general research, not to invent specific products. In *United States v. Dubilier,*[109] the United States Supreme Court recognized that equity was on the side of the inventor:

> [W]here a servant, during his hours of employment, working with his master's materials and appliances, conceives and perfects an invention for which he obtains a patent, he must accord his master a [shop right]. *This is an application of equitable principles.* . . . But the employer in such a case has no *equity* to demand a conveyance of the invention, which is the original conception of the employee alone, in which the employer had no part.[110]

Similar considerations exist for the author of copyrightable works.[111] Universities deserve some recompense for providing the raw

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THE OWNERSHIP, DISTRIBUTION, AND COMMERCIAL DEVELOPMENT OF M.I.T. TECHNOLOGY 5 (1989) [hereinafter M.I.T. POLICY] ("[If a creation] is developed by M.I.T. faculty . . . using significant M.I.T. funds or facilities, M.I.T. will own the [relevant] intellectual property.").

104. *See* Lape, *supra* note 42, at 257.

105. "The creative process starts with a brilliant idea . . . . You can't have a good technologist who doesn't wake up in the middle of the night searching for answers." William Taylor, *The Business of Innovation: An Interview with Paul Cook,* HARV. BUS. REV., Mar.-Apr. 1990, at 96, 98-99 (comments of Paul Cook, CEO of Raychem Corporation), *quoted in* Cherensky, *supra* note 22, at 614-15.

106. See *supra* text accompanying notes 62-63 for a full explanation of the "shop right" concept.

107. True, a shop right in an improved disk drive is more useful than a shop right in a book of poetry. But if the shop right in a particular creation is not helpful to the university, the university could instead require the professor to reimburse the university for the use of university resources. *See* Chew, *supra* note 9, at 270.

108. *See* Chew, *supra* note 9, at 270.

109. 289 U.S. 178, *amended,* 289 U.S. 706 (1933).

110. *Id.* at 188-89 (emphasis added).

111. *See, e.g.,* Weinstein v. University of Ill., 811 F.2d 1091 (7th Cir. 1987). In *Weinstein,* one professor sued two other professors and the University of Illinois because he was not designated as the lead author on a scholarly article co-written by all three professors and funded by the university. *Id.* at 1092-93. Although the professors used university resources, the court found that the article was a joint work co-owned by all three professors, not a work for hire owned by the university. *Id.* at 1094-95; *see supra* note 42.

materials for creation, but they receive it in the form of shop rights and increased faculty reputation, both of which have real value.[112] Thus, when balancing the equities, the scale tips toward the professor, not the university.

(2) Preventing Faculty Corruption

Universities often claim that they must own the IP rights in faculty creations to prevent professors from corrupting academia.[113] The basic fear is that professors will devote too much time to applied research rather than basic "pure" research for economic reasons, thus distorting the academic mission. However, this explanation applies with equal force to universities themselves. If universities rely on royalty revenue from marketable creations, they may pressure professors into producing such creations, which also distorts the academic tradition.[114] Universities, however, assert that greater concerns motivate them to claim IP rights in faculty creations.[115]

In addition, the supposed parade of horrors to which patents in academia were supposed to lead—pervasive secrecy, abandonment of basic research for applied research, publication of misleading results to fool rival researchers—has not occurred to any great extent.[116] Highly celebrated cases of professors behaving unethically have occurred, but these are rare.[117] If universities are vigilant about enforcing rules of permissible conduct, granting professors full IP rights in

112. *See supra* text accompanying note 108.

113. *See, e.g.,* Letter from William Hoskins, Director, U.C. Berkeley Office of Technology Licensing, to author (Oct. 1991) (on file with author) [hereinafter Hoskins Letter] ("[M]andatory assignments of patent rights [to the university] are necessary to ensure public funds are not used for private gain.").

114. *See* Chew, *supra* note 9, at 304-07; Reichman, *Applied Know-How, supra* note 11, at 719-21.

115. University IP policies consistently contain high-minded language about the importance of technology transfer to society. *See, e.g.,* M.I.T. POLICY, *supra* note 103, at 3 ("[T]echnology transfer . . . is an important aspect of M.I.T.'s commitment to public service."). However, this does not explain why *M.I.T.,* as opposed to M.I.T. *professors,* should own the IP rights to creations produced by these professors.

116. "'The problems are more of perception than reality,' contends Katherine Ku, associate director of Stanford's Office of Technology Licensing." Siler et al., *supra* note 11, at 92. *But see generally* Rebecca S. Eisenberg, *Proprietary Rights and the Norms of Science in Biotechnology Research,* 97 YALE L.J. 177 (1987) (taking a contrary view in the specific context of biotechnology research).

117. One celebrated case is that of Dr. Scheffer C.G. Tsueng, a professor formerly affiliated with Harvard. Tsueng held a substantial block of stock in the company established to market the experimental eye ointment he was testing. Before he published data showing the ointment to be a failure, Tsueng cashed in his shares and made a large profit. Siler et al., *supra* note 11, at 90.

their creations will not lead to additional problems.[118] Besides, ethical problems such as outside consulting and manipulation of test data are not the fault of patents in academia—they are present throughout in the academic research setting.[119]

The most extreme solution would be for professors and universities simply not to claim any IP rights in faculty creations. That solution, in vogue earlier this century, was discarded because granting IP rights tends to increase technology transfer and increase the production of creative works.[120] The risk of corruption is omnipresent when money is involved; the question is one of balancing those risks against the advantages of owning IP rights.[121] On one hand, it is unclear whether granting 100% of royalties to professors instead of 50% or 35% increases the risk of corruption.[122] On the other hand, there are significant advantages to professors owning full IP rights, described in full detail in Part III.B. Thus, the claim that universities are preventing faculty corruption by owning IP rights in faculty creations is weak at best.[123]

(3) Loss of Revenue

Universities fear that if professors own the IP rights to their creations, universities will suffer a devastating loss of royalty revenue. Universities receive substantial royalties generated by faculty creations; more than $172 million in patent royalties was collected in fiscal year 1992, for instance.[124] If all professors actually decided to market their creations themselves, universities would lose this reve-

118. For example, state regulations require that "when researchers at California's public universities submit project applications for approval or renewal, [the researchers must disclose] their financial interests in the private entities that sponsor their research." Helen Leskovac, *Ties That Bind: Conflicts of Interest in University-Industry Links*, 17 U.C. DAVIS L. REV. 895, 896 (1984).

