THE ACADEMIC-INDUSTRIAL COMPLEX: A WARNING TO UNIVERSITIES

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Imagine, as the president of a large public university, you have assembled your regents to consider a proposed joint venture between the university and a major pharmaceutical giant.[1] According to the proposal, the university stands to gain $25 million to fund basic research in the Biology Department. In exchange for this, the university will grant the company first right to negotiate licenses for discoveries, including discoveries resulting from research funded by the state and federal government. Additionally, the pharmaceutical corporation requires a guarantee that its interests will be represented. Therefore, two of the five seats on the department's research and development committee will be occupied by employees of the corporation who will have input on how the money is expended on research.

The debate is heated. In the face of declining state and federal funding your research budget is shrinking; corporate financing would fill the gap. Yet, it is unclear how this would affect the department's research and teaching agenda, your reputation amongst future students, and the faculty's concern for its academic freedom. Moreover, it is not entirely foreseeable what other issues are at hand. Do you risk your tax-exempt status by engaging in such an endeavor? Should you prohibit your research scientists from holding stock in the pharmaceutical company? Is there a risk that the largesse of your corporate partner might consciously or subconsciously warp faculty objectivity towards research? In short, is this a wise idea?

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1. This is based loosely on an actual situation. *See* Eyal Press & Jennifer Washburn, *The Kept University*, ATLANTIC MONTHLY, Mar. 2000, at 39–40 (describing the academic-industrial collaboration between the University of California at Berkeley and pharmaceutical maker Novartis).

INTRODUCTION: THE TENSION IN ACADEMIC-INDUSTRIAL RELATIONSHIPS

Presently, numerous publications focus on the arsenal of intellectual property regimes available to academic researchers to protect the fruits of their labor for both the university and its deep-pocketed industrial financiers.[2] However, what a number of articles addressing publicly funded research gloss over,[3] explain away,[4] or even completely ignore[5] is that academic-industrial collaborations are predicated upon a radical and perhaps irreconcilable tension between the values of academia and those of the corporate world. Thus, it is worth reflecting on even more fundamental questions: *whether such endeavors ought to be undertaken at all and, if so, at what cost.* The issue, then, is whether a paradigm based on academic freedom, collaboration, and a gift economy[6] can be reconciled with an industrial culture and marketplace that reward the hoarding of ideas.

This comment aims to warn those universities considering joint ventures with industry of their more Faustian overtones.

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2. *E.g.*, Ann S. Jennings & Suzanne E. Tomkies, *An Overlooked Site of Trade Secrets and Other Intellectual Property Leaks: Academia*, 8 TEX. INTELL. PROP. L.J. 241 (2000); *see also* Joshua A. Newberg & Richard L. Dunn, *Keeping Secrets in the Campus Lab: Law, Values and the Rules of Engagement for Industry-University R&D Partnerships*, 39 AM. BUS. L.J. 187 (2002).

3. Robert Kneller, *University-Industry Cooperation and Technology Transfer in Japan Compared with the United States: Another Reason for Japan's Economic Malaise?*, 24 U. PA. J. INT'L ECON. L. 329, 343 (2003) (noting that the incursion of market forces into academia may result in a distortion of "core academic goals and values," yet claiming that "a number of recent steps by private companies, the U.S. Patent and Trademark Office ('PTO'), and government funding agencies are reducing the likelihood that IP issues will stymie innovation").

4. Newberg & Dunn, *supra* note 2, at 212 ("While a comprehensive examination of [the tension between academic openness and commercial secrecy] is beyond the scope of the present paper, we can identify four principal reasons for viewing the claim of fundamental irreconcilability with skepticism.").

5. Jack E. Kerrigan & Christopher J. Brasco, *The Technology Transfer Revolution: Legislative History and Future Proposals*, 31 PUB. CONTRACT L.J. 277, 278 (2002) (praising technology transfer laws for provoking a "fundamental and historic shift in government policy and in the Government's relationship with private industry"); *see also* Angeline G. Chen, *Technology Transfers in the Aerospace Industry: General Observations*, 17 AIR & SPACE LAW 8 (2002).

6. A gift economy is a system of social and moral commitments in a defined community that is sustained by the giving of gifts—goods and services—without the assurance of personal return. DAVID BOLLIER, SILENT THEFT: THE PRIVATE PLUNDER OF OUR COMMON WEALTH 31 (2002) [hereinafter BOLLIER, SILENT THEFT].

In other words, universities risk selling their most prized possession—academic freedom—and compromising their fundamental mission—disseminating knowledge to the public.[7] The first part of this comment examines the tradition of academic freedom and its contribution to the public interest. The second part considers the normative structure underlying the academic research gift economy, the customary tradition of objective study, peer review, and the dissemination of ideas. The third part addresses how changes in intellectual property law affect the norms of the academic research gift economy. The fourth part examines the risks in university-industrial collaboration, punctuated by appropriate illustrations, to show how such collaborations might have unforeseen, and often disastrous, consequences. Last, given that the Sirens' call of financial backing will, in all likelihood, continue to draw universities to industry, the fifth part considers how a university might strive not only to protect the results of such labor, but do so without unduly enclosing the academic commons.

I. THE UNIVERSITY COMMONS: ACADEMIC FREEDOM AND THE PUBLIC INTEREST

A brief history of the evolution of academic freedom in the American university system and its contribution to society helps set the stage for the clash between the conflicting paradigms of science and the marketplace. Traditionally, the task of higher education in a democratic society is discovering and freely transmitting knowledge to all segments of contemporary

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7. Marcia Angell, *Is Academic Medicine for Sale?*, 342 NEW ENG. J. MED. 1516, 1518 (2000) ("[A]cademic medical centers should be wary of partnerships in which they make available their precious resources of talent and prestige to carry out research that serves primarily the interests of the companies. That is ultimately a Faustian bargain."). *Cf.—for fun—* JOHAN WOLFGANG VON GOETHE, GOETHE'S FAUST 93, 95 (Walter Kaufmann trans., Doubleday 1990) (1808):

> I have, alas, studied philosophy, jurisprudence and medicine, too, and worst of all, theology with keen endeavor, through and through—and here I am, for all my lore, the wretched fool I was before. Called Master of Arts, and Doctor to boot, for ten years almost I confute and up and down, wherever it goes, I drag my students by the nose . . . . I also have neither money nor treasures, nor worldly honors or earthly pleasures; no dog would want to live longer this way. Hence I have yielded to magic . . . .

society, and to the next generation.[8] In this view, the university is to be a commons,[9] a public resource subsidized by all through government taxation while itself being a tax-free nonprofit organization.[10]

Nowhere is the idea of a commons more clear than in university research labs where unfettered basic research, sometimes called *upstream* research, often leads to significant and substantially useful marketplace technologies and pharmaceuticals, generally referred to as *downstream* technologies.[11] Rather than property rights, scientists traditionally gain peer recognition, job security, and occasionally fame in return for their contributions to society.[12] Salk, Sabin, and Enders, for example, offered the polio vaccine to the public domain and not only gained the respect of the scientific community, but also a place in the annals of history.[13]

Paradoxically, these discoveries have often rested on the "transcendent uselessness" of academic freedom.[14] That is, by

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8. David Bollier, *The Enclosure of the Academic Commons*, ACADEME, Sept.–Oct. 2002, at 19, *available at* http://www.aaup.org/publications/Academe/2002/02so/02sobol.htm. [hereinafter Bollier, *Academic Commons*].

9. *Id.*

10. Peter Blumberg, Comment, *From "Publish or Perish" to "Profit or Perish": Revenues From University Technology Transfer and the § 501(c)(3) Tax Exemption*, 145 U. PA. L. REV. 89, 91 (1996).

11. Press & Washburn, *supra* note 1, at 46 ("New products and new processes do not appear full grown . . . . They are founded on new principles and new conceptions, which in turn are painstakingly developed by research in the purest realms of science."); *see also* Michael A. Carrier, *Resolving the Patent-Antitrust Paradox Through Tripartite Innovation*, 56 VAND. L. REV. 1047, 1082 (2003) (noting that "'basic' upstream research is the building block for downstream product applications. The basic research, which has no commercial value by itself, creates gateways . . . to products.").

12. *See* Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. U. L. REV. 77, 90 (1999) (stating that "the scientist's claim to 'his' intellectual 'property' is limited to that of recognition and esteem") (emphasis removed); ROBERT K. MERTON, THE SOCIOLOGY OF SCIENCE: THEORETICAL AND EMPIRICAL INVESTIGATIONS 323 (1973) (noting that "rewards are largely honorific . . . [and] are to be meted out in accord with the measure of accomplishment").

13. Wilfrid Sheed, *The Time 100 Most Important People of the Century: Jonas Salk*, TIME, Mar. 1999, at 168, *available at* http://www.time.com/time/time100/scientist/profile/salk.html.

14. *See* JOHN HENRY NEWMAN, THE IDEA OF UNIVERSITY 291 (Frank M. Turner ed., Yale U. Press 1996); *see also* Ben R. Martin & Henry Etzkowitz, *The Origin and Evolution of the University Species*, 13 VEST J. SCI. & TECH. STUDIES 9, 18 (2000), *at* http://www.vest-journal.net/Mart-Etz.pdf (noting that the 'classical university' is the "'ivory tower' of independent scholars producing knowledge for

providing academic faculty with the ability to pursue their research agenda regardless of its immediate usefulness, a haven for controlled, and often serendipitous, creativity was born.[15] In fact, entire industries are now based on research that was *once* considered to be so upstream it was difficult to fund.[16] Nobel prize-winning chemist Paul Berg underscores this idea:

> The biotech revolution itself would not have happened had the whole thing been left up to industry . . . [where] venture capital people steered clear of anything that didn't have obvious commercial value or short term impact. They didn't fund the basic research that made biotechnology possible.[17]

Moreover, had Paul Berg been beholden to a private firm, it is unlikely he would have been able to lay the groundwork for splicing DNA to make hybrid molecules, because it was considered so upstream as to be of questionable utility.[18] Thus, the subsequent work of Stanly Cohen and Herbert Boyer—creators of the recombinant DNA clone—would have been hampered or stillborn; the birth of the biotech industry may have been significantly delayed or even strangled in the cradle for lack of any short-term utility.[19]

Therefore, while academic freedom, at least in basic research, may at first appear to lack utility, it is precisely this insulation from market constraints which may ultimately lead to the inception of an entirely new and quite lucrative industry. With this in mind, the historical trajectory of academic freedom in American higher education bears further examination. It is precisely this trajectory that vividly demonstrates the encroachment of the corporate culture—an industrial culture and marketplace that reward the hoarding of ideas—into the commons of the academic research gift culture—a paradigm based on academic freedom, collaboration, and a gift economy.

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its own sake and passing it on to students to enable them to develop their full potential").

15. *See* NEWMAN, *supra* note 14.

16. Press & Washburn, *supra* note 1, at 54.

17. *Id.*

18. *Id.* Berg recalled that shortly after his own discovery he met a young scientist who had been pursuing the same idea for Merck, a leading pharmaceutical company. When this scientist encountered obstacles after six or seven months, Merck terminated the research. *Id.*

19. *See id.*

A. A Brief History of Academic Freedom

Our modern conception of academic freedom is largely the product of Twentieth Century American thought.[20] However, as one might expect, it is informed by a longer history. Painting in broad strokes, two historical strands contribute to the modern conception of academic freedom: the Medieval Parisian principle of relative faculty autonomy and the nineteenth century German tradition of 'lehrfreiheit,' the right of a university faculty to teach free.[21] The first strand, faculty autonomy, meant that a faculty member in a medieval university enjoyed a degree of protection from outside powers. Thus, a faculty member was protected—for example, from local politics—by virtue of membership in a faculty guild and as a result of the independence and prestige of European universities.[22] The second strand, 'lehrfreiheit,' meant that university professors were free to examine bodies of evidence and to report those findings through lecture or publication, though the right did not extend beyond the walls of the university.[23] Thus, 'lehrfreiheit,' too, offered academics protection from external pressures.

It is against this panoramic historical backdrop that the American university system and the modern notion of academic freedom are situated. Nearly a century ago, the American Association of University Professors (AAUP) noted that in order to effectively discover and convey knowledge to the public, an environment insulating scholars and researchers from external pressures was required.[24] Of course, the university was such a vehicle; its cornerstone was academic freedom. The AAUP presented its mission as advancing academic freedom,

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20. Donald D. Schmeltekopf, *Whence Academic Freedom*, Remarks at Spring 2000 Conference on Academic Freedom 2 (Feb. 11, 2000) *at* http://www.uvsc.edu/ethics/conftrans/acafree-schmeltekoph.pdf (noting that "[o]ur concept of academic freedom is both modern and generally American").

21. *Id.* at 6.

22. *Id.* at 4 ("So when feuds arose between town and gown, and they often did and occasionally were bloody, the faculty was not without bargaining power . . . [such as] the cessation of lectures.").

23. *Id.* at 5.

