

ACADEMIC DISCOURSE AND PROPRIETARY RIGHTS: PUTTING PATENTS IN THEIR PROPER PLACE

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Abstract: This Article provides a fresh perspective on the Bayh-Dole debate by focusing on the impact of patent novelty rules on academic discourse. The Article proposes that to begin to reverse an observed deterioration in disclosure norms, flexibilities must be built into the patent system so that patents can be facilitators of the academic knowledge dissemination enterprise. In particular, the Article advocates creation of an opt-in extended grace period that would provide more time for academic researchers to publish and present early-stage research before having to file a patent application. Such an extension, coupled with early application publication, would both address third-party needs for notice of proprietary claims and allow researchers to engage in traditional academic discourse while they retain the ability to obtain proprietary rights useful for commercialization of their inventions.

INTRODUCTION

By most measures, the numbers are pretty impressive. In fiscal year 2004 alone, approximately 154 U.S. universities reaped over \$1 billion in net patent licensing income, executed 3928 new licenses, and were issued over 3800 U.S. patents, largely as a result of university-industry technology transfer initiatives.¹ By comparison, in 1991,

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¹ ASS'N OF UNIV. TECH. MANAGERS, AUTM LICENSING SURVEY: FY 2004 SURVEY SUMMARY ii, 22, 26 (Ashley J. Stevens et al. eds., 2005), available at <http://www.autm.net/events/File/FY04%20Licensing%20Survey/04AUTM-USLicSrvy-public.pdf>.

ninety-eight universities garnered a mere \$123 million in gross licensing income.² These funds provide needed revenue to university coffers,³ stimulate economic growth in surrounding municipalities,⁴ and provide beneficial products to consumers here and abroad.⁵

But these achievements have not come without a cost to academia. Historically, universities have existed for the purpose of promoting inquiry and advancing the sum of human knowledge.⁶ To further these goals, university researchers would publish and present their scientific findings as soon as possible in accordance with communal norms promoting the prompt and open sharing of data. But today, academic researchers are being encouraged by technology transfer offices ("TTOs") and industry sponsors to delay publishing and presenting their work until after filing a patent application and sometimes even longer than that.⁷ In addition, the growth in patent-related

² ASS'N OF UNIV. TECH. MANAGERS, AUTM LICENSING SURVEY: FY 1991–FY 1995: FIVE YEAR SURVEY SUMMARY 10, 14 (Daniel E. Massing ed., 1996), available at <http://www.autm.net/events/File/Surveys/91-95AUTMLicSurveyPublic.pdf>.

³ For example, the Wisconsin Alumni Research Foundation ("WARF"), which handles technology transfers for the University of Wisconsin-Madison, has contributed approximately \$750 million to fund basic research at the university over the past eighty years. See *Patent Law Reform: Hearings Before the Subcomm. on Courts, the Internet, and Intellectual Property of the H. Comm. of the Judiciary*, 109th Cong. 2 (2005) [hereinafter *Patent Law Reform Hearings*] (statement of Carl Gulbrandsen, Managing Director, WARF).

⁴ The impact on state and local economies can be quite important. The Wisconsin Alumni Foundation also boasts that "[t]o date, more than 30 companies based on WARF technology have spun out of the university, with all but one of them based in Wisconsin." *Guide Offers Aid to Campus Entrepreneurs*, UNIV. OF WIS.-MADISON NEWS, Apr. 14, 2004, <http://www.news.wisc.edu/9666.html>.

⁵ The website of the Association of University Technology Managers ("AUTM") contains a list of "product stories" describing successful university-generated products and programs that spans more than twenty-five pages. See Ass'n of Univ. Tech. Managers, Product Stories, http://www.autm.net/aboutTT/aboutTT_prodStory.cfm (last visited Feb. 15, 2006).

⁶ AM. ASS'N OF UNIV. PROFESSORS, 1915 *Declaration of Principles on Academic Freedom and Academic Tenure*, in POLICY DOCUMENTS & REPORTS app. 1, at 295 (9th ed. 2001). The two other purposes are "to provide general instruction to the students" and "to develop experts for various branches of the public service." *Id.*; see Charles C. Caldart, *Industry Investment in University Research*, 8 SCI. TECH. & HUM. VALUES 24, 30–31 (1983) (noting a fundamental tension between the proper role of universities and the profit motive).