119. *See* Lachs, *supra* note 93, at 289.

120. *See* Reichman, *Applied Know-How*, *supra* note 11, at 644.

121. *See id.* at 646-47 (discussing how the Pajaro Dunes Statement, which was issued in 1982 by a prominent group of university presidents, assessed the potential risks of university-industry collaboration and proposed possible solutions).

122. There is no evidence that professors at the University of Minnesota or the University of Wisconsin, two universities that generally allow faculty to retain full patent rights in faculty inventions, have more conflict-of-interest problems than professors at other universities.

123. *See supra* notes 114-15 and accompanying text.

124. *See, e.g., Access by Foreign Corporations to Federally-Funded Research, Hearings Before the Subcommittee on Science of the House Committee on Science, Space, and Technology*, 103d Cong., 1st Sess. 80 (1993) (reprinting ASS'N OF UNIV. LICENSING TECHNOLOGY MANAGERS (AUTM), LICENSING SURVEY) [hereinafter *House Hearings, 1993*]. This amount does not include royalties from copyrighted works created by professors and owned by universities, so the AUTM figure somewhat understates the true royalty amount from faculty creations.

nue. But many professors do not have the time, the inclination, or the training to market their creations themselves.[125] Thus, in a competitive market, university technology transfer offices ("TTOs") would still keep much of their present business of licensing and/or selling professors' creations.[126]

The model for this new breed of TTO is the University of Wisconsin Alumni Research Foundation ("WARF"). Since its creation in 1925, WARF has made roughly $50 million for the University of Wisconsin ("UW").[127] UW allows its professors to own the IP rights to their creations,[128] so WARF must compete for the right to market professors' inventions[129] with private technology transfer companies and private companies interested in licensing specific inventions.[130] Most UW professors who have patentable inventions go through WARF to market their inventions even though they are not required to do so.[131] In short, WARF has competed very well.

If other universities implemented the WARF model, they would inevitably lose some revenue because some professors would not use university TTOs.[132] However, this assumes a new IP regime would

125. A notable exception is Stephen Wolfram, who enjoys "making deals." *See* Siler et al., *supra* note 11, at 90; *infra* Part III.B.2.

126. TTOs handle all aspects of university-to-industry technology transfer. First, they have staff attorneys who write the patents on faculty inventions. Then they solicit companies through presentations and symposia to license or buy these inventions. Finally, they negotiate the contract between the university and the company. All the while, the TTO staff keeps in contact with the inventing professor, keeping tabs on the status of the invention. *See* M.I.T POLICY, supra note 103, at 21.

127. See *University/Industry Cooperation in Biotechnology: Hearings before the Subcomm. on Investigations and Oversight and the Subcomm. on Science, Research, and Technology of the House Comm. of Science and Technology,* 97th Cong., 2d Sess. 219-20, 230 (1982) (reprinting THE WISCONSIN ALUMNI RESEARCH FOUNDATION, A STORY OF DEDICATION) [hereinafter *House Hearings, 1982*]. The most famous (and profitable) WARF inventions are the irradiation process used to add Vitamin D to milk and bread, and warfarin, a famous rat poison. *Id.* at 219-20.

128. *See supra* note 80.

129. WARF does not market copyrightable works. *See House Hearings, 1982, supra* note 127, at 239. However, the proposed TTO in this Note would market copyrightable works as well. *See infra* Part IV.

130. *See House Hearings, 1982, supra* note 127, at 220 ("[T]hese inventions have been assigned to the foundation voluntarily."); David Blumenthal et al., *Commercializing University Research: Lessons from the Experience of the Wisconsin Alumni Research Foundation,* 314 NEW ENG. J. MED. 1621, 1622 (1986) (mentioning that WARF actively seeks out inventions and makes advertising presentations to professors); Linda Williams, *Academia Wises Up on Patents,* L.A. TIMES, Mar. 16, 1990, at A1 (describing some private technology transfer offices).

131. Blumenthal, *supra* note 130, at 1624.

132. Almost every other university TTO has a monopoly on licensing faculty inventions because the university owns the invention. *See supra* note 98 and accompanying text. If professors had full IP rights in their creations, some professors would probably abandon

have no influence on faculty creativeness, which is not true.[133] The number of licenses granted or creations sold by the university TTO may well increase because the volume of total faculty creations would increase, and TTOs would capture much of this growth.[134] Also, these new TTOs would market a new class of creations—copyrightable works.[135]

Will these factors fully offset any loss? Without empirical evidence, it is difficult to say, but these factors would certainly have a large effect. In addition, royalty income is a bare 1.3% of total university research funding,[136] so a relatively small drop in income would not imperil the survival of university research. Therefore, the "loss of revenue" argument universities make in defending present-day IP policies has serious flaws. Even if there were a small decrease in funding, the benefits to universities from granting full IP rights to professors would outweigh this loss, as explained in Part III.B.

(4) Bayh-Dole Act[137]

Universities claim federal law requires them to own all faculty creations.[138] However, that claim is very misleading. The Bayh-Dole Act "allows universities, small businesses and non-profit organizations to patent the results of government-funded research and license such inventions to industry."[139] There are four steps that the Bayh-Dole Act contemplates:

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their university TTO, as evidenced by UW's experience. *See supra* text accompanying note 131.

133. See *infra* Part III.B.3. for the argument that the new IP regime will *increase* the number of faculty creations.

134. *See infra* Part III.B.3.

135. *See infra* Part IV. Some technologically oriented copyrightable works (computer software, for instance) are already being handled by some university TTOs. *See, e.g.*, CALTECH POLICY, *supra* note 76, ch. 7, at 6 (claiming software for the university); M.I.T. POLICY, *supra* note 103, at 16 (same). However, this practice is not commonplace. *See supra* note 90 and accompanying text.