24. Am. Ass'n of U. Professors, *Declaration of Principles* (1915), reprinted in ACADEMIC FREEDOM & TENURE, 157–76 (Louis Joughin ed., 1969) *available at* http://www.campus-watch.org/article/id/566 [hereinafter *Declaration*] ("[The] function is to deal at first hand, after prolonged and specialized technical training, with the sources of knowledge; and to impart the results of their own and of their fellow-specialists' investigation and reflection, both to students and to the general public, without fear or favor.").

defining fundamental professional values and standards of higher education, and ensuring that universities continued to contribute to the common good.[25] Over time, the AAUP helped shape higher education in America by developing procedures and standards designed to maintain both the quality of American education and a modicum of academic freedom.[26]

For example, the AAUP's *1915 Declaration of Principles* ("*1915 Declaration*") enumerated an individual faculty member's right to teach, research, and publish, as well as to write or speak as a concerned citizen independent of the university setting.[27] Accordingly, the *1915 Declaration* mandated that university professors be insulated from "pecuniary motive or inducement" to espouse conclusions that were not the authentic result of their own study.[28] Rebecca Eisenberg, in her study of academic freedom, parses this concept well by noting that "academic freedom protects faculty members from trustees and university administrators so that professional scholars will say what they think."[29] While this initial *1915 Declaration* sought to protect scholars and researchers from the university itself, noticeably absent were explicit statements regarding corporate sponsorship.[30]

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25. *See* Am. Ass'n of U. Professors, *at* http://www.aaup.org/ (last visited Feb. 25, 2004).

26. *See generally* Am. Ass'n of U. Professors, *AAUP Academic Freedom Resources*, *at* http://www.aaup.org/Com-a/resources.htm#redbook (last updated Jan. 2004).

27. *See generally Declaration*, *supra* note 24, at 157–76.

28. *Id.* at 162.

29. Rebecca S. Eisenberg, *Academic Freedom and Academic Values in Sponsored Research*, 66 TEX. L. REV. 1363, 1366 (1988) [hereinafter Eisenberg, *Academic Freedom*].

30. One reason the Declaration may have failed to address standards regarding academic industrial collaborations is because such joint ventures were still in their infancy. *See* DAVID NOBLE, AMERICA BY DESIGN 112 (1977). Noble notes:

> During the first three decades of the twentieth century . . . the corporate engineers undertook to organize and harness science to industry. Their work evolved in three overlapping phases. The first involved the establishment of organized research laboratories within the industrial corporations . . . . The second concerned the active support of, and cooperation with, research agencies outside of the corporations: trade-association laboratories, research foundations, government bureaus, and most important, the science and engineering departments of the universities. The third saw the national coordination of these myriad research activities . . . . The first two developments began roughly around the turn of the century, the third surfaced during World War I.

Two and a half decades later, in the *1940 Statement of Principles on Academic Freedom and Tenure* ("*1940 Statement*"), the AAUP addressed the issue of faculty 'moonlighting'—that is, industrial side projects for pecuniary gain—by noting that such endeavors were acceptable if sanctioned by the university itself.[31] Though the overall attitude towards academic freedom remained more or less unchanged, the *1940 Statement* contained a noticeable shift in policy. Rather than simply protecting the faculty from the university, the AAUP also sought to protect the university from faculty members unduly influenced by industry.[32] Therefore, under this policy, universities were held responsible for creating standards and screening their faculty members for conflicts of interest in order to protect themselves from the unscrupulous acts of employees.[33] Over time, both the *1915 Declaration* and the *1940 Statement* came to represent industry custom.[34] Thus, even though the AAUP's guidelines were only binding if adopted by universities themselves, they were of great persuasive value. That the *1915 Declaration* and *1940 Statement* are considered authoritative is evidenced by their use in the courts, including

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See also Eisenberg, *Academic Freedom*, *supra* note 29, at 1367–68. It seems implicit in Eisenberg's argument that academic-industrial collaborations were not generally considered a threat in 1915:

> [T]he authors of the [1915 Declaration] give only passing attention to the subject of research in defining the scope of academic freedom, focusing instead on contemporary threats to freedom of teaching and extramural utterances. They broadly define academic freedom as comprising "freedom of inquiry and research; freedom of teaching within the university or college; and freedom of extra-mural utterance and action." But after giving "freedom of inquiry and research" top billing in this opening definition, they immediately dismiss this category of freedom from their list of concerns in the next two sentences: "The first of these freedoms is almost everywhere so safeguarded that the dangers of its infringement are slight. It may therefore be disregarded in this report."

31. Am. Ass'n of U. Professors, *1940 Statement of Principles on Academic Freedom and Tenure* (1940), *at* http://www.aaup.org/statements/Redbook/1940stat.htm ("Teachers are entitled to full freedom in research and in the publication of the results, subject to the adequate performance of their other academic duties; but research for pecuniary return should be based upon an understanding with the authorities of the institution.").

32. *See id.*

33. *See id.*

34. Risa L. Lieberwitz, *The Corporatization of the University: Distance Learning at the Cost of Academic Freedom*, 12 B.U. PUB. INT. L.J. 73, 85 (2002) ("[T]he AAUP academic freedom principles have been internalized by the academic profession and, in important ways, by academic institutions.").

the U.S. Supreme Court.[35] The Court, in turn, also helped form the modern notion of academic freedom through its own contributions. For example, in *Sweezy v. New Hampshire*, Justice Frankfurter noted that:

> It is the business of a university to provide that atmosphere which is most conducive to speculation, experiment and creation. It is an atmosphere in which there prevail 'the four essential freedoms' of a university—to determine for itself on academic grounds who may teach, what may be taught, how it shall be taught, and who may be admitted to study.[36]

In 1964, the AAUP expanded its policy regarding conflicts of interest beyond its *1915 Declaration* and *1940 Statement*.[37] The AAUP's *1964 Statement on Preventing Conflicts of Interest in Government-Sponsored Research at Universities* ("*1964 Statement*") placed emphasis on protecting the government as a research sponsor.[38] The *1964 Statement* continued to develop the notion that an individual researcher might have an insurmountable conflict of interest.[39] In this statement, "the villain is [again] the [academic] faculty member co-opted by industry," while "the victim is the university *and* its public benefactor."[40] Thus, in contrast to the *1940 Statement*, which painted the university as the *only* victim, the *1964 Statement* considered the government, and ultimately the taxpayer, as a vulnerable

35. *See, e.g.*, Roemer v. Bd. of Pub. Works of Md., 426 U.S. 736, 756 (1976) (finding relevant the fact that "each college [at issue] subscribes to, and abides by, the 1940 Statement of Principles on Academic Freedom of the American Association of University Professors"); Tilton v. Richardson, 403 U.S. 672, 681–82 (1971) (finding relevant that "all four institutions . . . subscribe to the 1940 Statement of Principles on Academic Freedom and Tenure endorsed by the American Association of University Professors and the Association of American Colleges").

36. Sweezy v. New Hampshire, 354 U.S. 234, 263 (1957) (Frankfurter, J., concurring) (quoting a statement of a conference of senior scholars from the University of Cape Town and the University of the Witwatersrand); *id.* at 250 (finding that the government's inquiry into the subject matter of a University of New Hampshire lecturer's presentations "unquestionably was an invasion of . . . liberties in the areas of academic freedom and political expression—areas in which the government should be extremely reticent to tread"); *see also* Regents of Univ. of Cal. v. Bakke, 438 U.S. 265, 312 (1978).

37. Eisenberg, *Academic Freedom*, *supra* note 29, at 1369.

38. *Id.*

39. *Id.* at 1369–70.

40. *Id.* at 1369 (emphasis added).

party.[41] Yet, the *1964 Statement*, while legitimately addressing the possibility of unscrupulous researchers influenced by corporate dollars, failed to address the even greater risk that an entire faculty could "be co-opted by the interests of government and corporate sponsors of on-campus research."[42] Such blind spots led to criticisms that the AAUP failed to address the more relevant and timely issues confronting academic freedom.[43]

Perhaps the AAUP heard these concerns, because in 2001 it released its *Statement on Corporate Funding of Academic Research* ("*2001 Statement*").[44] Beginning on a traditional note, the *2001 Statement* touted the old party line stressing both the importance of academic freedom and the need to transmit knowledge to the public.[45] Additionally, it acknowledged the place of the industry-university collaboration by stating that:

> Research universities have long collaborated with industry to their mutual benefit. The relationship has been the most productive for both parties when scholars are free to pursue and transmit basic knowledge through research and teaching. Learning, intellectual development, and progress—material, scientific, and technological—require freedom of thought and expression, and the right of the researcher to convey the results of inquiry beyond the classroom, laboratory, or institution.[46]

However, soon thereafter the *2001 Statement* took an ominous turn that echoed concerns Eisenberg had voiced for over a decade, when it noted that:

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41. *Id.* at 1369–70. Eisenberg paraphrases a litany of concerns present in the 1964 statement:

> [F]aculty members working under a government contract while simultaneously benefiting financially from relationships with companies might orient their government-sponsored university research to meet the needs of the private company, purchase equipment from the company, transmit to the company government-sponsored work product not made generally available, or make unauthorized use of privileged information acquired in connection with government-sponsored research.

42. *Id.* at 1370.

43. *Id.* at 1370–71.

44. Am. Ass'n of U. Professors, *Statement on Corporate Funding of Academic Research* (2001), *at* http://www.aaup.org/statements/Redbook/repcorf.htm.

45. *Id.*

46. *Id.*

> The relationship, however, has never been free of concerns that the financial ties of researchers or their institutions to industry may exert improper pressure on the design and outcome of research. This is especially true of research that has as its goal commercially valuable innovations, which is the most common type of industry-sponsored research .... Moreover, the impact of corporate funding of university research has greater influence where it is most heavily focused, primarily in the fields of medicine, biology, chemistry, and engineering.[47]

Finally, in a 2002 publication of a survey of the legal landscape of academia, the AAUP reiterated that the involvement of corporations in the university system may threaten "academic freedom in research when corporate interests clash with the unfettered pursuit of truth."[48]

In short, the AAUP sought to protect individual faculty members from the university itself in 1915. It sought to protect universities from 'moonlighting' faculty members in 1940 and, in contrast, sought to protect government sponsors from unscrupulous researchers influenced by corporate dollars in 1964. Finally, in 2001 and 2002, the AAUP sought to protect the fundamental notion of the university as the repository of academic freedom from the influx of corporate cash.

Such a wide array of concerns illustrates three points. First, by observing the AAUP's shifting emphasis over the years of just who needed protection from whom, it is evident that these statements underscore the complexity of multiple issues and tensions. Second, these statements suggest that the relationships between the public, individual academic researchers, universities, and corporations are delicate and can be heavily influenced by market forces. Finally, the reaction of the AAUP, evident in an accretion of policy changes, to increasing market pressures on these bastions of "transcendent uselessness" highlights the growing controversy surrounding academic-industrial collaborations.[49]

To summarize, the notion of academic freedom is deeply rooted in American history. This freedom, unchained from the

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47. *Id.*

48. Donna R. Euben, *Academic Freedom of Individual Professors and Higher Education Institutions: The Current Legal Landscape* (May 2002), *at* http://www.aaup.org/Com-a/aeuben.htm.

49. *See supra* text accompanying note 14.

influences of the market, plays a crucial role in the knowledge industry and stands to significantly benefit the public. However, the evolution of the AAUP's statements regarding academic freedom—a century's worth of policy concerns—has ominous overtones and suggests a growing tension between the academy and industry.

B. Criticism of "Transcendent Uselessness": A Utopian Narrative?

However, another group of scholars and educators considers such hand-wringing overblown. Commercialization, these critics argue, has long been an important part of academic life.[50] Moreover, they claim these collaborations are, by and large, productive and provide much needed financial support to academic research labs; to claim otherwise is to dramatize a minor issue.[51] In turn, these critics marshal persuasive arguments against what they see as an unrealistically utopian narrative.[52]

First, critics point out that the notion of the university being insulated from market forces is at best naïve and, at worst, sheer falsehood.[53] As noted by David Noble, prior to the 1900s,

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50. Felicia R. Lee, *Academic-Industrial Complex*, N.Y. TIMES, Sept. 6, 2003, at B9, B11.

51. *Id.* Lee quotes University of Southern California President Steven B. Sample as saying:

> Commercialization has been an important part of academic life for a long time, especially in American higher education .... It's extraordinarily competitive for research grants, gifts, faculty, students. But a lot of the reason for our success has been the intense level of competition. I'm thinking of research universities in particular.

Id.

52. F. Scott Kieff, *Facilitating Scientific Research: Intellectual Property Rights and the Norms of Science—A Response to Rai and Eisenberg*, 95 NW. U. L. REV. 691, 692 (2001) (noting a "mischaracteriz[ation of] the pre-1980 basic biological research community. The community's norms did not discourage intellectual property before 1980, or thereafter. Furthermore, [the] portrait does not account for the pernicious, selfish behavior that existed in this highly competitive and stratified community before 1980 and that persists today."); *see also* Arti Kaur Rai, *Evolving Scientific Norms and Intellectual Property Rights: A Reply to Kieff*, 95 NW. U. L. REV. 707, 707 (2001) ("According to Kieff, my Article sets up the period before 1980 as the benchmark against which the current patent system should be judged [and] paints the research community that existed before 1980 as a scientific utopia.").