⁷ See, e.g., Laura Heisler, *Be Aware: Public Disclosure Can Affect Patentability*, WARF NEWSL. (Wis. Alumni Research Found., Madison, Wis.), Winter 2005, at 1, available at http://www.warf.org/news/news.jsp?news_id=175 (warning about losing patent rights as a result of disclosing research results); Lauren MacLanahan, *Things to Know About Public Disclosures*, TECH. TRANSFER BUZZ (Ga. Tech Research Corp., Office of Tech. Licensing, Atlanta, Ga.), Fall 2004, at 6, available at http://otl.gtrc.gatech.edu/OTL_Fall_2004.pdf (same); Lana M. Knedlik, Publishing: How Your Rights Could Perish (Sept. 2, 2004), <http://www.stinsonmoheck.com/legalpublications/smhlupage.asp?key=65> ("Whether you are a sophisticated university or a lone inventor, the point is that publishing your work may not always be a

litigation involving universities⁸ and the much-hyped "tragedy of the anticommons" in the patenting of basic research tools are both costs attributable, at least in part, to technology transfer initiatives.⁹ While not amenable to precise quantification, the stifling of discourse and the erosion in the norms of sharing and colloquy historically associated with the scholarly enterprise are costs that must be balanced against the technology transfer gains.¹⁰

Both the impressive numbers and the negative side effects are usually traced to the 1980 Bayh-Dole Act, which allows universities to elect ownership of inventions developed with federal funds, enabling them to offer exclusive licenses to companies interested in commercializing the inventions.¹¹ The impetus for Bayh-Dole was a belief that

good idea. . . . [U]niversity researchers should be careful about making any sort of public disclosure or risk losing patent rights (and ability to profit from them) forever.").

⁸ See, e.g., *Iowa State Univ. Research Found., Inc. v. Wiley Organics, Inc.*, 125 Fed. Appx. 291, 292–94 (Fed. Cir. 2005); *Eolas Techs. v. Microsoft Corp.*, 399 F.3d 1325, 1328–29 (Fed. Cir. 2005); *Univ. of Rochester v. G.D. Searle & Co.*, 375 F.3d 1303, 1303 (Fed. Cir. 2004); *Madey v. Duke Univ.*, 307 F.3d 1351, 1352–53 (Fed. Cir. 2002); Eli Kinitsch, *Yale Wins Suit Against Nobel Laureate*, SCI.NOW, Feb. 14, 2005, <http://sciencenow.sciencemag.org/cgi/content/full/2005/214/1>.

⁹ See, e.g., ADAM B. JAFFE & JOSH LERNER, *INNOVATION AND ITS DISCONTENTS: HOW OUR BROKEN PATENT SYSTEM IS ENDANGERING INNOVATION AND PROGRESS, AND WHAT TO DO ABOUT IT* 64–68 (2003) (discussing *Madey v. Duke* and the patenting of research tools); Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCI. 698, 701 (1998) (explaining the effect of the tragedy of the anticommons in biomedical research).

¹⁰ See, e.g., Rebecca S. Eisenberg, *Academic Freedom and Academic Values in Sponsored Research*, 66 TEX. L. REV. 1363, 1374–84 (1988) (discussing sponsored research agreement restrictions on dissemination of academic results); Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. U. L. REV. 77, 79 (1999) (noting that changes in intellectual property law have undermined scientific research norms). Other costs, also difficult to quantify, include the loss to U.S. universities and the domestic economy of jobs and industry research funds as U.S. companies, frustrated by the difficulty of working with U.S. university TTOs, send jobs and dollars to overseas institutions with their growing corps of highly skilled researchers. See, e.g., Wayne C. Johnson, *Globalization of Research and Development in a Federated World*, in *REINVENTING THE RESEARCH UNIVERSITY* 159, 164 (Luc E. Weber & James J. Duderstadt eds., 2004) ("[L]arge U.S. based corporations have become so disheartened and disgusted with the situation [i.e., negotiating intellectual property rights with U.S. universities] they are now working with foreign universities, . . . which are more than willing to offer extremely favorable intellectual property terms.") (alteration in original) (quoting R. Stanley Williams, HP Fellow for Hewlett-Packard Laboratories); ROBERT KILLOREN & SUSAN B. BUTTS, *NATIONAL ACADEMIES GOVERNMENT-UNIVERSITY-INDUSTRY RESEARCH ROUNDTABLE, INDUSTRY-UNIVERSITY RESEARCH IN OUR TIMES* ¶ 24 (2003), http://www7.nationalacademies.org/guirr/ip_background.html (noting competition for industrial funding from European technical universities).