The TTO proposed by this Note will also handle less technological copyrightable works, such as teaching aids or even books. Most professors who write books will continue to deal with publishers directly, but for other types of copyrightable works, they may use the TTO to find a willing licensee, especially if the professors are not interested in dealing with the business side of creation. This new stream of revenue may offset some of the inevitable losses the TTO will face by losing its monopoly over IP transfer.

136. *See House Hearings, 1993, supra* note 124, at 80 ($13.0 billion in total sponsored funding and $172.7 million in royalty income).

137. The Bayh-Dole Act is the popular name for the Patent and Trademark Law Amendment Act of 1980 and is codified at 35 U.S.C. §§ 200-212 (1988 & Supp. V 1993).

138. *See* Chew, *supra* note 9, at 293.

139. *Senate Holds Hearings on Bayh-Dole Act*, 6 J. PROPRIETARY RTS. 38 (1994). "Prior to the enactment of this law [in 1980], rights to those inventions were either assigned to the funding agency or dedicated to the public through publication of the research results." *Id.*; *see also* Lachs, *supra* note 93, at 268. If the government owned the patent rights,

1. The inventor (typically a professor or other university researcher) reports to the university any patentable invention. The university must then disclose the existence of the patentable invention to the federal sponsoring agency "within a reasonable time."[140]
2. The university has the opportunity to claim title to the invention assuming the university files a patent application in a timely fashion.[141]
3. If the university declines to claim title to the invention, then the federal government may claim title.[142]
4. If the government does not claim title (and it claims title infrequently),[143] then the inventor can request rights in the invention.[144]

However, the Act has limited scope. The Act only applies when specific funding agreements are made with federal agencies.[145] Research done using unrestricted university or industry-provided money is excluded by the Act.[146] Copyrightable works are also not covered

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it would disseminate this knowledge through nonexclusive licensing. The results were very discouraging—"less than four percent of the 28,000 patents held were developed."

Congress remedied this problem through the Act, which allows universities and small businesses to keep patents developed with federal funds. *Id.* at 267. By almost all accounts the Act has proved to be very effective. *See House Hearings, 1993, supra* note 124, at 62-63 (detailing how much one university, the University of Florida, benefited from the Act); *id.* at 80 (revealing that in fiscal year 1992, universities filed roughly 2,300 patent applications, granted almost 1,400 licenses to industry, and received royalty revenues of approximately $172.7 million).

For more details on the Act, including discussions of how licensees must agree to manufacture substantial portions of licensed inventions in the United States and of how the Act affects small businesses, see Edward C. Walterschied, *The Need for a Uniform Government Patent Policy: The D.O.E. Example,* 3 HARV. J.L. & TECH. 103, 131 (Spring 1990), and William L. Geary, Jr., *Protecting the Patent Rights of Small Businesses—Does the Bayh-Dole Act Live Up to Its Promise,* 20 AM. INTELL. PROP. L. ASS'N Q.J. 10 (1992).

140. 35 U.S.C. § 201(c) (1988). In this context, the university is usually the "contractor" under the Act because the university is one party to the funding agreement with the federal sponsoring agency. *See id.*; *infra* note 145 and accompanying text. Inventors do not have to report creations that they believe to be unpatentable. Chew, *supra* note 9, at 294 n.142.

141. *See* 35 U.S.C. § 202(a) (allowing universities to claim title to inventions if certain requirements are met); *id.* § 202(c)(3) (requiring universities to promptly file a patent application); *id.* § 201(i) (including universities under the definition of "nonprofit organization").

142. 35 U.S.C. § 202(c)(2) (providing that if the university does not claim title, the federal government "may receive title to any subject invention").

143. Presumably, if the university does not want title to the invention, it is not worth having. *See* Chew, *supra* note 9, at 294.

144. 35 U.S.C. § 202(d) (1988).

145. *See* 35 U.S.C § 202(c) (1988) (requiring a funding agreement to apply the Act).

146. *See* 35 U.S.C. § 200 (1988) ("It is the policy and objective of the Congress to use the patent system to promote the utilization of inventions arising from *federally supported research or development.*") (emphasis added). Industry-academia agreements usually have their own allocation of rights. *See* Colburn, *supra* note 11, at Z10 (discussing the need for complicated agreements to allocate rights between universities and industrial partners).

by the Act.[147] Thus, the Act does not require universities to make a blanket claim of ownership to all faculty creations; at most, universities may claim title to federally funded patentable inventions.[148]

B. Why Professors Should Own IP Rights in Their Creations

There are three main reasons why professors and not universities should own the IP rights in professors' creations:

1. All genres of faculty creation should receive equal treatment. Professors who create patentable inventions should be treated the same as professors who create copyrightable works because comparable talent and dedication are required for both types of creation.
2. Giving professors full rights in their creations is a form of "soft compensation," which is especially important for public universities struggling to retain faculty.
3. A greater number of socially useful works will be created because professors will have greater incentive to create such works.

(1) All Genres of Creation are Equal

As discussed in Part I, most universities treat particular genres of faculty creation differently: all rights in copyrightable works are kept by professors, but rights in patentable inventions are assigned to the university. Since technical professors produce inventions, this disparity hits them especially hard. This disparity is based on outmoded notions of who "true professors" are and what those professors do and is hence unjustifiable. Such notions may lead to interdisciplinary resentment, which is hardly a desirable result.

Traditionally, "professors" were liberal arts professors or theoretical science professors—Sir Isaac Newton, for example.[149] There was a strong common-law tradition that professors owned the work they

However, this Note does not address the proper allocation of IP rights between industry and academia and the resulting conflict-of-interest problems.

147. *See* 35 U.S.C. § 202(a) (explaining the scope of the Bayh-Dole Act in terms of "subject invention"); *id.* § 201(e) (defining "subject invention" in terms of "invention"); *id.* § 201(d) (defining "invention" as a patentable invention or a plant variety protected by the Plant Variety Protection Act, 7 U.S.C. §§ 2321-2582 (1988)).

148. It is true that a large percentage of faculty inventions are subject to the Bayh-Dole Act because they are federally funded. *See, e.g.*, Hoskins Letter, *supra* note 113 (over 90% of all inventions disclosed to the U.C. Berkeley TTO are federally funded and thus subject to the Bayh-Dole Act). However, most universities do not receive the level of federal funds that U.C. Berkeley does, so they have correspondingly fewer inventions subject to the Bayh-Dole Act. *See* Chew, *supra* note 9, at 297 (stating that in 1989 only 59% of research funding for all universities came from the federal government).