53. NOBLE, *supra* note 30, at 110.

academic-industrial collaboration was "rare and isolated."[54] However, exponential turn-of-the-century growth of both industry and education was concomitant with a surge in academic-industrial collaboration.[55] Industrial giants, both engineering and chemical, would foot research bills in return for the services of academic research scientists.[56] Universities subsequently established industrial research centers to furnish corporations with personnel, while some schools went into business themselves.[57] The University of Minnesota, for example, operated its own mine, while New York University entered the food industry by establishing a macaroni factory.[58]

Second, supporters of academic-industrial collaboration argue that there is nothing inherently deceptive or sly about these joint ventures, given the utilitarian strand of American higher education.[59] They claim that one need only browse through the works of Thomas Jefferson or John Dewey to realize there is nothing shameful about an educational system that works to solve real-world problems.[60] Additionally, these critics point out that the public university system was historically predicated upon practicable marketplace results.[61] To support this assertion they offer the history of the land grant university.

In 1862, the Morrill Act gave rise to America's public land grant universities on the explicit premise that states should create centers of education that teach "agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes . . . ."[62] The Act was intended to offer a broad segment of the population a practical education with real life application.[63] By providing federal funds to a state, based on its number of Congressional representatives, these funds—or 'land scrips'—provided an endow-

54. *Id.* at 110–11.
55. *Id.* at 111.
56. *Id.* at 111–15.
57. *Id.*
58. Press & Washburn, *supra* note 1, at 45.
59. *Id.*
60. *Id.*
61. *Id.*
62. Morrill Act, 37 Cong ch. 130, § 4, 12 Stat. 504 (1862) (codified as amended at 7 U.S.C. § 304 (2000)).
63. James R. Fischer, *The Idea of a Land Grant University*, remarks to the President's Colloquium at Clemson U. 1 (Nov. 9, 2000), *at* http://www.clemson.edu/caah/cedp/pres_coll/images/Fischer.pdf.

ment to form at least one university in each state; hence the term "land grant university."[64] In 1890, a Second Morrill Act funded seventeen land grant institutions to serve African Americans in southern states.[65] Finally, in 1994, the Equity in Educational Land Grant Status created twenty-nine Native American colleges in the western and plains states, bringing the total number of land grant universities in excess of 100.[66]

Rather than criticizing academic-industrial collaboration, proponents argue, such endeavors should be lauded as furthering the ultimate purposes of the Morrill Act, because universities participate in injecting both skilled laborers and useful goods into the marketplace.[67] In other words, given the origins of the land grant universities, one might view academic-industrial collaborations as just another manifestation of the utilitarian policy underlying the Morrill Act, the desire to create a more robust marketplace.

Finally, it is not uncommon to hear criticism of the university as an "ivory tower,"[68] that "transcendent uselessness" is an unaffordable luxury, self-indulgent, and a waste of taxpayer money.[69] Given the vast amount of resources expended to create upstream research whose only guarantee is that it *may* one day be useful, such a "shot in the dark" approach is both an antiquated and inefficient notion.[70] These arguments, and their ilk, serve as powerful reproof against what may well be considered the glorification of academic freedom.

The remainder of this comment seeks to respond to these pointed arguments. It argues that what is most disturbing about today's academic-industrial collaborations is not that substantial amounts of private capital flow into universities to facilitate technology transfer beneficial to both parties and the

64. *Id.* at 2.
65. *Id.*
66. *Id.*
67. Press & Washburn, *supra* note 1, at 45.
68. *E.g.*, Francis J. Mootz III, *A Future Foretold: Neo-Aristotelian Praise of Postmodern Legal Theory*, 68 BROOK L. REV. 683, 686 (2003) ("Outside the university, many lampoon academic life as a retreat to an ivory tower.").
69. Martin & Etzkowitz, *supra* note 14, at 14–15.
70. *Id.* at 14 (describing this inefficiency as the "Government throwing sacks of money over the wall to the scientists within the university who, at some later stage, may toss back the results of their research, only some of which may subsequently be picked up by firms and other 'users' and exploited to yield economic or social benefits").

public.[71] Instead, what is striking is that *more and more universities themselves are becoming indistinguishable from for-profit companies.*[72] Conceding that there was always some form of academic-industrial collaboration, it may be worthwhile to account for its mass proliferation. Discerning why almost every major academic research facility in the United States now has a technology transfer department brings one a step closer to understanding this significant paradigm shift.[73] The answer, in brief, lies in alterations in intellectual property law, most notably in judicial and legislative changes in the patent regime as well as state trade secret protection. As a result, the academic gift culture is suffering a sea change. In other words, it is threatened with the radical replacement of its traditional norm-based incentive structure by a new structure at odds with the academic mission, the essence of which can be summed up in one word: profit.[74]

II. NORMS AND THE GIFT ECONOMY OF ACADEMIC RESEARCH

When and why did public universities—which, before 1980, generally eschewed large-scale for-profit business ventures, with the exception of the occasional macaroni factory—begin to act and operate like for-profit organizations? The short answer is the seismic impact the Bayh-Dole Act had on the university system.[75] By allowing public universities to take title to the fruits of their research, the Act encouraged corporate underwriters to supplement the waning public funding of those same universities in return for licensing rights.[76] The result was the increased transfer of technology from the lab to the marketplace[77] and a potentially new stream of revenue for universities.

Yet, in order to understand the difference between the incentive structures that drove academic research scientists and

71. Press & Washburn, *supra* note 1, at 39–41.
72. *Id.*
73. *Id.* at 41.
74. Bollier, *Academic Commons*, *supra* note 8, at 19 ("In the course of one generation, the public-spirited ethic of the academy has been challenged by a frankly acquisitive ethic that aggressively seeks private ownership and profit from the fruits of university research.").
75. *Id.* at 20.
76. Rai, *supra* note 12, at 96–98.
77. *See id.*

universities before 1980, and what forces drive them today, an understanding of the norms of science is necessary. Thus, this part takes a slight detour through the world of scientific norms in order to illustrate how these norms coalesce into the traditional gift community of academic research. In short, a working definition of 'norm' and an understanding of the norms of universalism, communalism, disinterestedness, organized skepticism, and invention make this possible.

A. What Is a Norm?

As noted by Arti Rai, "[a] threshold question in law-and-norms theory is definitional: what is a norm?"[78] No doubt such a question is a philosophical issue in and of itself; however, for the purposes of this note, Rai's definition is sufficient. A norm is simply behavior people engage in out of a sense of obligation.[79] As distinct from a law, where violations are punishable by state actors, the violation of norms are generally punished by private actors in the form of informal or formal non-legal sanctions.[80] The norms of science, manifest in the traditional academic research community, are generally thought to be fourfold: universalism, communalism, disinterestedness, and organized skepticism.[81] Though sometimes deviated from, these fundamental norms are the constituent elements of what David Bollier calls the "gift economy" of academic research scientists.[82] As this part demonstrates, the beauty of the gift economy is its efficiency and the incentive structure it supports.

1. Universalism

First, the norm of universalism simply means that scientific truth claims are subject to "pre-established impersonal cri-

78. *Id.* at 81.

79. *Id.*

80. *Id.* (describing informal sanctions as "disdain or gossip" and formal sanctions as "exclusion from the group").

81. MERTON, *supra* note 12, at 270; *see also* Kieff, *supra* note 52, at 693 ("This set of prescriptive norms may be an accurate accounting of the consensus goals of the basic biological research community and a proper statement of what those goals should be.").

82. BOLLIER, SILENT THEFT, *supra* note 6, at 34–35.

teria."[83] In other words, the norm of universalism requires that the truth of a claimed observation be determined on the basis of impersonal criteria independent of the prejudices of the scientist who makes the observation.[84] Thus, "[t]he Haber process cannot be invalidated by a Nuremberg decree nor can an Anglophobe repeal the law of gravitation."[85] Of course, such a norm is incommensurate with secrecy as full disclosure becomes necessary to ensure sound conclusions and to avoid fraudulent results.[86] By implication, ephemeral results, or results that could not be recreated, are discounted as either anomalous or mistaken. Therefore, a principle is not universal until it can be freely replicated.[87]

2. Communalism

Next, communalism, in a non-political sense, means that substantive scientific discoveries are collaborative in nature, each advancement made possible by the work of one's progenitors.[88] Such a collaborative endeavor is then offered to the community at large.[89] Furthermore, because a scientist's claim to her intellectual property consists primarily of recognition, concern with scientific priority is natural and of critical importance; the right to exclude would act as a liability to the pursuit of knowledge.[90] Thus, in 1975, Goerges Kohler and Cesar Milstein, Nobel Prize winners for their development of monoclonal

83. MERTON, *supra* note 12, at 270.

84. Rebecca S. Eisenberg, *Proprietary Rights and the Norms of Science in Biotechnology Research*, 97 YALE L.J. 177, 183 (1987) [hereinafter Eisenberg, *Proprietary Rights*].

85. MERTON, *supra* note 12, at 270. Merton is suggesting that mere animus towards the English hardly invalidates Newton's observations regarding the nature of gravity. *See generally* Nuremberg Trial Held by the United States of America Under Control Council Law No. 10, *at* http://www.ess.uwe.ac.uk/genocide/cntrl10_trials.htm (last modified Mar. 15, 2002). The point here is that despite the wholly unethical behavior of German industry during the second world war, which was condemned wholesale during the Nuremberg trials, scientific developments—such as the Haber-Bosch nitrogen fixation process for the production of synthetic nitrates to be used in explosives—are considered valid or invalid apart from the moral context in which they are generated.

86. Rai, *supra* note 12, at 90–91.

87. MERTON, *supra* note 12, at 270 ("Objectivity precludes particularism.").

88. *Id.* at 273.

89. Rai, *supra* note 12, at 90 ("One central element of the scientific ethos that promotes the sharing of information in the public domain is the view that scientific knowledge is ultimately a shared resource.").

90. MERTON, *supra* note 12, at 273.

antibody technology, did not even ask if their method should be patented.[91] Similar to universalism, the notion of secrecy is the antithesis of such a norm. Likewise, according to sociologist of science Robert Merton, "[t]he communism of the scientific ethos is incompatible with the definition of technology as 'private property' in a capitalist economy."[92] In other words, the right of a scientist to exclude others is foreign to a collaborative multi-generational endeavor, because arbitrary exclusion could easily lead to holdouts, high transaction costs, and agonizingly slow growth.

3. Disinterestedness

Third, disinterestedness, as a scientific norm, requires the impartial pursuit of knowledge.[93] That is, scientists pursue knowledge rather than furthering their own pecuniary interests by advancing questionable or dishonest claims.[94] This is so because both the collegiality of communalism and the rigorous scrutiny of universalism conjoin to virtually eliminate charlatanism and fraud from scientific communities.[95] Thus, disinterestedness is likely the result of the constant policing of substantive claims of scientists by scientists.[96]

4. Organized Skepticism

Additionally, organized skepticism supports the other three norms by requiring the scientific community to subject truth claims and beliefs of its members to empirical scrutiny before accepting them as true.[97] Because scientists ask questions of fact concerning all aspects of society and nature, they may come into conflict with the attitudes of other institutions towards data that has been crystallized or ritualized over time.[98] As Merton puts it, in such instances, the scientist "does

91. Rai, *supra* note 12, at 93–94.
92. MERTON, *supra* note 12, at 275.
93. *Id.*
94. Eisenberg, *Proprietary Rights*, *supra* note 84, at 183.
95. *See id.* at 183–84.
96. MERTON, *supra* note 12, at 276.
97. Eisenberg, *Proprietary Rights*, *supra* note 84, at 183.
98. MERTON, *supra* note 12, at 277–78. The job of the scientist is to proclaim the world round, regardless of the dictates of the government or the church. *Id.*

not preserve the cleavage between the sacred and the profane."[99]

5. Invention

Finally, Rai adds the norm of invention to the list.[100] Even though research scientists who adhere to the norms of individualism and communalism benefit and merit some admiration, insofar as they are not sanctioned by their peers, the highest levels of recognition and the greatest rewards are reserved for those who make significant and original contributions to the "common stock of knowledge."[101] As a result, scientists are motivated to compete to be the first to present research results to the scientific community.[102] Broadly speaking, the hunt for recognition is linked primarily to incentives of status, and secondarily to pecuniary gain.[103] Of course, at a more practical level, the two are inextricably intertwined because recognition leads to tangible rewards, such as more grants, better academic positions, and greater influence on the course of research. Consider Salk, for example. It was inevitable that the first person to allay the fears of infant paralysis, or polio, would become a national hero and thereby enhance his own professional status.[104]

Also, this norm is so powerful that deviations from other norms may be tolerated in its name; thus, the norm of communalism might be placed in the background where invention is concerned.[105] Rai considers the case of James Watson and Francis Crick, a canonical example where the norm of invention preempted that of communalism.[106] In that instance Watson and Crick, competing with Linus Pauling to discover the makeup of DNA, refused to release their research results, though such information would have been beneficial to other

99. *Id.* at 277.
100. Rai, *supra* note 12, at 92.
101. *Id.*
102. *Id.*
103. MERTON, *supra* note 12, at 323 ("These rewards are largely honorific, since even today, when science is largely professionalized, the pursuit of science is culturally defined as being primarily a disinterested search for truth and only secondarily a means of earning a livelihood.").
104. *See* Sheed, *supra* note 13.
105. Rai, *supra* note 12, at 92.
106. *Id.*

research scientists, until they were ready to publish.[107] Similarly, invention could also lead a scientist to publish too quickly despite an obligation to only present the verified results of her research.[108]

B. Norms and the Gift Economy

Like other institutions, the scientific community has developed an intricate system for allocating rewards to those living up to its norms.[109] These norms are, in fact, its 'invisible hands' and they explain what appears, to the outsider at any rate, to be a profession filled with saints and altruists.[110] Keeping the norms of the scientific community in mind, it becomes possible to see how they coalesce and form the gift economy of the academic research commons. Thus, the interaction of these norms and the incentive structures they support culminates in a traditional scientific community of academic researchers operating mainly through gift-giving relationships.