¹¹ See Bayh-Dole Act, Pub. L. No. 96-517, 94 Stat. 3015 (1980) (codified as amended at 35 U.S.C. §§ 200–212, 301–307). Of course there are myriad factors that have contributed

the ivory tower was stuffed with useful technologies that could meet societal needs and stimulate economic progress if appropriate incentives—for example, exclusive rights—could be provided for private industry to commercialize them.¹² Although not without critics, Bayh-Dole is widely seen as a success, and many foreign countries are implementing changes to their laws to mirror its policies.¹³

Bayh-Dole and other enabling legislation are evidence of a congressional desire to facilitate technology transfer between universities and industry by using patent policy, with the ultimate goal of benefiting the public.¹⁴ But luring academics into this brave new world of patents and royalties has created some unintended side effects. For example, university research often progresses in stages, and the traditional model of scholarly discourse involves the presentation and publication of research conclusions and insights at those various stages. Yet the rigid patent novelty rules directly conflict with this model by requiring an inventor to file a patent application either before or within twelve months of exposing the invention to the public (depending on the country) to avoid losing the right to obtain a patent.¹⁵ These rules constrain researcher behavior in ways that are not conducive to academic discourse.

to the technology transfer boom, including reductions in federal and state funding to universities, the influence of corporate America on universities, and advances in technology such as the discovery of DNA and the creation of the field of biotechnology. A full discussion of all such factors is beyond the scope of this Article, which focuses on patent-related impacts to technology transfer.

¹² See *NIH: Moving Research from the Bench to the Bedside: Hearing Before the Subcomm. on Health of the H. Comm. on Energy and Commerce*, 108 Cong. 3 (2003) [hereinafter *From the Bench to the Bedside*] (statement of Sherrod Brown, Member, H. Comm. on Energy and Commerce) ("Congress has long recognized that the value of an idea is in using it.")

¹³ See, e.g., *Patent Law Reform Hearings*, *supra* note 3, at 11 (statement of Carl Gulbrandsen, Managing Director, WARF) ("At WARF, we receive numerous visitors each year from around the world. Invariably, our foreign visitors ask about Bayh-Dole and express the wish that their own countries would adopt such forward-thinking legislation."); ASS'N OF UNIV. TECH. MANAGERS, AUTM LICENSING SURVEY: FY 2003 SURVEY SUMMARY 2 (Ashley J. Stevens & Frances Toneguzzo eds., 2004), available at http://www.autm.net/events/File/Surveys/03_Abridged_Survey.pdf (citing announcements by the United Kingdom, Canada, Germany, and Japan of investment programs and/or statutory changes to enhance the commercialization of research from academic institutions as the countries "continue to strive to emulate U.S. success in harnessing the intellectual output of its academic institutions").

¹⁴ Congress's most recent effort in this area, the Cooperative Research and Technology Enhancement Act of 2004 (the "CREATE Act"), is designed to encourage research collaborations between academic institutions and private enterprises by making it easier for the partners to obtain patents on inventions created by joint inventors from both organizations. See *infra* notes 89–93 and accompanying text.

¹⁵ 35 U.S.C. § 102(b) (2000).