But even if the university claims title to an invention, it does not have to *retain* title—it can assign it back to the inventor, and all the benefits of faculty ownership can then accrue. *See infra* note 197 and accompanying text.

149. *See* RICHARD D. MANDELL, THE PROFESSOR GAME 18-19 (1977) (stating that practical studies were not a part of the university's traditional role).

produced: "This has been the academic tradition since copyright law began."[150] Since there were few "practical" professors at the time this common law developed, professors were and indeed still are strongly associated with books and academic articles, not inventions.[151] When technical professors began creating patentable inventions and receiving patents, many saw this as a derogation of an academic's core functions of performing pure research and publishing.[152]

Why were professors traditionally allowed to own and control their work? First, professors are best equipped to disseminate their knowledge to society.[153] Second, control by the university over professors' work would damage the ideals of academic freedom. For example, universities could suppress unpopular ideas if universities owned the work that contained the ideas.[154] However, these same consequences are true for technical professors who invent. Professors disseminate much knowledge through their inventions, especially when the inventions are made public after the patent has issued.[155] Professors are well-equipped to disseminate their inventions to private firms because they, not faceless university bureaucrats, know their field of research intimately.[156] Also, when universities control faculty inventions, they interfere with this mode of disseminating ideas, which threatens academic freedom.[157] Thus, the reasons supporting the tra-

150. Weinstein v. University of Ill., 811 F.2d 1091, 1094 (7th Cir. 1987); *see* Hays v. Sony Corp. of Am., 847 F.2d 412, 416 (7th Cir. 1988) ("[V]irtually no one questioned that the academic author was entitled to copyright his writings."). For more discussion on this point, see *supra* notes 44-46 and accompanying text.

151. In addition, teaching is a big part (the biggest part at non-research universities) of a professor's workload. *See* MARTIN J. FINKELSTEIN, THE AMERICAN ACADEMIC PROFESSION: A SYNTHESIS OF SOCIAL SCIENTIFIC INQUIRY SINCE WORLD WAR II, at 87 (1984); HERBERT LIVESEY, THE PROFESSORS 45 (1975).

152. Historically, university professors did not seek to patent their research results because patenting was thought to corrupt the academic mission. *See supra* notes 93-94 and accompanying text.

153. *Hays,* 847 F.2d at 416 (noting that universities also are poorly equipped to distribute a professor's work).

154. *Cf.* Lape, *supra* note 42, at 261-62 (showing how some universities do not claim copyright in traditional scholarly works, thus demonstrating their commitment to "academic freedom").

155. *See* 35 U.S.C. §§ 10-13 (1988) (detailing ways the Patent and Trademark Office makes patents available to the public). In addition, because publishing articles is part of a professor's duties, technical professors publish articles detailing their patentable inventions. Under American patent law, an inventor may publish details of her invention and not forego the right to patent the invention, provided that the patent application was filed within one year of the publication. *See id.* § 102(b).

156. Of course, if professors do not want to spend time dealing with licensing issues, they can permit university technology transfer offices to handle their inventions. The point is that universities are not necessarily better able to license inventions than professors.

157. Valuable academic ideas can be expressed through inventions and accompanying patent applications as well as through the more traditional route of scholarly articles.

dition of professors owning their copyrightable works also support professors owning their patentable inventions.

If equal treatment is not forthcoming, resentment among those receiving different treatment is inevitable. Liberal arts professors may retain the copyright in their musical compositions, while technical professors must give up the patent rights on their newly-created chemical processes.[158] With the advent of computer software, this resentment has been exacerbated. Software is a "practical" creation, but at most universities it is treated as just another copyrightable work, which allows "technical" professors who create software to retain full rights in their work, unlike technical professors who create patentable inventions.[159] Having a special policy for software,[160] however, would not solve the central problem: inequality by genre and across disciplines in the treatment of faculty creations.[161] This inequality fuels interdisciplinary conflicts, harms university morale, and detracts from the academic tradition more than would allowing professors to own the patent rights in their inventions.[162]

Moral equity demands that liberal arts and technical professors be treated equally with respect to the ownership of their creations. All professors are "true professors," and on a moral level, all genres of faculty creation should be valued equally.[163] However, universities

158. Technical professors may benefit from the present university copyright policy by publishing their research. A more accurate classification would distinguish "inventive professors" from "noninventive professors." However, most technical professors have opportunities to invent, and for all practical purposes, only technical professors can invent, so for ease of description in this Note, "technical" is equated with "inventive."

159. *See supra* note 85. Computer software in some circumstances may be patented, but that is not the usual mode of IP protection. *See supra* note 8.

160. Some universities *do* have special IP policies for software. *See supra* note 85.

161. Universities may claim that the supposedly higher revenues available for patentable inventions would corrupt faculty and provide revenue to universities. However, as explained in Part III.A, faculty corruption due to ownership of patents is unlikely; other factors (such as competition with other professors) probably play a much bigger role in causing corruption. Additionally, if professors owned IP rights in all types of creations, the production of these creations would increase, and many, if not most, of these new creations will be handled through the campus TTO. Thus, universities may end up making more money under this new regime. *See supra* Part III.A.3.

In addition, treating faculty creations equally regardless of genre does not mean that within a particular genre, objective evaluations of merit cannot be made. *See supra* note 14.

162. *See* Reichman, *Overlapping Rights, supra* note 10, at 81.

163. *But see generally* Peter Westen, *The Empty Idea of Equality,* 95 HARV. L. REV. 537 (1982) (stating that since no two things are truly alike and therefore do not deserve equal treatment, equality is "an empty vessel with no substantive moral content of its own"). This argument, however, has met fiery responses. *See* Kent Greenawalt, *How Empty is the Idea of Equality?,* 83 COLUM. L. REV. 1167 (1983); Erwin Chemerinsky, *In Defense of Equality: A Reply to Professor Westen,* 81 MICH. L. REV. 575 (1983). This Note assumes that equality is important because "the equality notion at least creates a strong legal-moral presumption in favor of equal treatment . . . , departures from which must be

could claim *all* rights in faculty creations (books and inventions alike), and this would constitute equal treatment as well. Nevertheless, the tradition of professors owning their copyrightable works is strong today, even in the face of ambiguous statutory language.[164] Since the moral reasons underlying this tradition apply equally to patentable inventions, the tradition should be broadened to include patentable inventions.