First, collaboration and the sharing of data are a structural necessity if substantive claims are to be corroborated and recognized universally.[111] Second, without a communal approach in which work is shared, scrutinized, and built upon, scientific advancement comes at an excruciatingly slow pace.[112] Third, motives for short term personal gain are discouraged by rigorous scrutiny stemming from organized skepticism, in turn, buttressing the norm of disinterestedness.[113] Fourth, scientists' achievements are measured by the significance and accuracy of their publications and are rewarded through the enhancement of their status; for example, in the form of eponymously titled discoveries, such as Halley's Comet and Tourette's Syndrome, instead of property rights, extravagant salaries, or market share.[114] In order to achieve these incentives, scientists must disclose their data and the self-sustaining normative cycle be-

107. *Id.*
108. *Id.*
109. MERTON, *supra* note 12, at 297.
110. *Id.* at 267–78.
111. *See infra* Part II.A.1.
112. Rai, *supra* note 12, at 90–91 ("Secrecy can do serious damage to scientific inquiry by limiting feedback and verification [and] can also 'foster[] needless duplication of effort[].'") (quoting Sissela Bok, *Secrecy and Openness in Science: Ethical Considerations*, 7 SCI. TECH. & HUM. VALUES 32, 33 (1982)).
113. MERTON, *supra* note 12, at 275–78.
114. *Id.* at 322–25.

gins again. Fifth, though the norm of invention may have certain preemptive qualities in extreme circumstances, it is still situated and bound by additional norms.[115]

Thus, gift economies, by enforcing the aforementioned norms, serve to establish an inner commitment[116] amongst researchers so as to maintain, over the long haul, a vigorous and healthy marketplace of ideas *insulated from the actual marketplace.* This is not to say that research scientists are completely unaffected by the traditional marketplace; researchers do depend upon grants and other financial resources. Rather, the point is that gift economies are powerful systems for eliciting and developing virtues that the market cannot, such as collaboration, honor, trust, sociability, and loyalty.[117]

In other words, the entire normative structure is efficient *precisely because* the intangible scientific norms of the gift community work in tandem to create the inner commitment necessary among researchers to collaborate in achieving scientific and technological advancement.[118] Additionally, because the scientific community polices itself, the transaction costs of relying on legal regimes to produce desirable behaviors are minimized, as unofficial sanctions help to dissuade undesirable behavior.[119] With this framework in the background, it becomes possible to see what is at stake when the norms of the academic research gift economy are disrupted by shifts in intellectual property law.

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115. Rai, *supra* note 12, at 92.

116. MERTON, *supra* note 12, at 269 ("[T]hese imperatives, transmitted by precept and example and reenforced [sic] by sanctions are in varying degrees internalized by the scientist, thus fashioning his scientific conscience.").

117. BOLLIER, SILENT THEFT, *supra* note 6, at 30.

118. *See id.* at 35. Bollier notes:

> Market forces are ill suited to sustaining these values, however, because monetary punishment and reward are a problematic tool for nurturing moral commitment. If someone's ethics, loyalty to the community, or moral judgment can be "bought" by money, then those inner values are not really very deep or secure. An *inner commitment*, and not just external appearances, must be secured. . . .
>
> . . . [A] gift economy is particularly effective in cultivating deep and unswerving values.

119. Rai, *supra* note 12, at 82–83. According to Rai, "[t]o the extent that norms of invention and communalism are eroded by pressures to secure property rights, we lose a relatively cost-free mechanism for enriching the store of knowledge." *Id.* at 119.

III. INTELLECTUAL PROPERTY LAW AND ITS EFFECT ON THE NORMS OF SCIENCE

Whereas the vast bulk of university research was once funded by the public through the federal government's collection of taxes, corporations now fund a significant amount of research at public universities.[120] Changes in intellectual property law, in particular the Bayh-Dole Act, precipitated this transformation by ushering in the age of technology transfer.[121] In addition, the expanding sphere of patentable subject matter and new common law trade secret protection also created incentives for both the university and industry to participate in technology transfer.[122] As a result, these changes in intellectual property law are having a radical impact on the gift economy of the academic research commons and threaten to precipitate its enclosure; effectively sounding the death knell of this unique tradition.[123] In short, the exclusivity-based norms of the market are incommensurate with the norms of the academic research commons, which are based on the free-flow of information.

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120. Press and Washburn, *supra* note 1, at 40:

> Although the federal government still supplies most of the funding for academic research (it provided $14.3 billion, or 60 percent, in 1997, the latest year for which figures are available), the rate of growth in federal support has fallen steadily over the past twelve years, as the cost of doing research, particularly in the cutting-edge fields of computer engineering and molecular biology, has risen sharply.

121. As Jennifer Washburn put it:

> The growing commercialization of the academy can be traced to the Bayh-Dole Act of 1980, which allowed universities to patent federally-funded research for the first time. Congress' intent in passing Bayh-Dole was to bring ideas out of the ivory tower and into the marketplace more quickly to help fuel U.S. economic growth. And I think to a large extent it has achieved this objective.

Jennifer Washburn, *The Idea of the University: The Corporate University or the High Seminary of Learning*, The Presidential Colloquium, Clemson University 3 (2001), *at* http://www.clemson.edu/caah/cedp/pres_coll/images/Wasburn.pdf.

122. Rai, *supra* note 12, at 100–03.

123. Bollier, *Academic Commons*, *supra* note 8, at 20 ("Bayh-Dole has also exacted long-term costs that many universities prefer not to confront: a sweeping privatization of publicly funded knowledge, a ceding of research agendas to the private sector, and an erosion of public confidence in the independence of university research.").

A. The Encroaching Market: The Bayh-Dole Act

However, in order to understand this clash of norms, certain threshold matters are relevant. Crafting a working definition of technology transfer and examining the Act itself becomes necessary. Therefore, an understanding of technology transfer, the debate surrounding the Act, and its contents is warranted.

1. Technology Transfer

1980 was a pivotal year for patent law and brought two Acts that encouraged greater technology transfer between the lab and the market.[124] Though the phrase "technology transfer" sometimes varies according to context, it generally refers to the process in which technology developed by a government-funded entity in one area for one purpose is used in another area for another purpose.[125] The benefits of such a transfer are fairly obvious, because technology applied beyond its original use is cost efficient. Furthermore, the cross-pollination of ideas, as well as the convergence of multiple technological advancements, increases the likelihood of further scientific achievement.[126] These desirous qualities made technology transfer attractive to a Congress looking for a way to increase the technical prowess of the nation.

2. Legislating the Commons: Debating Bayh-Dole

With this in mind, Congress began to pass legislation with an eye towards technology transfer. The first significant Act of Congress in the field of technology transfer was the Stevenson-Wydler Technology Innovation Act, which made technology transfer an important part of the research and development responsibilities of federal laboratories.[127] As a result, technology transfer was designated as a purposive task for federal agen-

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124. Rebecca S. Eisenberg, *Public Research and Private Development: Patents and Technology Transfer in Government-Sponsored Research*, 82 VA. L. REV. 1663, 1663–64 (1996) [hereinafter Eisenberg, *Public Research*].

125. Angeline G. Chen, *Technology Transfers in the Aerospace Industry: General Observations*, 17 AIR & SPACE LAW. 8, 8 (2002).

126. *Id.*

127. Eisenberg, *Public Research*, *supra* note 124, at 1665.

cies to pursue deliberately.[128] However, by far the more important legislation for the scope of this comment is Bayh-Dole, an Act specifically designed to foster academic-industrial collaborations between universities and corporations.[129] Behind the Bayh-Dole Act were large chemical, electronic, and pharmaceutical corporations lobbying to reverse the presumption that research funded by the federal government would either be placed in the public domain or be licensed nonexclusively.[130]

In short, the Bayh-Dole lobbyists wanted to persuade Congress that the tradition of placing research results in the public commons was not conducive to technology transfer.[131] Proponents of the Act argued private firms were unwilling to lend their resources to public university research departments to develop marketable inventions when those discoveries would simply pass into the public domain.[132] Whereas the major principle in the decades after World War II was that technology owned by the government was for "everyone's benefit," supporters of the Act claimed that this policy effectively rendered government-owned technology for "nobody's benefit."[133] It simply gathered dust in government repositories. Therefore, if a firm were to invest in university research, the only way to guarantee it would recoup its investment would be to ensure a market advantage. Allowing the university to take title to technological innovations and in turn license that title to its corporate underwriters was such a market advantage.[134]

However, under the pre-1980 regime, the government retained intellectual property rights to such research; thus, a

128. *Id.*

129. *See* Bollier, *Academic Commons*, *supra* note 8, at 20.

130. *Id.*

131. Eisenberg states:

> Previous legislation had typically encouraged or required that federal agencies sponsoring research make the results widely available to the public through government ownership or dedication to the public domain. But in this new vision, . . . the public domain was a treacherous quicksand pit in which discoveries sink beyond reach of the private sector. If the results of federally-sponsored research were to be rescued from oblivion and successfully developed into commercial products, they would have to be patented and offered up for private appropriation.

Eisenberg, *Public Research*, *supra* note 124, at 1663–64 (citation omitted).

132. *Id.* at 1698–99 ("University-owned patent rights would facilitate [the technology transfer] process in part by providing a source of exclusive rights to assure private firms that successful products would be profitable.").

133. Kerrigan & Brasco, *supra* note 5, at 279.

134. *See* Eisenberg, *Public Research*, *supra* note 124.

firm would have to go through the unwieldy process of trying to license inventions from the federal government.[135] Therefore, the argument culminated, the current regime was terribly inefficient. In the end, allowing universities to take title to their academic research was not an incentive to invent; researchers were already doing this without legislative protection. Instead, the Act was aimed at corporate underwriters who, because of these newly added layers of legal protection, would be encouraged to underwrite university research so as to turn inventions into marketable products.[136]

In contrast, opponents of the Act pointed out that such an incentive system would deprive the American people of the fruits of the academic research commons.[137] That is, consumers would be cheated twice, once when they were taxed to subsidize academic-industrial collaborations and again when they were forced to pay monopoly prices to the exclusive licensees of academic research inventions.[138] Furthermore, there would be nothing to stop a university from using government funding to create a useful product, then licensing it to a corporate firm.[139] Congressman Jack Brooks, then a representative from Texas and perhaps the most outspoken opponent of the Act, stated that it was a "pure giveaway of rights that properly belong to the people," and that "[t]he federal government ha[d] the equivalent of a fiduciary responsibility to the taxpayers of this country."[140] However, such cries fell on deaf ears and the Act passed.[141]

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135. *Id.* at 1699 ("Much of the testimony in opposition to government ownership focused on the poor track record of the government in getting its patent portfolio licensed for commercial development.").

136. Eisenberg notes:

> [W]hen universities are assured of patent rights in the results of federally-sponsored research, it is easier for them to attract industrial funding for related research on campus, because industrial sponsors need not be concerned that they will lose the rights to develop any commercially interesting discoveries that come out of the research . . . because of government patent policy.

Id. at 1700 (citation omitted).

137. *Id.* at 1966–67.

138. *Id.*

139. *Id.*

140. *Amending the Patent and Trademark Laws: Report to Accompany H.R. 6933, Before the House Comm. on the Judiciary*, 96th Cong. 29, 32 (1980) (dissenting views of The Honorable Jack Brooks).