The unforgiving nature of patent novelty rules encourages a culture in which the dissemination of even very early-stage research, sometimes no more than a proof of concept, is delayed while a provisional patent application is prepared by the university TTO. As a result, secrecy is on the rise among academic researchers, particularly in the life sciences, with many university scientists choosing to limit or delay disclosures of their work in order to participate in the patent/technology transfer arena.¹⁶ For example, in 1966, 50% of surveyed experimental biologists felt safe in sharing information on current research with others; only 26% felt that way by 1998.¹⁷ In a recent study of geneticists, 35% perceived academic scientists as somewhat or much less willing to share information and data than a decade ago. Also, 58% reported adverse data withholding effects on their own research, and 56% reported adverse data withholding effects on the education of students and post-doctoral researchers.¹⁸

While these statistics are troubling, other judicial, legislative, and commercial developments point toward an even bleaker future for academic discourse in the sciences. The recent decision by the Court of Appeals for the Federal Circuit in *In re Klopfenstein* seems sure to result in a further stifling of scholarly discourse prior to the filing of patent applications.¹⁹ There, the court expanded the scope of patent-invalidating prior art by broadly interpreting the phrase "printed publication" to include even ephemeral scientific poster presentations.²⁰ The decision is significant because previous caselaw had required the distribution of at least some copies or the indexing and cataloguing of at least one physical copy of a reference before such information would be considered patent-defeating prior art.²¹ On the legislative

¹⁶ See, e.g., Jeremy M. Grushcow, *Measuring Secrecy: A Cost of the Patent System Revealed*, 33 J. LEGAL STUD. 59, 75-79 (2004) (presenting data on the increased secretiveness of university researchers between 1980 and 1990); John P. Walsh & Wei Hong, Correspondence, *Secrecy Is Increasing in Step with Competition*, 422 NATURE 801, 802 (2003).

¹⁷ Walsh & Hong, *supra* note 16, at 802.

¹⁸ Eric G. Campbell et al., *Data Withholding in Academic Genetics: Evidence from a National Survey*, 287 J. AM. MED. ASS'N 473, 478 (2002). This is not to suggest that increasing secrecy is solely, or even predominantly, the result of the patent novelty rules. There are a variety of contributing factors, such as the widespread inclusion of secrecy clauses in industry sponsorship agreements and the increasingly competitive nature of academic research in general. Nevertheless, the potential of the patent novelty rules to encourage this kind of behavior cannot be ignored.

¹⁹ See 380 F.3d 1345, 1352 (Fed. Cir. 2004).

²⁰ *Id.*

²¹ See, e.g., *In re Cronyn*, 890 F.2d 1158, 1161 (Fed. Cir. 1989) (holding that student theses were not a printed publication because "they had not been either cataloged or indexed in a meaningful way"); *In re Hall*, 781 F.2d 897, 900 (Fed. Cir. 1986) (holding that a

front, recently introduced patent reform measures, which include the creation of a "winner takes all" race to the patent office and the elimination of the best mode requirement, promise a further deterioration of the traditional sharing norms of university researchers while offering little if any concomitant benefit to this group of inventors.²² Moreover, Emory University's recent announcement of its \$540 million sale of intellectual property, considered to be the largest such sale in the history of American higher education, is likely to fan further the flames of interest in technology transfer initiatives at other institutions hoping to obtain new funds for various endeavors.²³

Much has been written on the myriad problems associated with the Bayh-Dole Act and the over-zealous patenting, litigation, and licensing practices of some university TTOs, along with the resulting access issues for upstream research tools, increased secrecy among university scientists, and more.²⁴ To address these perceived problems,

dissertation was a printed publication when there existed exactly one cataloged copy in a university library); *Mass. Inst. of Tech. v. AB Fortia*, 774 F.2d 1104, 1109 (Fed. Cir. 1985) (holding that a scientific paper was prior art because between fifty and 500 interested persons were told of its existence, and the document itself was "disseminated without restriction to at least six persons").

²² See Patent Reform Act of 2005, H.R. 2795, 109th Cong. § 3 (2005) (first to file); *id.* § 4 (best mode). In theory, changing from a first-to-invent to a first-inventor-to-file regime would tend to hinder the sharing of research results by creating perverse incentives for competitive conduct in the race to the patent office (for instance, competitors rushing to patent non-obvious variants of an inventor's disclosed discovery to narrow the scope of protection to which she might otherwise be entitled). The current "best mode" requirement obligates inventors to disclose in their patent applications the best methods of which they are aware for practicing the invention. See 35 U.S.C. § 112 (2000). Elimination of the requirement thus would make it easier for an inventor to share less information about the discovery with the interested public.