(2) "Soft Compensation"

Offering professors complete IP rights in their creations will help universities retain talented faculty.[165] Public universities are particularly vulnerable because they are generally unable to pay competitive wages as compared to both industry and private universities because of budget cuts over the last decade or so.[166] Universities have special problems keeping professors in the health sciences and engineering disciplines because private companies, as well as other universities, are competitors.[167] Especially in biotechnology, the gap between theory and practice is vanishingly small, so the usual disdain by academics for practical applications is not present. Industry-academia interaction is commonplace,[168] and biotech professors often leave for private practice to do much the same work they did at their universities.[169]

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justified." GERALD GUNTHER, CONSTITUTIONAL LAW 607 (12th ed. 1991). Part III.A contended that universities' justifications for unequal treatment are *not* justified, and so all genres of faculty creations should be treated equally.

164. Section 101 of the Copyright Act defines "work-for-hire" very broadly. *See* 17 U.S.C. § 101 para. 40 (1994). Some commentators believe it encompasses faculty-created copyrightable works, but judges, treatise-writers, and other commentators disagree. *See supra* notes 34-48 and accompanying text.

165. *See* Chew, *supra* note 9, at 284.

166. *See* Gordon, *supra* note 19, at A23; Lisa Lapin, *Budget-Driven Early Retirements Pare UC Faculty, Staff,* SACRAMENTO BEE, Jan. 8, 1993, at B1 (discussing how early retirements are devastating the University of California system).

167. *See* Chew, *supra* note 9, at 284-85 & n.95.

168. This rapid transition from theory to practice in the biotechnology area has prompted many industry-academia research collaborations. *See, e.g., House Hearings, 1982, supra* note 127, at 13-19 (statement by Dr. David M. Kipnis, Professor and Head of Internal Medicine at Washington University, St. Louis) (discussing the $23.5 million deal Washington University inked with Monsanto Co.); Malcolm Gladwell, *Johns Hopkins Forming Firm to Help Sell Results of Invention,* WASH. POST, Nov. 28, 1988, at F5, F6 (listing several industry-academia partnerships, including the Washington-Monsanto linkup).

169. *See, e.g., Activated Cell Therapy Announces New Executive Management Team,* Business Wire, Aug. 30, 1995, *available in* Westlaw, USNEWS database (reporting that company's new chief executive officer was formerly a professor at the University of Washington and company's new vice-president is currently a professor at Stanford University); Sonni Efron, *UCI Researcher, Firm Join in Alzheimer's Fight Medicine: A San Diego Company Will Support Studies Aimed at Developing a Clinical Test for the Disease,* L.A. TIMES

The prospect of controlling the exploitation of one's work will induce professors to stay in academia and tolerate the lower pay academia offers.[170] Most professors are realistic—they realize that few of their projects will make any appreciable money.[171] This situation is true for technical and liberal arts professors alike. However, since the potential rewards are so great,[172] the incentive still remains.[173]

In 1979, the California Institute of Technology (Caltech) learned the hard way that not giving professors ownership of their creations can drive brilliant minds away. Stephen Wolfram, a theoretical physicist, created a computer program to calculate quantum field theory diagrams (also known as Feynman diagrams).[174] Caltech claimed that it owned the copyright in the program and attempted to wrest control of it away from Wolfram, who wanted to distribute it cheaply to fellow scientists.[175] The resulting dispute precipitated Wolfram's departure from Caltech.[176]

(Orange County ed.), Sept. 17, 1991, at D1 (reporting that researcher formerly at a university laboratory moved to a private company; now the laboratory and company are collaborating on a research venture).

170. For instance, the University of California, Los Angeles ("UCLA"), tried to retain a distinguished professor of surgery by giving him the rights to his pioneering tissue-typing invention. Elaine Woo, *Professor's Conflict-of-interest Case Raises Broader Questions,* L.A. TIMES, July 31, 1987, at A3. However, this triggered quite a controversy because UCLA's actions allegedly violated many state regulations. *Id.* at A26. Under a regime where professors owned their inventions, which is the proposal this Note espouses, no such violations would have occurred.

171. *See* Henrik D. Parker, Note, *Reform for Rights of Employed Inventors,* 57 S. CAL. L. REV. 603, 604 (asserting that only 1 out of every 100 inventions will be "economically viable"). Most projects done by technical professors do not even generate patentable inventions but rather generate discoveries in pure science or result in unpatentable technological know-how. *See* Reichman, *Applied Know-How, supra* note 11, at 652 (discussing how most of the enormous investment of time and effort in the field of biotechnology is not patentable).

172. For example, Charles Boyer, a former University of California, San Francisco (UCSF) professor who co-founded Genentech, recently donated $24 million to UCSF. *See Biochemist Gives $24 Million to UC San Francisco,* L.A. TIMES, Apr. 29, 1994, at A33. His donation came from royalties generated by the gene-splicing process he and Stanley N. Cohen, a Stanford University professor, created in the 1970's. *Id.* This process is the foundation of the modern biotechnology industry. *Id.*

173. This conclusion varies in accuracy for different fields. An art history professor probably has fewer opportunities to leave academia than an electrical engineering professor—fewer openings exist in private art galleries than in computer companies. Perhaps for the art history professor, granting full IP rights to professors is an unnecessary incentive to stay in academia. However, most schools grant full rights in copyrightable works to professors anyway, so the status quo for the art history professor would not change. On the other hand, if the professor is able to retain IP rights in her creations, she has a powerful incentive to remain on campus.