141. Pub. L. No. 96-517, 94 Stat. 3019 (codified as amended at 35 U.S.C. §§ 200–211 (1980)).

3. Contents of the Bayh-Dole Act

Crafted with the marketization of the commons in mind, the Act's policy and objective is to create the same kinds of relationships that caused the AAUP in 2001 to warn universities of heedlessly engaging in academic-industrial collaborations without sufficient forethought.[142] The Bayh-Dole Act states:

> It is the policy and objective of Congress to use the patent system to promote the utilization of inventions arising from federally supported research . . . ; to encourage maximum participation of small business firms in federally supported research . . . ; to promote collaboration between commercial concerns and nonprofit organizations, including universities . . . .[143]

To this end, Congress included two new policies. First, universities were permitted to "retain title to any subject invention" and second, those same universities were required "to share royalties with the inventor."[144] In other words, Congress created a presumption that a researcher involved in a project who wanted to patent her discovery would be preferred over another who felt the discovery should be offered up to the public domain.[145] Thus, if it looks like money is to be made through the patenting of government-sponsored research, it is likely to be patented.[146] In sum, Congress, in an effort to foster short term growth through technology transfer, enacted legislation, particularly the Bayh-Dole Act, which made academic research infinitely more attractive to corporate industry. However, Congress acted without addressing the long term effects of the imposition of market norms upon the existent gift economy of academic research.

B. The Encroaching Market: Patents and Trade Secrets

In addition to the Bayh-Dole act, further changes in the patent system, as well as robust new common law trade secret protection, made technology transfer a significantly easier and

142. Am. Ass'n of U. Professors, *supra* note 44 and accompanying text.
143. 35 U.S.C. § 200 (2000).
144. 35 U.S.C. § 202 (2000).
145. Eisenberg, *Public Research*, *supra* note 124, at 1666.
146. *Id.*

more attractive option than it had been only a few decades before.[147] Understanding this shift in intellectual property law sets the stage for an examination of the resulting tension and clash between traditional market forces and the norms of the academic commons. What follows is an examination of the shift in the law of both patents and trade secrets.

1. Patents

Until the early 1980s, to what extent computer software[148] and man-made life forms[149] were generally patentable was unsettled. For example, in *Parker v. Flook*, algorithms in computer software failed to meet the standard of patentability as they were considered abstract scientific or mathematical principles.[150] Thus, the rule of *Flook* and its progeny basically rendered algorithms patentable only when they were fixed in hardware.[151]

However, about the time the Bayh-Dole Act met with Congressional approval, the Supreme Court greatly expanded the scope of patentable subject matter. Two cases, *Diamond v. Chakrabarty*[152] and, later, *State Street Bank and Trust Co. v. Signature Financial Group*,[153] ushered in a new epoch of the patent regime best summed up by the *Chakrabarty* Court's bold claim that "'anything under the sun that is made by man'" is patentable.[154] In that same case, the question of whether living organisms created or isolated in nature were patentable was finally laid to rest: living organisms were patentable so long as they were man-made or isolated by man in nature.[155] As for *State Street*, that decision allowed the patenting of

147. Rai, *supra* note 12, at 100–03.

148. *See generally* Parker v. Flook, 437 U.S. 584 (1978).

149. *See generally* Diamond v. Chakrabarty, 447 U.S. 303 (1980).

150. *Flook*, 437 U.S. at 954 (holding "[h]ere it is absolutely clear that respondent's application contains no claim of patentable invention").

151. *Id.*; *see also* Gottschalk v. Benson, 409 U.S. 64, 71–72 (1972) (where the Court held that a process for converting binary-coded decimal numerals into binary number was unpatentable); *but see* Diamond v. Diehr, 450 U.S. 175, 184 (1981) (essentially reversing *Flook* by upholding as patentable a process for curing rubber that relied on a well-known algorithm).

152. *Chakrabarty*, 447 U.S. at 303.

153. State St. Bank & Trust v. Signature Fin. Servs., 149 F.3d 1368 (1998).

154. *Chakrabarty*, 447 U.S. at 309 (quoting the Committee Report accompanying the 1952 Act) (citation omitted).

155. *Id.*

mathematical algorithms when the result was "useful, concrete and tangible."[156]

In only a few years, the legal framework that acted as a catalyst for the booming business of computer software and biotechnology was born. Visions of royalty payments encouraged academic scientists to focus on marketable research; public universities could take title to research funded by the federal government, and finally the deep pockets of corporate America were willing to pay for the fruits of such labor. In short, public universities may now take title to publicly funded research, then license their discoveries to the highest bidder.

2. Trade Secrets

Developments in trade secret law also made technology transfer an attractive option for universities. Under most state trade secret law, if a university has developed technology of value with marketization in mind, it need only take reasonable precautions in order to have the indefinite protection of the law.[157] Trade secret protection lasts so long as there is a secret to protect and renders liable all who would misappropriate it, with the exception of those who make the discovery independently, through information publicly displayed, or through reverse engineering.[158] As a result, academic research inventions were protected while the preliminary steps towards the filing of a patent were taken. Of course, one cannot both protect a trade secret and publish it; therefore, publication of research would have to play second fiddle to a policy of technology transfer.

The Supreme Court's *Kewanee Oil Co. v. Bicron Corp.* decision significantly strengthened trade secret law.[159] Prior to *Kewanee Oil*, there was a circuit split as to "whether state trade secret protection [was] pre-empted by federal patent law."[160] *Kewanee Oil* ensured that common law trade secret protection was not preempted by the federal patent regime; thus, it would remain available to work in tandem with a newly

156. *State St. Bank & Trust*, 149 F.3d at 1373 (quoting In re Alappat, 33 F.3d 1526, 1544 (C.A. Fed. 1994)) (internal quotation marks omitted).

157. Jennings & Tomkies, *supra* note 2, at 248–49.

158. MERGES, INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGY AGE 61–63 (2d ed. 2000).

159. 416 U.S. 470 (1974).

160. *Id.* at 472.

enhanced patent system.[161] As a result, it was possible for state trade secret law to forbid the disclosure of technology developed in a research lab even though that technology was unpatentable.[162]

Finally, if trade secret law was not thought to be enough protection, contract law, in the form of nondisclosure agreements (NDAs), was always available.[163] Similarly, many companies that licensed materials and tools to researchers could require them to sign materials transfer agreements (MTAs) that assign or license any intellectual property discoveries made while using such research tools.[164]

C. *The Impact of Alterations in the Law of Intellectual Property*

The result was as expected. Less than twenty-five years after the passage of Bayh-Dole, the advent of *Diamond* and *State Street*, and the development of trade secret law in *Kewanee*, almost every research university in the nation has a technology transfer policy as well as a technology licensing office.[165] Some universities have gone even further: the University of Chicago created an affiliated non-profit whose mission was to launch start-up companies based on faculty inventions, while the Johns Hopkins Medical School established an internal venture capital fund to underwrite projects with technology transfer potential.[166] The short term benefits of Bayh-Dole are undeniable and technology transfer between the university and the marketplace has increased exponentially. As Bollier notes, "[o]ne need look only at the efflorescence of biotechnology parks and silicon corridors in university towns, the hundred of patents granted to universities (mostly a small club of research institutions), and the important technologies brought to the market."[167]

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161. *Id.* at 474.
162. *See id.*
163. Jennings & Tomkies, *supra* note 2, at 258–59.
164. Andrew Watkins & Isaac Leventon, *Technology Transfer Office*, *in* BIOTECHNOLOGY PATENTS & BUSINESS STRATEGIES 451, 469–70 (2003), *available at* 760 PLI/PAT 451.
165. Press & Washburn, *supra* note 1, at 41.
166. *Id.* at 46.
167. Bollier, *Academic Commons*, *supra* note 8, at 20.

Though no independent assessment of the Act's economic impact has been made, a consortium of roughly 300 research institutions and universities engaging in technology transfer—the Association of University Technology Managers (AUTM)—published a statistical survey of its members citing 2,578 start-up companies, which formed pursuant to a license of an academic invention since 1980.[168] Additionally, an estimated $34 billion in 1998 alone was generated as a result of technology transfer, producing in excess of a quarter million American jobs.[169] Other high profile cases cast university research as the goose that lay the golden egg. For example, the Cohen-Boyer patent—made possible by Berg's upstream research—involved over 200 licenses and brought in over $100 million in royalty income to the University of California and Stanford.[170]

Finally, it might be said that the Act exceeded its framers' wildest imaginations; it has even sparked similar legislation in Japan.[171] However, despite the $100 million royalty payments,[172] despite the exponential growth of technology transfer offices,[173] despite university technology-dependent start up companies and a multitude of potential new careers,[174] and despite the resounding huzzah of Congressmen patting themselves on the back,[175] the marketization of the academic research commons comes with a price. And, it is not entirely clear that this price is worth paying.

IV. THE PRICE TO BE PAID: LESSONS FROM FAUST

Just as Faust's bargain with Mephistopheles imperiled his soul,[176] so too do universities risk bargaining away their very essence. The traditional norms of science came into tension with marketplace norms due to the Bayh-Dole Act and other

168. Press & Washburn, *supra* note 1, at 47.
169. *Id.*
170. Jennings & Tomkies, *supra* note 2, at 243. See Part I, *supra* for a description of the Cohen-Boyer patent.
171. Press & Washburn, *supra* note 1, at 47.
172. See Jennings & Tomkies, *supra* note 2, at 243.
173. Press & Washburn, *supra* note 1, at 41.
174. *Id.* at 47.
175. Birch Bayh & Bob Dole, *Our Law Helps Patients Get New Drugs Sooner*, THE WASHINGTON POST, April 11, 2002, at A28 ("The law we passed is about encouraging a partnership that spurs advances to help Americans. We are proud to say it's working.").
176. GOETHE, *supra* note 7, at 183–85.

changes in intellectual property regimes. Clearly, these contradictory paradigms raise important issues, such as potential conflicts of interest,[177] the possible loss of objectivity by academic researchers,[178] potential loss of control of the research and teaching agendas,[179] threats to the non-profit status of public universities,[180] as well as high transaction costs of a disgruntled public, student population, and professional faculty.[181] In this part, various illustrations address technology transfer gone awry to illuminate the enormity of what is at stake for a university considering technology transfer collaborations. In sum, universities should be on notice that a strange panoply of misfortunes await those who do not take certain front-end precautions in academic-industrial collaborations.

Such pitfalls may be generally lumped into three categories: conflicts of interest, the stifling of creativity and innovation, and the high transaction costs of academic-industrial collaboration. Due to its scope, this part will focus only on the first two and say little about the third. Suffice it to say, one can imagine the additional transaction costs involved in placating students, teachers, the press, and a public furious over the destruction of an institution that holds a most sacred position in the American psyche.[182]

A. Conflicts of Interest

Because the injection of market influences can easily disturb the equilibrium of the academic research gift culture and erode traditional scientific norms, a myriad of potential conflicts of interest are born and serious consequences may result. First, researchers might lose their objectivity when they take financial interests—such as stock ownership—in companies promoting their research. Second, research funding comes

177. *See infra* Part IV.A.
178. *See infra* Part IV.A.1.
179. *See infra* Part IV.A.2–3.
180. *See infra* Part IV.A.4.
181. Press & Washburn, *supra* note 1, at 51 ("[I]n a graphic display of dissent, a student speaker placed the blue-and-orange Novartis logo [a corporation with whom the University had gone into business] directly above Berkeley's, while a hundred students in the audience mockingly donned graduation caps emblazoned with the Novartis logo."); *see also id.* at 40 (noting that more than half the faculty "believed that [Berkeley's business relationship with Novartis] would have a 'negative' or 'strongly negative' effect on academic freedom").
182. *See id.*

with conditions and these conditions may control the research agenda, curtailing traditional notions of academic freedom. Third, becoming heavily dependent upon corporate finance may radically alter what universities teach. Finally, universities that receive significant finance from firms may, in theory, lose their non-profit status.