²³ See Clifton Leaf, *The Law of Unintended Consequences*, FORTUNE, Sept. 19, 2005, at 250, 252.

²⁴ See, e.g., DAVID C. MOWERY ET AL., *IVORY TOWER AND INDUSTRIAL INNOVATION: UNIVERSITY-INDUSTRY TECHNOLOGY TRANSFER BEFORE AND AFTER THE BAYH-DOLE ACT IN THE UNITED STATES* 127-59 (2004) (surveying the effects of Bayh-Dole on research and patenting processes in American universities); Rebecca S. Eisenberg, *Public Research and Private Development: Patents and Technology Transfer in Government-Sponsored Research*, 82 VA. L. REV. 1663, 1726 (1996) (positing that the patenting of upstream research tools calls into question the appropriateness of public funding to support that research); Clovia Hamilton, *University Technology Transfer and Economic Development: Proposed Cooperative Economic Development Agreements Under the Bayh-Dole Act*, 36 J. MARSHALL L. REV. 397, 415 (2003) (noting that critics of Bayh-Dole charge that it distorts the direction of basic academic research toward commercially promising subjects); Scott D. Locke, *Patent Litigation over Federally Funded Inventions and the Consequences of Failing to Comply with Bayh-Dole*, 8 VA. J.L. & TECH. 3, 15 (2003) (proposing that a recipient of federal funds who fails to comply with the requirements of Bayh-Dole should be divested of title to any patents funded by the public); Peter Mikhail, *Hopkins v. CellPro: An Illustration that Patenting and Exclusive Licensing of*

several commentators have called for reformation of the Act,²⁵ as well as other changes to the patent system, such as heightening the subject matter and utility standards and creating a statutory experimental use exception to patent infringement.²⁶ These proposals could, if implemented, improve some aspects of the current university patenting regime.²⁷ Even if enacted, however, such reforms likely would have little, if any, effect on the increase in secrecy among academic researchers because they do not address the underlying causes of that problem.

I contend that a more promising mechanism for addressing the deterioration in disclosure norms in academia would be to build flexibility into the novelty rules of U.S. and foreign patent systems. This would tailor the patent system to accommodate the needs, val-

Fundamental Science Is Not Always in the Public Interest, 13 HARV. J.L. & TECH. 375, 383–84 (2000) (suggesting that the exclusive licensing of technology developed with federal funds impermissibly limits access to research tools); Arti K. Rai & Rebecca S. Eisenberg, *Bayh-Dole Reform and the Progress of Biomedicine*, 66 LAW & CONTEMP. PROBS. 289, 291 (2003) (arguing for the reformation of Bayh-Dole to give funding agencies greater discretion in mandating the non-exclusive licensing of federally funded inventions); Diane M. Sidebottom, *Updating the Bayh-Dole Act: Keeping the Federal Government on the Cutting Edge*, 30 PUB. CONT. L.J. 225, 236–37 (2001) (explaining that the government requires greater flexibility than Bayh-Dole allows in order to negotiate technology licenses that are attractive to industry); Leaf, *supra* note 23, at 268 (arguing for the amendment of Bayh-Dole to require broad licensing of federally funded inventions); Gary Stix, *Razing the Tollbooths*, SCI. AM., Apr. 2003, at 37 (same).

²⁵ See Hamilton, *supra* note 24, at 417 (proposing amendments to Bayh-Dole to promote collaboration between universities, local planning agencies, and managers of venture funds and industry leaders); Rai & Eisenberg, *supra* note 24, at 291 (arguing for the reformation of Bayh-Dole to give funding agencies greater discretion in mandating the non-exclusive licensing of federally funded inventions); Sidebottom, *supra* note 24, at 236–37 (arguing that Bayh-Dole should provide the government greater flexibility to negotiate technology licenses that are attractive to industry).

²⁶ See, e.g., Cynthia D. Lopez-Beverage, *Should Congress Do Something About Upstream Clogging Caused by the Deficient Utility of Expressed Sequence Tag Patents?*, 10 J. TECH. L. & POL'Y 35, 92 (2005); Richard R. Nelson, *Observations on the Post-Bayh-Dole Rise of Patenting at American Universities*, 26 J. TECH. TRANSFER 13, 18 (2001); Arti K. Rai & Rebecca S. Eisenberg, *Bayh-Dole Reform and the Progress of Biomedicine*, 91 AM. SCIENTIST 52, 56 (2003).