174. Dreyfuss, *supra* note 81, at 616; G.A. Taubes, *Physics Whiz Goes into Biz,* FORTUNE, Apr. 11, 1988, at 90.

175. Dreyfuss, *supra* note 81, at 616.

176. *Id.*

As a result of his experience with Caltech, Wolfram placed an important condition on any new employer: he, not his new employer, would own the copyrights in any computer programs that he created.[177] The University of Illinois ("Illinois") agreed to this condition and hired him.[178] Wolfram promptly created *Mathematica,* a much more advanced version of his original program and now a very popular mathematical modeling program for personal computers. Consequently, Wolfram is a very wealthy man, Illinois received favorable recognition for having Wolfram as an affiliated professor, and Caltech was left out in the cold, making little money selling Wolfram's original program, which lacked Wolfram's proposed improvements.[179]

Even though Wolfram did not want to profit from his original creation, he needed ownership rights to control the program's dissemination and use; not having these rights caused him to leave. Wolfram's story is perhaps more spectacular than most, but many professors do leave for greener pastures—either to private industry or more hospitable universities.[180] Allowing faculty to own the IP rights in their creations is a step universities should take to retain their professors, the heart of any university.[181]

(3) More Creations Will Be Produced

If professors had full IP rights in their creations, more works would be produced. Even if this proposition is true, is producing more works desirable for society? The answer is yes.

A fundamental tenet of American IP law is that IP protection acts as a financial incentive for further creation.[182] This tenet proves its truth in many ways. Countries that have statutory schemes for compensating employed inventors[183] have the highest rate of patent appli-

177. Siler et al., *supra* note 11, at 92.

178. *Id.*

179. Dreyfuss, *supra* note 81, at 616; Siler et al., *supra* note 11, at 95; Taubes, *supra* note 174, at 92.

180. *See* Siler et al., *supra* note 11, at 90 (profiling many professors who leave academia for private industry).

181. "When Dwight Eisenhower became president of Columbia University, he met with the faculty, which he labeled 'the employees of Columbia.' According to academic legend, a distinguished senior professor corrected him by saying, 'General, we are not employees of Columbia University. We *are* Columbia University.'" JULIUS GETMAN, IN THE COMPANY OF SCHOLARS: THE STRUGGLE FOR THE SOUL OF HIGHER EDUCATION 90 (1992).

182. The monopoly privileges that Congress may authorize "are [not] primarily designed to provide a special private benefit. Rather, the limited grant is a means by which an important public purpose may be achieved. It is intended to motivate the creative activity of authors and inventors by the provision of a special reward . . . ." Sony Corp. of Am. v. Universal City Studios, 464 U.S. 417, 429 (1984).

183. In the United States, which has no national statutory scheme, employees usually must give or assign their inventions to their employers. *See* Parker, *supra* note 171, at 617.

cations for domestically-created inventions.[184] When the University of California system doubled the professor-inventor's royalty rate, a "sharp and sustained increase occurred in the number of disclosures of ideas."[185] Among the top universities in patents awarded in 1988 were Stanford University, Harvard University, and the University of Wisconsin, all of which allow their professors to retain patent rights in their inventions.[186]

With regard to copyrightable works, the majority of universities do not claim copyright, so professors retain it.[187] If more schools start claiming works, output by professors is likely to decrease and will likely shift away from the genre of works universities claim.[188] Thus, the looming presence of university ownership distorts the work produced by professors.[189] The example of Stephen Wolfram described in Part III.B.2 illustrates that professors who have full ownership rights will probably create more works than professors who have limited rights. Thus, empirical evidence indicates that common sense is correct: granting more IP rights in creations promotes creation.

Granted, the production of more marketable creations does not mean that society is necessarily better off. Nevertheless, universities today are justly regarded as sources of technology transfer as well as citadels of pure science.[190] Professors who write books for popular

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Thus, these statutory schemes are an alternative form of compensation designed to reward inventors.

184. *See* Parker, *supra* note 171, at 605 n.17. Switzerland, Sweden, and the former West Germany ranked first, second, and third, respectively. The United States, which has no such compensation scheme, ranked seventh. *Id.*

185. Blumenthal, *supra* note 130, at 1625. The University of California doubled its royalty rate from 25% to 50%. What would happen if it increased its royalty rate to 100%? Part III.B.3 contends that even more idea disclosures would be submitted.

186. *See* Chew, *supra* note 9, at 284. The University of Wisconsin applies the policy most favorable to faculty: professors may retain all patent rights except those claimed by a funding sponsor. WISC. POLICY, *supra* note 80, at 2. Harvard allows its professors to retain ownership in inventions that are not related to medical diagnostics or therapeutic to public health. There is, however, a catch: if the inventing professor does not commercialize the invention, Harvard will retake ownership. *See supra* note 80. Stanford changed its patent policy in 1994. Now Stanford professors do not own their inventions—Stanford does. *See infra* note 198.

187. *See supra* notes 81, 90, and accompanying text.

188. *See* Dreyfuss, *supra* note 81, at 612. In addition, universities may press for more marketable works from a professor who wishes to pursue other interests.. This is not desirable because the author should decide when to write, not the employer. *See id.* at 614.

189. *See id.* at 592-93.

190. *See* Chew, *supra* note 9, at 260-61 (stating that universities are a burgeoning source of scientific breakthroughs); Lachs, *supra* note 93, at 268 ("'It is properly the business of the creative scholar to see to it that, if possible, his ideas serve mankind in his own generation.'") (quoting Yandall Henderson of Yale University); Williams, *supra* note 130, at A1 ("Technology transfer—the process of getting ideas from lab to markets—has become an integral part of the academic consciousness.").

audiences do a valuable service, as do professors who labor in the realm of abstract theory.[191] In fact, the "best" professors often combine elements of theory and practicality in their careers.[192]

In the end, the incentive of full IP rights will be enough to shift the focus of some professors toward marketable works, and more works will be produced. Society will benefit from increased production of these works. Other professors will continue to devote themselves to theory, which is fine as well. The key is that there will be adequate rewards for market-oriented creations as well as theoretical creations.[193]

C. Summary

The rationales offered by universities to justify ownership of faculty creations are unsatisfactory. By contrast, as previously described, solid reasons exist why professors should own the fruits of their labor. The next Part discusses in detail a proposal that allows faculty to own the IP rights in their own creations.