Moreover, not all research universities have addressed these concerns.[183] An article in the Journal of the American Medical Association in 2000 found a lack of consensus among universities regarding conflict of interest policies and noted a lack of formal safeguards in place.[184] Just over half of one hundred universities required disclosure of conflicts of interest while only 19 percent limited a researcher's financial ties to her corporate sponsors.[185] Finally, only 12 percent of universities limited corporate-dictated delays on the publication of research data.[186]

1. Loss of Objectivity

Common sense suggests that even those of the highest integrity cannot help but be motivated, at least in some sense, by the influence of the market. When income becomes tied to the results of scientific experimentation, the traditional norm of disinterestedness breaks down.[187] This concern cuts two ways. On the one hand, the largesse of corporations could cause individual academic research scientists to lose their impartiality or objectivity, consciously or unconsciously, regarding the results of their research.[188] Similarly, even the appearance of potential conflicts of interest may cast a pallor of impropriety over the enterprise, infuriating the public and having other unintended

183. Bollier, *Academic Commons*, *supra* note 8, at 22.
184. *Id.*
185. *Id.*
186. *Id.*
187. *See* David Shenk, *Money + Science = Ethics Problems on Campus*, THE NATION, Mar. 22, 1999, at 11, 12 ("[T]he cost of economic success may often be the integrity of the science itself. . . . If individual researchers are profiting from their own research . . . 'the outcome or direction of their work may be affected.'") (quoting University of Pennsylvania bioethicist Mildred Cho).
188. *Id.* A recent study published in the Journal of the American Medical Association suggests that "an astounding 43 percent of women and 31 percent of men suffer from 'sexual dysfunction.'" *Id.* Yet, two of the study's authors serve as paid consultants to Pfizer, which manufactures Viagra—a fact not disclosed in the article. *Id.*

consequences.[189] On the other hand, corporate financiers might engage in some form of malfeasance through the manipulation of manuscripts before publication, or the suppression of the publication altogether, to serve their commercial interests.[190]

i. Corporate Goodwill and the Appearance of Impropriety

Regarding university researchers, the question is not necessarily just one of integrity, but rather concern about the subtle effects of corporate goodwill. As Marcia Angell points out in her essay, *Is Academic Medicine for Sale*:

> What is at issue is not whether researchers can be "bought," in the sense of a quid pro quo. It is that close and remunerative collaboration with a company naturally creates goodwill on the part of researchers and the hope that the largesse will continue. This attitude can subtly influence scientific judgment in ways that may be difficult to discern. Can we really believe that clinical researchers are more immune to self-interest than other people?[191]

Despite the lack of ill intent, the consequences need be no less severe. For example, months before the appetite suppressant fen-phen was yanked from the market for its implication in the deaths of its users, a group of researchers published a study in the New England Journal of Medicine cautioning that the drug might have devastating health consequences.[192] However, that same issue contained an essay by two academic researchers minimizing the physical effects of the diet drug; both of these latter authors were paid, and undisclosed, consultants to the manufacturers and distributors of similar drugs.[193]

Likewise, the death of a patient in a gene-transfer study in 1999 at the University of Pennsylvania led to claims that the financial ties of researchers to the company financing the work

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189. *See infra* Part IV.A.1.

190. Press & Wasburn, *supra* note 1, at 42 ("Worse than the problems of enforced secrecy and delay, however, is the possibility that behind closed doors some corporate sponsors are manipulating manuscripts before publication to serve their commercial interests.").

191. Angell, *supra* note 7, at 6.

192. Press & Washburn, *supra* note 1, at 45.

193. *Id.*

impaired their objectivity.[194] Eighteen-year-old Jesse Gelsinger died after receiving an experimental gene transfer treatment. Gelsinger suffered from ornithine trans-carbamylase deficiency (OTC), a disease which prevented his body from breaking down and expelling ammonia.[195] Gelsinger participated in the experiment, knowing it would not help his condition, because he was told it involved little risk and would benefit future generations of those born with OTC.[196] During the experiment, Gelsinger was "injected with an adenovirus vector . . . caus[ing] him to slip into a coma and die."[197]

Thereafter, a suit was filed against the University of Pennsylvania, several doctors, and the dean of the medical school.[198] It alleged a failure to disclose numerous dangers, such as:

> the possible toxicity of the injection; the fact that monkeys who had been given the injection had become ill and/or died; the fact that patients who had previously participated in the trial had suffered serious adverse effects; the Institute for Human Gene Therapy's (IHGT) misrepresentation that it had "achieved certain efficacy with respect to the treatment of OTC"; and the fact that Dr. Wilson, one of the participating physicians, and the University of Pennsylvania stood to gain financially from the gene transfer experiment.[199]

While neither one of these anecdotes proves that the researchers involved lost their objectivity in the pursuit of financial gain, the lack of disclosure in the first case and the alleged lack of disclosure in the second are troubling and, at the very least, leave open the possibility that market interests warped the traditional norm of disinterestedness. At any rate, the pallor of potential impropriety hangs over such academic-industrial collaborations, because these are no longer the disinterested parties of the academic research gift culture. Rather, they are something more akin to corporate shareholders or paid lackeys. The fact that those involved may not have consciously

194. *Gelsinger Family Brings Suit, Then Settles,* 13 Professional Ethics Report No. 4 (Mark S. Frankel ed., 2000) *at* http://www.aaas.org/spp/sfrl/per/per23.htm #Gene (last visited Mar. 28, 2004).
195. *Id.*
196. *Id.*
197. *Id.*
198. *Id.*
199. *Id.*

skewed or manipulated data is likely to be of little consolation to those potentially harmed by unconscious favoritism.

ii. Inappropriate Ownership Interests

Another alarming trend signaling the erosion of the norm of disinterestedness is the growing number of academic researchers who actually are corporate shareholders; that is, they own equity in the corporations who sponsor their research.[200] Sheldon Krimsky, a public policy professor at Tufts University, found that in a study of 800 scientific papers published in various academic journals, more than one-third of the authors had financial interests in their studies.[201] Furthermore, in none of approximately 300 studies where Krimsky found a conflict of interest did those authors disclose their financial ties with the subject of study.[202]

Likewise, this trend can even extend to insider trading. Some academic researchers have used their unique knowledge of the research agenda to profit illicitly. For example, the Securities and Exchange Commission charged Columbia Professor Dale J. Lange with receiving over $25,000 in illegal profits after he bought stock in a company about to release beneficial findings—which he participated in collecting—concerning a pharmaceutical to treat Lou Gherig's disease.[203] Similarly, Charles Thomas, a criminologist at the University of Florida who advised the state regarding prison policy earned $3 million in consulting fees from the private-prison industry, an industry in which he also owned stock.[204] Thereafter, Thomas was fined $20,000 by the state ethics commission.[205]

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200. Press & Washburn, *supra* note 1, at 42.

201. *Id.* "Financial interests" is a broad term that encompasses stock ownership but may also include less suspect interests, like industry grants. Although the existence of such ties does not make an academic study suspect, full disclosure still seems warranted. *Id.*

202. *Id.* at 43.

203. *Id.*

204. *Id.*

205. *Id.*

iii. Corporate Malfeasance

As noted, academic researchers are not the only parties that may fail to act with disinterest.[206] Thus, it comes as no surprise—considering the basic tenets of business—that corporations, driven by the desire to profit, are hardly disinterested parties. However, there can be little doubt that this fact may put both universities and academic researchers in precarious ethical and legal situations. For example, clinical pharmacist Betty J. Dong worked on a study while at the University of California, San Francisco paid for by Knoll Pharmaceuticals.[207] Knoll hoped to establish the superiority of a thyroid drug Synthroid; to that end, the contract stipulated the right to design the protocols for the study, as well as the right to review and delay or suppress publication.[208] After determining that Synthroid was no more effective than three less costly medications, Knoll suppressed publication of the study.[209] Years later, when Dong's study was finally published in the Journal of the American Medical Association, it was the catalyst for a class action lawsuit by users claiming they had been defrauded out of an exorbitant amount of money. Knoll settled for close to $100 million.[210] One might argue that the threat of such a settlement would restrain even the most overzealous financier from behaving unethically; yet, if the corporate finance scandals of the early twenty-first century are any indication of the state of the corporate union, it is questionable to what extent these threats are effective.[211]

Dr. David Kern, professor of medicine at Brown University School of Medicine, found himself in an equally untenable situation.[212] While moonlighting as a consultant to Microfibres, a company out of Rhode Island that produces nylon flock, he discovered the existence of a fatal new lung disease amongst the employees.[213] Kern elected to publish an abstract of this in-

206. *See id.*
207. Shenk, *supra* note 187, at 11–12.
208. *Id.*
209. *Id.*
210. *Id.*
211. *See generally The Corporate Scandal Sheet,* CITIZEN WORKS, *available at* http://www.citizenworks.org/enron/corp-scandal.php (last visited Feb. 17, 2004).
212. Camile Colatosti, *Of Patents and Courseware: The Corporate Takeover of the University,* THE WITNESS (Sept. 2000) *at* http://thewitness.org/archive/sept2000/colatosti.patents.html.
213. Press & Washburn, *supra* note 1, at 42.

formation, despite a confidentiality agreement forbidding him to expose trade secrets and despite the warnings of Brown University.[214] Luckily for Kern, Microfibres did not file suit, most likely because in 1997 the Center for Disease Control (CDC) recognized the disease and coined the term "Flock Workers Lung" to describe it.[215] Prosecuting Kern would have led to a public relations nightmare.

The frightening reality of the situation, says senior research scholar Mildred Cho at Stanford's Center for Biomedical Ethics, is that for every Kern who comes forward, many more may be staying silent in the ranks.[216] One recent study supports this allegation as it points out that 98 percent of papers funded by industry gave favorable reviews compared to 79 percent in papers not funded by industry.[217] Another study, this one by Bodenheimer, reaches similar conclusions.[218]

An even more unnerving and unethical trend is the real possibility that corporate sponsors might be selectively editing manuscripts before publication to improve their product's reception in the market. In one such example, the Sandoz corporation removed passages from a draft manuscript highlighting the possible dangers of certain calcium channel blockers often used in the treatment of high blood pressure, such as heart damage and stroke.[219] One study of a major research center in engineering found that 35 percent of academic researchers allowed corporate sponsors to strike information in a paper prior to publication.[220] Of course, this is the absolute antithesis of the gift culture of academic research in which the norm of universalism requires the truth of a claimed observation be based on impersonal criteria.[221] Granted, one might argue that the passages struck were not necessary for truly evaluating the observation itself; that is, "extraneous" material was stricken. Yet, even if this was the reason for the selective editing of research results, it is questionable whether a corporate sponsor is qualified to make such decisions.

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214. *See id.*
215. *Id.*
216. *Id.*
217. Shenk, *supra* note 187, at 14.
218. Angell, *supra* note 7, at 6.
219. Press & Washburn, *supra* note 1, at 42.
220. *Id.*
221. *See supra* notes 85–90 and accompanying text.

2. "Controlling the Research Agenda"[222]

Furthermore, given that corporate underwriters ultimately seek useful products that can generate a profit in the marketplace, it is likely that market criteria may dictate university research.[223] Research agendas driven by profit undermine the tradition of the "transcendent uselessness" of academic freedom discussed in Part I of this comment.[224] One cannot help but wonder if, in some crude market-driven calculus, this equates to creating more drugs to help "robust" Americans lose weight and fewer pharmaceuticals addressing needs of a greater magnitude but a less prosperous clientele.

Chris Scott, a former employee of industry collaborations at Stanford's medical school, crystallized this notion well when he said, "Show me an industry-sponsored research project on schistomiasis—a liver parasite that afflicts people in the Third World—or malaria or river blindness or dengue fever."[225] Similarly, others bemoan that research on improving crop yields in developing nations is grinding to a halt because the market for it is not attractive.[226] The point, then, is that if research is market-driven, a very real impact on public health may be felt.

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222. Press & Washburn, *supra* note 1, at 50.

223. Angell, *supra* note 7, at 5 ("Researchers might undertake studies on the basis of whether they can get industry funding, not whether the studies are scientifically important."); *see also* Bollier, *Academic Commons*, *supra* note 8, at 21 (noting that although the Berkeley-Syngenta deal "may or may not be necessary to speed technology transfer, it cannot help but alter research priorities at the university and privatize more of the scientific knowledge generated"); *see also* Colatosti, *supra* note 212. Colatosti provides some examples of the university/corporate marriage:

- Lego Professor of Learning Research, MIT
- Dow Chemical Co. Research Professor of Economics, Chicago
- Sears Roebuck Professor of Economics, Chicago
- Nissan Professor of Economics, Chicago
- Federal Express Chair of Excellence in Information Technology, Memphis
- Fuyo Bank Professor of Japanese Law, Columbia
- Hanes Corp. Foundation of Professorship, Duke
- Bell South Professor of Education through Telecommunications, South Carolina
- Coca-Cola Professor of Marketing, Georgia
- McLamore/Burger King Chair in American Enterprise, Miami
- Foley's Federated Professor in Retailing, Texas
- United Parcel Service Foundation

Id.

224. *See supra* notes 8–19 and accompanying text.

225. Press & Washburn, *supra* note 1, at 50.

226. BOLLIER, SILENT THEFT, *supra* note 6, at 141.

Another example of this phenomenon involves Berkeley's Division of Biological Control, which, along with the Department of Plant Biology and over half of the faculty positions in entomology, no longer exists.[227] Many professors believe these programs were cut because there were no useful profits in such work. However, as Berkeley Entomologist Andy Gutierrez notes, "[y]ou can't patent the natural organisms and ecological understanding used in biological control"; yet, "if you look at public benefit, that division provided billions of dollars annually to the state of California and the world."[228] Gutierrez points to one project—where he helped halt the spread of a pest that threatened the cassava crop that feeds over 200 million people in West Africa—as illustrative of his claim.[229] Professor Mildred Cho agrees and suggests that vaccine research is another area where the public suffers.[230] She notes, "[p]ublic health services can't afford to pay high prices . . . . If research is market driven, it raises potential problems not only for the research agenda but for public health."[231]

This is perhaps one of the most unnerving issues to spring from academic-industrial collaborations. Even though there can be little doubt technology transfer continues to generate jobs, wealth, and useful products for consumers, the possibility that research of a greater humanitarian benefit might be stifled at the expense of a less useful, but more profitable, product must be addressed if the integrity of the university is to be maintained. In short, if the research agenda of the academic commons becomes co-opted by industry, much in the way of public health may be sacrificed at the altar of profit.