²⁷ Bayh-Dole's perceived successes have made it quite popular with members of Congress, universities, and interest groups, and more than minimal changes to the current Act seem unlikely in the near future. For example, patent reform legislation currently pending before Congress does not include meaningful changes to Bayh-Dole. See *supra* note 22 and accompanying text. Moreover, the CREATE Act of 2004 provided the ideal opportunity for Congress to address problems with the Bayh-Dole Act because the legislation specifically related to enhancing the Act's technology transfer mandate, yet none of the above-mentioned commentator reforms were included in that legislation. Instead, the Bayh-Dole Act was uniformly praised in congressional remarks. See, e.g., 150 CONG. REC. S2559 (daily ed. Mar. 10, 2004) (statements of Sens. Hatch and Leahy). In fact, Congress recently celebrated the twenty-fifth anniversary of Bayh-Dole with a resolution praising the achievements made possible by the Act. H.R. CON. RES. 319, 109th Cong. (2005).

ues, and realities of academic enterprises, and would permit academic researchers more freedom to share publicly their results. Surprisingly little, if any, real attention has been focused on modifying these rules that, along with restrictive terms in industry sponsorship agreements, are at the root of the increased secrecy permeating academia today. Twenty-five years after the passage of the Bayh-Dole Act, patents and technology transfer are firmly entrenched in academia,²⁸ but instead of being a simple aid to the dispersion and implementation of university discoveries, patent rules too often are dictating the pace, form, and scope of discourse and sometimes even the direction of the research itself. In a society that values the public benefits created both by prompt and open scholarly discourse and by the patenting of commercializable inventions, these developments are particularly troubling. In the interest of the public good, researchers should not have to choose between engaging in early-stage academic discourse and obtaining proprietary rights.

I suggest that to begin reversing the observed deterioration in disclosure norms, flexibility must be built into the patent system so that patents can facilitate, not control, the academic knowledge dissemination enterprise. In particular, I advocate the creation of an opt-in extended grace period that would provide more time for academic researchers to publish and present early-stage research before having to file a patent application. Such an extension, coupled with early application publication, would allow researchers to engage more fully in traditional academic discourse while retaining the ability to obtain the proprietary rights necessary for commercialization of their inventions. Importantly, this kind of extension also would provide early disclosure of discoveries for other scientists to build upon.

Part I of this Article provides a context for discussing issues relating to academic discourse and proprietary rights by highlighting key changes in the historical relationship between the academy and the public good prompted by the intrusion of proprietary rights.²⁹ Part II then considers the impact of changes in patent law and policy on sci-

²⁸ See Eisenberg, *supra* note 24, at 1726-27 (noting that "[t]he present policy of promoting patents on federally-supported inventions has become rapidly entrenched in U.S. law" and that "[r]etreating from the policy may be difficult at this stage. Research performers have adjusted to the incentives created by current policy. When government policy creates and distributes new property rights, it is inevitable that someone will protest if those rights are later taken away.").

²⁹ See *infra* notes 35-55 and accompanying text.

entific discourse in the academy.³⁰ It looks first at positive benefits created by the changes and then at several of the costs engendered by the patent and technology transfer boom within U.S. universities in the twenty-five years since the enactment of Bayh-Dole. Proposals for putting patents in their proper place are the focus of Part III.³¹ This Part proposes the enactment of a statutory amendment designed to ameliorate the effects of patent prior art rules on the dissemination of early-stage university research by allowing university researchers the option of an extended prior art grace period in exchange for immediate application publication.³² This proposal aims to increase prompt and full academic discourse, while balancing a researcher's ability to obtain patent protection with third-party needs for certainty regarding publicly available information. Part III also addresses controversial aspects of the proposals, including their relation to current patent reform and harmonization efforts under consideration in the United States and abroad.³³ The Article concludes that for norms of scientific scholarly discourse to regain traction in the academy, patents must move out of the limelight and into the supporting role that is their proper place.³⁴

I. THE ACADEMY AND THE PUBLIC GOOD: A CHANGING RELATIONSHIP

*Institutions of higher education are conducted for the common good and not to further the interest of either the individual teacher or the institution as a whole. The common good depends upon the free search for truth and its free exposition.*³⁵

This statement reflects the traditional view of universities as institutions dedicated to the advancement of the common good.³⁶ This advancement or "progress" requires "complete and unlimited freedom to pursue inquiry and publish its results. Such freedom is the breath in

³⁰ See *infra* notes 56–157 and accompanying text.