IV. A Proposal

As foreshadowed above, this proposal to reform the university IP system has four components:

1. All faculty creations will be treated equally: copyrightable works (including computer software), patentable inventions, and technological "know-how" that may not qualify for patent or copyright protection.
2. The professors who produce these creations will own all intellectual property rights in the creations. The only right the university will have is a shop right to use the creation for university purposes.[194]
3. Universities will revamp their existing TTOs along the lines of WARF, the very successful University of Wisconsin TTO, to market inventions or copyrightable works that professors *voluntarily* assign

191. *See* Bok, *supra* note 14, at 151-53.

192. Charles Boyer, the UCSF professor who co-invented the gene-splicing process currently used in all modern biotechnology, is an example: he won a Nobel Prize for his work and sowed the seeds for a new industry. *See supra* note 172. Another example is Professor Daniel Koshland of U.C. Berkeley. In addition to his work with the Manhattan Project and his revolutionary work in chemistry, he is also editor of *Science* magazine. *See* Russell Schoch, *California Q & A: A Conversation with Daniel E. Koshland Jr.*, CAL. MONTHLY, Dec. 1991, at 44-49; *see also* BOK, *supra* note 14, at 151-68.

193. In the university setting, status is often measured by beating one's "competitors" through publication of path-breaking articles in leading scholarly journals. *See* Eisenberg, *supra* note 116, at 183-84. This is one well-established road to success; by granting full IP rights, we will have created another road. A professor can follow one or the other or both, but at least now there will be sufficient prizes at the ends of both roads.

194. This simply codifies existing common law principles. *See supra* Part I.

to the university.[195] Professors will have the choice between negotiating with the TTO to license their creations or handling the licensing chores themselves, thus bypassing the TTO. The TTO will be funded from a percentage of the overall royalties earned by faculty creations.[196]

4. For federally-funded inventions, the university should elect to take title under the Bayh-Dole Act. Then the university would reassign the invention back to the professor for nominal consideration; from that point, the invention would be treated like any other faculty-created invention.[197]

These provisions should be explicit in this new university IP policy.[198] The policy should be signed by professors as a prerequisite to

195. *See supra* notes 127-31 and accompanying text. Notice that WARF does not handle copyrightable works, but this new TTO would handle all types of copyrightable works, even non-technological works.

196. This is how many university TTOs are funded currently. *See, e.g.,* CALTECH POLICY, *supra* note 76, ch. 7, at 5 (patent licensing and administration costs are paid through royalties); BERKELEY POLICY, *supra* note 77, at 1 (15% of gross royalties applied to administrative costs of the TTO); M.I.T. POLICY, *supra* note 103, at 19 (same).

197. The Act does not forbid such an arrangement. *See* Chew, *supra* note 9, at 294-96; *supra* Part III.B.4.

There is no equivalent to the Bayh-Dole Act for federally-funded copyrightable works, but the enabling legislation of certain federal programs has provisions dealing with the ownership of copyrightable works produced in part through federal money. *See, e.g.,* 15 C.F.R. § 290.9 (1990) (dealing with copyrightable works, including computer software, created at the Regional Centers for the Transfer of Manufacturing Technology, which are university-government collaborations). A professor who creates a work at the Regional Center may claim copyright in the work, provided that in the work she acknowledges government sponsorship. *Id.* She must also give the government a permanent shop right in the work. *Id.* In this example, no special steps must be taken to comport with the proposal described in this Note.

In general, however, absent a provision like 15 C.F.R. § 290.9, the fact that the government provided the funding for the research has no relevance to ownership of the copyright. Thus, if a professor uses a federal grant to write a book, the government has no claim to the copyright.

198. Implementing this new IP regime through a vote of the Faculty Senate or equivalent governing body of professors seems to be the usual method. *Cf.* Appeal of Keene State College Educ. Ass'n, NHEA/NEA, 411 A.2d 156, 160 (N.H. 1980) (discussing how faculty committees "dealing with curriculum . . . or research topics" are acceptable but that "conditions of employment such as pay and hours" are subjects of union bargaining). However, "[faculty committees, like the Faculty Senate] are not intended nor do they have the power to enter into binding agreements on behalf of faculty." *Id.* Implementing a new IP policy would seem not to be within the power of the Faculty Senate but rather a subject for collective bargaining. This particular issue, however, has not yet been litigated. For a general discussion of collective bargaining among university professors, see GEORGE W. ANGELL ET AL., HANDBOOK OF FACULTY BARGAINING: ASSERTING ADMINISTRATIVE LEADERSHIP FOR INSTITUTIONAL PROGRESS BY PREPARING FOR BARGAINING, NEGOTIATING AND ADMINISTRATING CONTRACTS, AND IMPROVING THE BARGAINING PROCESS (1977).

Stanford University recently changed its IP policy by a vote of its faculty. It had previously allowed its professors to own all rights in their patentable inventions, but on April 14, 1994, the Stanford faculty voted to join the mainstream and implement mandatory assign-

employment, as opposed to being hidden in a faculty handbook.[199] Only professors, graduate students who may be co-creators with their professors,[200] and research scientists employed by the university should be eligible for this new IP policy. University staff employees need not be covered under this policy—as these employees are unlikely to create, the extra incentive provided by this new IP policy is unnecessary.[201]

University[202] TTOs could implement this new policy relatively easily. TTOs could keep most of their present personnel in place under this new regime. However, TTOs would need to add a few people skilled in licensing and marketing non-technological copyrightable works.[203] A more subtle yet more far-reaching change needed in these TTOs would be one of attitude. Currently, most TTOs have monopoly status—professors must license their creations through their campus TTO because the university owns the creation.[204] If professors are dissatisfied with their TTO's performance,[205] they have no alternative ex-

ment of patentable inventions to the university. Bill Workman, *Conflict Policy Ok'd by Faculty at Stanford,* S.F. CHRON., Apr. 15, 1994, at A19.

199. *See* University Patents, Inc. v. Kligman, 762 F. Supp. 1212, 1224 n.14 (E.D. Pa. 1991); *e.g.,* U.C. POLICY, *supra* note 76, at 2 (requiring every employee to sign its patent policy as part of the hiring process).