3. Controlling the Teaching Agenda

In addition to appropriating the research agenda, collaborations may drain funding away from other less profitable departments, which cannot help but affect the breadth of what a university is able to offer its students, particularly in the humanities. George Mason University (GMU), in the Washing-

227. Press & Washburn, *supra* note 1, at 50.
228. *Id.*
229. *Id.*
230. *Id.*
231. *Id.*

ton, D.C. area, serves as the poster child for this concern.[232] In 1998, Virginia Governor James S. Gilmore conditioned the increase of state funds for GMU—in the neighborhood of $25 million a year—on the university increasing its service of local high-tech providers.[233] By the end of the year, GMU President Alan G. Merten added a number of degree programs in information technology and computer science. Unfortunately, other degree programs were sacrificed.[234] German, Russian, and a number of other humanities departments were completely eliminated.[235]

This anecdote fits within a greater trend: from 1970–1994 the number of bachelor's degrees conferred in English, foreign languages, philosophy, and religion decreased, while there was a five to ten-fold increase in computer and information science degrees.[236] Engell and Dangerfield—who collected this data—write: "Test what you will—majors, salaries, graduate programs . . . the results come back the same . . . [s]ince the late 1960s the humanities have been neglected, downgraded, and forced to retrench, all as other areas of higher education have grown in numbers, wealth, and influence."[237] Though a more substantial examination of the issue is beyond the scope of this comment, it is worth considering the social impact of such a trend.

4. A Threat to Non-Profit Status?

Finally, it is quite possible that unfettered technology transfer at a public university is so far at odds with its underlying mission of education and discovery as to jeopardize its non-profit status, a kind of systemic conflict of interest. Thus, efforts directed at technology transfer could arguably end up being labeled as unrelated business income for tax purposes. In his student comment, Peter Blumberg, now a professor at the University of Pennsylvania, considers the public purpose of the university's tax exempt status.[238] He notes that when universities undertake an activity separate and distinct from their pub-

232. *Id.* at 51.
233. *Id.*
234. *Id.*
235. *Id.*
236. *Id.* at 51–52.
237. *Id.* at 52.
238. *See generally* Blumberg, *supra* note 10.

lic purpose, the Tax Code is wont to place income from such endeavors into the bracket of the unrelated business income tax (UBIT).[239] Blumberg states:

> Revenues from university technology-transfer activities present a hard case: while scientific research is clearly inseparable from the mission of the research university, it is equally clear that research activities can be of such a type or conducted in such a manner that they bear little or no relation to the educational and scientific public purposes which originally justified the exemption. Certain aspects of the technology-transfer research enterprise—publication, exclusive licensing, student involvement, diminishment of academic freedom and basic research, and conflicts of interest—raise the question of whether such income should be subject to UBIT.[240]

Thus, in the near future, universities that fail to act as a true commons may no longer be treated as one. One might argue that, in a sense, this scenario is desirable. Losing tax exempt status might be an incentive for a university to participate in even more technology transfer to cover the ensuing shortfall. This would arguably benefit the public; yet, the fact that most universities barely break even in such endeavors[241] fails to justify the embrace of a change in tax status.

B. The Stifling of Innovation

Ironically, the clash between traditional scientific norms and the norms of the business world, facilitated by the Bayh-Dole Act and other changes in intellectual property law, may stifle the innovation of new technologies. This is the opposite effect of what was intended by lawmakers.[242] Given that a fundamental element of trade secret law is secrecy itself, and considering that secrecy and property rights are at odds with the norm of communalism, the free flow of ideas so important to creative scientific research may very well be threatened. First,

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239. *Id.* at 146–47.
240. *Id.*
241. Press & Washburn, *supra* note 1, at 47.
242. Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, SCIENCE, May 1, 1998, at 698, *available at* http://www.sciencemag.org/cgi/content/full/280/5364/698.

secrecy delays the dissemination of knowledge.[243] Second, the propertization of information necessarily means the right to exclude and threatens to turn the commons into a fragmented and inaccessible anticommons.[244]

1. Secrecy: Delaying the Dissemination of Knowledge

Regarding secrecy, a number of studies show that the effect of trade secret protection and contract law—NDAs and MTAs[245]—is the delay of publication of research data and conclusions. For example, a 1994 survey of 210 life-science companies determined that 58 percent of those sponsoring academic research instituted delays of six months or more before publication.[246] In a more specific study of plant breeders in U.S. universities, 45 percent said their research was negatively affected by challenges in accessing the seed stocks of private companies.[247]

At the individual level, there can be little doubt such secrecy can have negative consequences on research scientists struggling to gain useful data. Steven Rosenberg, of the National Cancer Institute, notes that this "shift toward confidentiality . . . is severely inhibiting the interchange of information."[248] When trying to obtain data on safe dosage levels for a reagent he needed to test an experimental cancer treatment, he was asked to sign a confidentiality agreement by the sponsoring company. When he refused, the company withheld the information.[249] Had Rosenberg disclosed this information he could very well have been accused of misappropriating a trade secret, as was the case in *American Cyanamid Co. v. Fox*—on less sympathetic facts—where employees were convicted of taking antibiotic cultures.[250]

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243. *Proprietary Rights*, *supra* note 84, at 191.

244. *See* Heller & Eisenberg, *supra* note 242, at 698 ("[A] resource is prone to under use in a 'tragedy of the anticommons' when multiple owners each have a right to exclude other from a scare resource and no one has an effective privilege of use.").

245. *See infra* III.B.2 for a brief description of NDAs and MTAs.

246. Press & Washburn, *supra* note 1, at 41–42.

247. BOLLIER, SILENT THEFT, *supra* note 6, at 141.

248. Press & Washburn, *supra* note 1, at 42.

249. *Id.*

250. 234 N.Y.S.2d 364 (N.Y. Spec. Term 1964) (stating that plaintiff's previous employee possessed plaintiff's trade secrets unlawfully and refused to return

Furthermore, as previously noted, because normative incentive structures traditionally reward scientific priority, being first in time to publish is crucial to tenure and professional advancement. A delay in publishing could have real consequences in the race for recognition in the world of "publish or perish." As Eisenberg notes, the "parsimonious hoarding" of academic research data interferes with communicative and collaborative efforts stifling the pursuit of scientific advancement.[251] Public disclosure, of course, ends secrecy. Thus, it might be said that the "publish or perish" ethos is being supplanted by a "profit or perish" ethos.[252] In itself, profit maximization is not troublesome; what is concerning is the fact that the hoarding of data might lead to less, rather than more, innovation.

2. Propertization: The Threat of an Anti-commons

This is, perhaps, the most disturbing criticism levied at the propertization of academic research knowledge: that it accomplishes exactly the opposite of what it intends; it stifles innovation. Rebecca Eisenberg and Michael Heller, arguably the most articulate writers on this subject, note that the proliferation of property rights in academic knowledge threatens to create an anti-commons of under-use because "too many owners can block each other."[253] This is especially true regarding the propertization of upstream research for downstream marketization. For example, if research lab A takes title to upstream research B and licenses this research solely to pharmaceutical company C, then pharmaceutical companies D–Z may be blocked from developing useful, and perhaps lifesaving, drugs.

One might argue that, assuming rational actors, no transaction costs, and perfect information, it simply does not matter that research lab A initially owns these property rights. Such entitlements will make their way, via the market, to those corporations willing to pay for them. However, these assumptions may assume away the entire issue. We do not live in a world of rational actors; holdouts are possible, transaction costs can be

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them; the court entered judgment restraining the defendant from violating the plaintiff's rights).

251. *Proprietary Rights*, *supra* note 84, at 194.

252. *See generally* Blumberg, *supra* note 10.

253. Heller & Eisenberg, *supra* note 242, at 698.

significant, and knowledge is imperfect. Moreover, the consequences may be quite profound if lifesaving pharmaceuticals cannot escape the patent thickets that threaten to erupt in an academic commons growing more and more fallow.[254] Though Eisenberg and Heller are particularly concerned about the inadvertent creation of a biomedical anti-commons, their analysis could apply to other academic-industrial collaborations.

Finally, an anti-commons may erupt through either the creation of too many slices of intellectual property pie in future products—concurrent fragments—or by allowing too many upstream patent owners to burden downstream users—stacking licenses.[255] Given the expansion of the scope of patentability in the *Chakrabarty* and *State Street* opinions, such an anti-commons has grown more conceivable.[256]

i. Concurrent Fragments

Heller and Eisenberg's first concern, that of concurrent fragments, could be seen in the attempt in 1991by the National Institute of Health (NIH) to patent anonymous gene fragments through a patent application on expressed sequence tags (ESTs).[257] The NIH's patent application was noteworthy, because before this, patents on genes were based on predictable commercial products like diagnostic tests for genetic diseases or therapeutic proteins.[258] Genetic material such as this, on the other hand, is typically of an unknown function and generally used as a probe to "locate and characterize the full gene."[259] Though the NIH abandoned its patent request, other corporations continued, and by 1996 three of these EST gene fragments had been patented.[260] The potential problem with such a patent is that commercial products are likely to require the use of multiple fragments of genetic material and it may become very difficult to collect the bundle of property rights necessary

254. *Id.*
255. *Id.* at 699.
256. *See supra* notes 152–59 and accompanying text.
257. Heller & Eisenberg, *supra* note 242, at 699.
258. *Id.*
259. Rai, *supra* note 12, at 104.
260. Molly A. Holman & Stephen R. Munzer, *Intellectual Property Rights in Genes and Gene Fragments: A Registration Solution for Expressed Sequence Tags*, 85 IOWA L. REV. 735, 738–39 (2000).

to develop such a product.[261] On the one hand, patent blocking becomes a real possibility and on the other, any "pooling" of such patented research tools could run afoul of antitrust measures.[262] In other words, each patent on an EST or similar upstream research "creates a specter of rights that may be larger than the actual rights, if any, eventually conferred by the [U.S. Patent and Trademark Office]."[263] Therefore, the problem of holdouts and high transaction costs becomes very real.

ii. Reach-Through Licensing Agreements

Additionally, the use of reach-through licensing agreements (RTLAs) on patented research tools is another manner in which an anti-commons may emerge. As Heller and Eisenberg use the term, RTLAs provide the owner of an invention used in upstream research rights in subsequent downstream discoveries.[264] These rights may be royalties on sales that result from use of the upstream research tool, exclusive or nonexclusive licenses on future discoveries, or options to acquire such a license.[265] Theoretically, RTLAs allow researchers on a budget to use these patented research tools immediately and pay when research becomes fruitful.[266] However, in practice, RTLAs might very well lead to a stacking of "overlapping and inconsistent claims" on downstream products.[267] In other words, the upstream patent holder will always have his thumb in the pie. Therefore, downstream researchers could have a difficult time providing a title free and clear of any superior claim. In short, the high transaction costs of bundling these rights in a useful fashion, the myriad interests of upstream patent holders, and the biases of holdouts threaten to create an anti-commons resulting in deleterious effects upon scientific advancement and innovation. Of course, the assumption that valuable property rights will find their way into the hands of

261. Heller & Eisenberg, *supra* note 242.

262. *See generally* Steven C. Carlson, Note, *Patent Pools and the Antitrust Dilemma*, 16 YALE J. ON REG. 359 (1999).

263. Heller & Eisenberg, *supra* note 242. For information on the PTO, a federal body regulating patents and trademarks, see United States Patent and Trade Office Home Page, *available at* http://www.uspto.gov/ (last modified Apr. 7, 2004).

264. *Id.*

265. *Id.*

266. *Id.*

267. *Id.*

those who most desire them is insightful and quite true, in a perfect world. However, as noted earlier, actors are not always rational, nor are transaction costs always surmountable.

In sum, the fencing off of the academic research commons to encourage product development undoubtedly succeeds in the short term: jobs are created, useful products are circulated, and money flows like water to a few "lucky" universities.[268] However, without strong policies policing the influx of market pressures, in the long run the disruption of the norms that sustain the gift economy will lead to a bevy of conflicted interests that result in questionable research, undermine the university's integrity, appropriate the teaching and research agenda, and threaten the public health.[269] Furthermore, if academic research universities act as corporate subsidiaries, they move far from their role as disseminators of knowledge and acute observers of the truth. Paradoxically, the propertization of the academic commons and the strengthening of the trade secret and patent regimes may very well lead to an anti-commons of holdouts and blockers.[270] Such a diagnosis seems grim and begs for a normative response.

IV. SOLUTIONS: HEEDING THE SIRENS' CALL; OR, BUY YOUR OWN PIZZA

It is axiomatic that markets are desirable. Moreover, when considering the relationship between gift economies and markets, it should be said markets are "no more a villain than a lion whose metabolism needs gazelles."[271] Of course, as is often the case, protecting the commons requires a balance. Thus, while the simplest course of action would be to eschew all academic-industrial collaborations and conduct university activities free of marketplace intervention, this is not necessarily desirable or practical. In truth, the genie is out of the bottle and the response of both industry and universities to the legal in-

268. Press & Washburn, *supra* note 1, at 47 ("[The] surprising twist, however, is that although university licensing offices are churning out patents, most of these offices are themselves barely breaking even.").