200. When faculty creations are produced with contributions by graduate assistants, some sort of co-ownership of the IP rights is necessary. *See supra* note 48 (joint authorship of copyrightable works) and note 58 (joint inventorship of patentable inventions).

201. The purpose of this new IP policy is to change professors' research patterns through increased financial incentives. However, this presupposes that professors can tailor their research toward fields that will produce marketable creations. Staff employees have much less freedom in their work, so any incentive to create provided by this new IP policy will not significantly affect their creative behavior. Any creation by staff employees will occur by happenstance as they are not trained to create, and financial incentives cannot affect fate.

202. Lachs suggests an independent patent management agency to handle these functions instead of a TTO controlled by or affiliated with the university. Lachs, *supra* note 93, at 282-85. That solution works best for small colleges, where there are few marketable creations and the expertise to effectively license and market them is lacking. *See id.* at 282-83. However, at large research universities with active university TTOs in place, there is no need to jettison the expertise present in these TTOs. Implementing Lachs' suggestions at these universities would work a dramatic upheaval in university life with uncertain benefit.

203. Most university TTOs, even if the university has a copyright policy, presently do not handle nontechnological works such as books and scholarly articles. *See supra* note 135.

204. *See supra* note 78.

205. In February 1995, two former University of California, San Francisco professors sued the University of California Office of Technology Transfer ("OTT"), claiming that the OTT bungled the licensing agreement concerning the professors' invention. Lance Williams, *Suit Says UC Blew Patent Deal: Scientists: Rights to Medical Technology All But Given Away,* S.F. EXAMINER, Feb. 12, 1995, at D1. The invention was the use of a chemical compound that, when added to blood and analyzed by a Magnetic Resonance Imaging ("MRI") scanner, provided images of blood flow useful in predicting strokes and heart

cept perhaps to "hide" their creation from the TTO and market it independently, which would be a breach of contract.[206] Under this new regime, TTOs would have to sell professors on their services in a competitive market.[207] Making this transition from monopoly to competitive player might be difficult in the short run, but soon after the changeover, TTOs around the country would effectively compete for business and keep royalty revenues flowing into their universities.[208]

Conclusion

Before ending this Note, we should revisit State U.[209] If this proposal were implemented there, engineering professor *A* (who created a better mousetrap), history professor *B* (who wrote a nonfiction bestseller), and computer science professor *C* (who wrote a computer program) would all be treated in the same manner—all three would own their IP rights in their creations outright. *A, B,* and *C* would be free to assign their creations to the new and improved State U. Technology Transfer Office voluntarily while negotiating their own royalties. Alternatively, they could strike out on their own to market their cre-

attacks. *Id.* The professors claimed that the OTT sold the invention to a Norwegian firm for $12,500 when previously, both U.C. and the Norwegian firm thought the invention was worth up to $4.7 billion over the patent's 17-year life. *Id.* at D3. Under the IP policy at U.C., the professors had no choice but to use the OTT. *See* U.C. POLICY, *supra* note 76, at 1.

206. What about "hiding" inventions? The most famous case of "hiding" occurred a few years ago. In 1967, University of Pennsylvania ("Penn") dermatology professor Albert Kligman invented Retin-A, a chemical compound used to treat acne. At the time, he donated all his royalties to Penn, which made $15 million from the invention. *Penn Settles Patent Suits on Retin-A,* PHIL. INQUIRER, Mar. 6, 1992, at B6. In the early 1980s, it was learned that Retin-A had great potential as an antiwrinkle cream. Penn sued Kligman in 1990 because he had allegedly filed for a patent on this new use of Retin-A in 1981 and had sold these patent rights to Johnson & Johnson ("J&J") without notifying Penn, the supposed rightful owner of Retin-A. *Id.* After losing a motion for summary judgment (reported as *University Patents, Inc. v. Kligman,* 762 F. Supp. 1212 (E.D. Pa. 1991)), J&J settled the case in 1992 by paying Penn and its hired patent management firm royalties on Retin-A while retaining the rights to the patent. *Id.*

In addition, this author knows professors and graduate students who have not reported their creations to the university TTO but secretly marketed them anyway. Telephone Interview with Graduate Student Smith (a pseudonym) (Feb. 1995).

207. Competition can arise in two ways. The first is from private patent management firms that act like university TTOs as intermediaries between the professor and corporation. *See* Lachs, *supra* note 93, at 284-85. The second is from companies that want to license the creation directly from the professor, meaning that no intermediary is involved. *See, e.g.,* WISC. POLICY, *supra* note 80, at 5-6 (describing how professors may negotiate licensing deals themselves); *see also supra* note 130 (describing how WARF sells UW professors on its services).

208. Most professors will continue to use the campus TTO to license their creations. *See supra* Part III.A.3.

209. *See supra* Introduction.

ations. Either way, the opportunity to own the IP rights in their creations will encourage them to stay at State U. to produce more creations beneficial to society.[210]

Thus, implementing this proposal would have the following effects: professors would have an increased incentive to create and would produce more creations;[211] universities would more easily retain professors while losing little (if anything) in royalties;[212] and society would have more useful creations.[213] But at bottom, this proposal recognizes the undesirability and inability of ranking types of creation, be they mousetraps, books, or software. The foreword to *The Lord God Made Them All,* a book by the noted "legal" expert James Herriot,[214] comes to mind:

> All things bright and beautiful
> All creatures great and small
> All things wise and wonderful
> The Lord God made them all.[215]

This sentiment of equality applies just as well to genres of faculty creations as it does to creatures in the animal kingdom.

210. *See supra* Parts III.B.2, III.B.3.

211. *See supra* Part III.B.3.

212. *See supra* Parts III.A.3, III.B.2.

213. *See supra* Parts III.B.2, III.B.3.

214. Of course, James Herriot was a famous British veterinarian-cum-author who wrote about his experiences as a country veterinarian in the Yorkshire countryside. His best-known book was *All Creatures Great and Small. Obituaries, James Herriot,* S.F. CHRON., Feb. 24, 1995, at D4.

215. Cecil Frances Alexander, *Foreword* to JAMES HERRIOT, THE LORD GOD MADE THEM ALL (1981).