269. Washburn, *supra* note 121 ("[I]f we allow universities to become too closely enmeshed with the marketplace . . . there is a grave risk not only to the humanities and to 'public good' research and to the integrity of the scientific enterprise, but to our economy and to our future economic growth.").

270. *See generally* Heller & Eisenberg, *supra* note 242.

271. BOLLIER, SILENT THEFT, *supra* note 6, at 3.

centive of propertization illustrates that the world of academic research before 1980 certainly was not the most efficient system possible. The federal government only provides around 59 percent of the funding of academic research.[272] Furthermore, additional funding is rarely easy to come by and, if universities are to remain cutting edge, they must find a way to fill the ever increasing lack of governmental funding.[273] This part offers pragmatic precautions a university might contemplate when considering academic-industrial collaborations.

A. Selective Propertization

Rather than wholeheartedly rejecting such endeavors, a university might choose to selectively reject the propertization and marketization trend in relation to some intellectual property regimes, while still pursuing others. MIT's OpenCourseWare (OCW) project epitomizes this approach.[274] MIT intends to create Web sites for all its courses, open and freely accessible to the public.[275] Participation in this program is entirely optional on the part of university faculty. Moreover, participants continue to own the "E-versions," culled from the materials they create, for their courses.[276] In other words, faculty members continue to own the electronic versions of the material they generate for their courses, even if those works were turned into Web-compatible formats as part of the OCW project.[277] There is little doubt that MIT will still participate in patenting the fruits of other academic-industrial collaborations; however, its OCW project, though still quite young, is well

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272. *Id.* at 137.

273. *E.g.*, Dan Morgan, *The Higher Education of Washington*, WASHINGTON POST, Feb. 4, 2004, at A21, *available at* http://www.washingtonpost.com/wp-dyn/articles/A10807-2004Feb3.html ("President Bush's fiscal 2005 budget proposal . . . cuts some basic research programs vital to universities . . . . On the line are billions of dollars in federal support for medical, defense, space and physics research, as well as special 'earmarks' for agricultural research stations, buildings and other local projects."); John C. Ensslin, *If Funds Shrink, CU Faces Going Private, Chief Says*, ROCKY MOUNTAIN NEWS, Nov. 18, 2003 (University of Colorado President Elizabeth Hoffman stated that "[i]f higher education continues to get squeezed between dwindling state funds and growing spending mandates, the University of Colorado may someday have to go private.").

274. Steven R. Lerman & Shigeru Miyagawa, *OpenCourseWare: A Case Study in Institutional Decision Making*, 88 ACADEME 23 (2002).

275. *Id.*

276. *Id.*

277. *Id.* at 27.

within the gift giving tradition of the academic commons. This free transmission of data and knowledge is strongly imbued with the open and communal notion of the traditional academic gift culture.

B. Collective Efforts

Collective efforts between universities to preserve the values of the academic research gift community are also available.[278] Such collaborative endeavors maintain fidelity to the traditional gift culture norms, particularly the norm of communalism, by sharing information to further scientific discovery. An excellent example of this is the Uniform Biological Materials Transfer Agreement (UBMTA).[279] Under this agreement, an academic researcher may use biological material for non-commercial teaching and research without a licensing agreement.[280] Likewise, a group of publicly funded researchers resolved that "all human genomic DNA sequence information generated by centers funded for large scale human sequencing should be freely available and in the public domain in order to encourage research and development."[281] Such collaborative endeavors may strike a healthy balance between the marketplace and the gift culture of research science.

C. Prohibitions

Other solutions are simple and inexpensive to implement. First, as any attorney who has passed the Bar can attest, the regulation of conflicts of interests amongst professionals is quite common.[282] By analogy, universities might also regulate potential conflicts of interest. Thus, to avoid a clash with the norm of disinterestedness and potential conflicts of interest, a university might forbid professors from owning stock in their corporate underwriters, or at least cap that interest at a rea-

278. Rai, *supra* note 12, at 113.
279. *Id.*
280. *Id.*
281. *Id.* (quoting discussion of the Bermuda Agreement in Eliot Marshall, *Genome Researchers Take the Pledge: Data Sharing*, 272 SCIENCE 477, 478 (1996)).
282. *See* MODEL RULES OF PROF'L CONDUCT RS. 1.7–1.9 (governing attorney conflicts of interest).

sonable level.[283] A university itself might also consider a ban, or a limitation, on its own investment in such corporations.

Second, in addition to limiting direct financial interest in corporations underwriting research, Marcia Angell suggests limiting the spread of corporate "goodwill" to students and faculty at research facilities.[284] Angell quips: teaching hospitals should "buy their own pizza."[285] That is to say, both universities and academic researchers should be insulated from corporate largesse. By insulating its employees from the subconscious effects of corporate goodwill, research might be less apt to be inappropriately influenced.

Third, to help ensure the flow of research data, universities could institute policies forbidding the prohibition of publication delays by more than, say, thirty, sixty, or ninety days.[286] Likewise, to help ensure the veracity of research data, they might consider instituting a complete ban on the right of corporate underwriters to selectively edit such publications.[287] Finally, universities could minimize proprietary restrictions on basic research tools and utilize a 'pay as you go approach' rather than using RTLAs.[288] Such endeavors would strive to maintain the free flow of information so crucial to the academic gift culture, while reaping the rewards of academic-industrial collaborations.

D. Standard Setting

Moreover, whatever policies are instituted, a university would be wise to be sensitive to the AAUP's reminder that the primary responsibility to maintain the integrity of the university lies with the academic community, especially with the faculty.[289] Pursuant to this reminder, the AAUP lists a number of possible policies that might be instituted by university faculties. First, under these guidelines, the faculty should have a significant role in both formulating university policy regarding academic-industrial collaborations and in developing a plan for

283. Press & Washburn, *supra* note 1, at 54.
284. Angell, *supra* note 7, at 1517.
285. *Id.* at 1518.
286. *Id.*
287. *Id.*
288. *See supra* notes 264–66 and accompanying text.
289. Am. Ass'n of U. Professors, *supra* note 44.

assessing this policy's effectiveness.[290] Once generated, the policy would be distributed to faculty who would then inform their students.[291]

Second, the faculty should have the responsibility of ensuring that the university's conflict of interest plan has some sort of monitoring mechanism and that both it and the policy are consistent with the tenets of academic freedom.[292] Furthermore, the plan should require that the "source and purpose" of all corporate funding is publicly disclosed.[293] Finally, such contracts should be required to provide for the open communication of research data and not be subject to a sponsor's permission.[294]

Third, the AAUP suggests:

> The faculty should call for, and participate in, the periodic review of the impact of industrially sponsored research on the education of students, and on the recruitment and evaluation of researchers (whether or not they hold regular faculty appointments) and postdoctoral fellows.[295]

Fourth, regular procedures should be instituted to deal with allegations of conflict of interest.[296] This should include disciplinary measures, sanctions, and perhaps even punitive measures while still respecting academic due process.[297] Also, in order to keep a conflict-of-interest policy current and responsive to dynamic research relationships with industry, the faculty should regularly review these policies.[298] Such guidelines are particularly useful in that they promote standardization of policy and definitions among universities and make it easier to determine when the integrity of the university system is threatened. Ideally, standards in different disciplines—medical, biotech, etc.—would become more uniform over time.[299] General agreement on exactly what a conflict of interest is and how it would be dealt with would discourage a "race

290. *Id.*
291. *Id.*
292. *Id.*
293. *Id.*
294. *Id.*
295. *Id.*
296. *Id.*
297. *Id.*
298. *Id.*
299. Angell, *supra* note 7, at 1518.

to the bottom"; that is, an exodus of faculty members to universities with little or no protections against such conflict of interest.[300]

E. Creative Solutions

Creative approaches might also be fruitful. For example, earmarking a percentage of the profits of market driven research and using it to fund novel upstream research may help to strike an appropriate balance between the market and creative experimentation. If, for example, a university reserved 10, 20, or 30 percent of its corporate funding for "pure" or basic research, it would thereby insulate a portion of its research agenda from the market. Similarly, dividing research into market-driven and non market-driven categories—and paying taxes on the former—could appease the IRS, which might otherwise be wont to strip a university of its non-profit status.[301]

Moreover, educating university employees and students as to exactly what a conflict of interest is may lead to a greater number of disclosures, thus reducing the number of non-objective participants in an academic-industrial collaboration. This could be done in a traditional manner such as in-service training or employee handbooks. Another novel approach is illustrated by Stanford University where an anonymous "Self Test" can be taken at the Office of Technology Licensing Web site.[302] Such a self test would quiz the reader's knowledge of the university's conflict of interest policy and, depending on the results of the quiz, might suggest the faculty member follow up with the Office of Technology Transfer or the appropriate dean about a possible conflict of interest.[303] The anonymous nature of the Internet could help address conflicts of interest that a faculty member might be otherwise unwilling to reveal. At any rate, such front-end precautions can help ensure the integrity of the university while reaping the financial rewards of technology transfer.

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300. *Id.*

301. Blumberg, *supra* note 10, at 141.

302. Stanford Research Administration Resource Page for Intellectual Property Self Tests, http://www.stanford.edu/dept/DoR/Resources/ip.html (last visited Feb. 27, 2004) ("You do not need to identify yourself, and no record of any scores will be kept. Go ahead, mark wrong answers! Nobody knows, nobody cares!").

303. *Id.*

F. Government Intervention

Additional solutions involve government intervention. To some extent, government intervention has already taken place. The Public Health Service, in 1996, set forth guidelines requiring academic researchers to report to their universities when they receive payments of more than $10,000 from a company or to report when they hold 5 percent or greater of that company's stock.[304] However, there are other ways in which the government might become involved in academic-industrial collaborations. For example, government sanctioned patent pools would avoid the antitrust issues of private patent pools, while the PTO could institute a narrower balancing test to protect upstream research from falling into an anti-commons or a patent thicket.[305] Similarly, the PTO might limit the quantity of upstream research available to a patent holder, shorten the duration of a patent, or implement a registration system that initially offers strong rights that taper off over a period of time.[306]

Others, in an effort to find some balance between the norms of the marketplace and the norms of the academic research gift culture, have proposed amendments to the Bayh-Dole Act itself. Rai and Eisenberg recently argued that the Act is flawed because it "draws no distinction between downstream inventions that lead directly to commercial products and fundamental research discoveries that broadly enable further scientific investigation."[307] To remedy this defect, they suggest Congress should change the Act so that the institutions which performed this basic research would no longer have the unfettered discretion to take title to their research and patent it.[308] Rather, Rai and Eisenberg suggest that funding agencies will often have a better understanding of "knowledge and incentives to make these determinations in furtherance of the overall public interest in research and product development."[309] In short, they argue the Act should be retooled to give funding agencies—such as the federal government—greater discretion to decide whether publicly-funded research discoveries will be of-

304. Press & Washburn, *supra* note 1, at 45.
305. Rai, *supra* note 12, at 136–37.
306. Holman & Munzer, *supra* note 260, at 809–814.
307. Arti K. Rai & Rebecca S. Eisenberg, *Bayh-Dole Reform and the Progress of Biomedicine*, 66 LAW & CONTEMP. PROBS. 289, 290–91 (2003).
308. *Id.* at 291.
309. *Id.*

fered into the public domain.[310] Though these are only a few possible solutions, they help illustrate the myriad of possible responses to the threatened enclosure of the academic commons.

Finally, an important question still looms. As noted, joint ventures between industry and the university are here to stay; in fact, in some cases they are necessary to keep university research labs cutting-edge. Yet, it is unclear how efforts to protect academic freedom will impact industrial investment and vice versa. Thus, it remains to be seen whether non-governmental solutions will deter industry from investing in the same manner. These questions are necessary factors to consider in the continuing dialogue.

CONCLUSION

In conclusion, the roots of academic freedom run deep. Such freedom has played a major role in American history by providing significant contributions to our collective health and welfare. A vigorous marketplace of ideas has existed and developed under the protective umbrella of academic freedom and within a bubble of "transcendent uselessness." The traditional norms of the gift community of academic researchers—universalism, communalism, disinterestedness, organized skepticism, and invention—self-regulate in an efficient and productive manner relatively free of conventional marketplace intrusions.

However, there are real and documented concerns that changes in intellectual property regimes, both by statute and common law, threaten to erode the tradition of academic freedom and its contribution to the academic commons. Though academic-industrial partnerships have always existed in some fashion, new incentives threaten, as never before, to inject market pressures into academic research and burst the bubble of "transcendent uselessness" hereunto situated in a critical place in American democracy. This sort of collaboration may be useful and beneficial to both universities and the public when the proper balance is struck; however, the need for a greater dialogue exists. As this exchange percolates, universities must be on notice of what is at stake when they begin to

310. *Id.*

act as for-profit organizations, lest they strike an ultimately destructive Faustian bargain.