³¹ See *infra* notes 158–229 and accompanying text.

³² See *infra* notes 163–200 and accompanying text.

³³ See *infra* notes 201–29 and accompanying text.

³⁴ See *infra* notes 230–32 and accompanying text.

³⁵ AM. ASS'N OF UNIV. PROFESSORS, 1940 *Statement of Principles on Academic Freedom and Tenure*, With 1970 *Interpretive Comments*, in POLICY DOCUMENTS & REPORTS, *supra* note 6, at 3.

³⁶ See *id.* There are many ways in which universities have contributed to the public good in the United States and abroad throughout history. The contributions of American universities to industry, agriculture, pharmaceuticals, and local community development, as well as the training of a skilled workforce, are well documented. A useful discussion of this topic is provided in MOWERY ET AL., *supra* note 24, at 9–34.

the nostrils of all scientific activity."³⁷ Academic freedom manifests itself in scholarly articles, books, and presentations that are useful for the researcher (for example, in getting a job or achieving tenure) and for the interested academic or industry audience seeking to build on that researcher's work.

A. Historical Norms

Historically, researchers choosing an academic career made a clear choice for academic freedom over monetary reward:

The professor opts to forgo the fast-paced and often stressful environment found in an industrial research and development department and the high salary that accompanies that position. Instead, professors are attracted to the chance to pursue similar interests in an academic arena where they are also endowed with freedom to research topics of their choice.³⁸

Thus in academe "[i]deas, research, and writing are the currency"³⁹ that, in conjunction with academic freedom and the other intangible benefits of publication and discovery, historically have made the academic enterprise rewarding for researchers. This is not to say that academics were completely altruistic and unselfish in their efforts. Rather, the "public credit and kudos" accruing to authors of important scientific publications have provided incentives for early publication of scientific discoveries since Henry Oldenburg introduced the

³⁷ AM. ASS'N OF UNIV. PROFESSORS, *supra* note 6, in POLICY DOCUMENTS & REPORTS app. 1, at 295 (9th ed. 2001). For a cogent argument that the concept of academic autonomy unfettered by university administration is no longer tenable in a Bayh-Dole or sponsored research environment, see Eisenberg, *supra* note 10, at 1404. Professor Rebecca S. Eisenberg contends:

The traditional American conception of academic freedom, with its emphasis on defending the professional autonomy of individual faculty members against universities, is ill-adapted to the task of protecting academic values in sponsored research within universities. Research sponsors having interests at odds with traditional academic values may use the lure of research funding to entice academic scientists into serving their interests. . . . It makes little sense to immunize faculty members from institutional supervision and control in their relationships with research sponsors if faculty members cannot be counted on to uphold academic values on their own.

Id.

³⁸ Sandip H. Patel, Note, *Graduate Students' Ownership and Attribution Rights in Intellectual Property*, 71 IND. L.J. 481, 499 (1995).

³⁹ Lisa G. Lerman, *Misattribution in Legal Scholarship: Plagiarism, Ghostwriting, and Authorship*, 42 S. TEX. L. REV. 467, 477-78 (2001).

journal *Philosophical Transactions of the Royal Society of London* in 1665.⁴⁰ Of course, the public has benefited from this norm of open disclosure as well. As noted by the National Academy of Science's Committee on Responsibilities of Authorship in the Biological Sciences:

[T]he power of the principles first established by Henry Oldenburg and the *Philosophical Transactions of the Royal Society* in 1665 remain undiminished: The rewards of publication counterbalance inclinations to secrecy. Oldenburg's simple idea created an ethic of open disclosure of scientific results that has lasted for centuries and served to move science forward.⁴¹

Prompt dissemination of research hypotheses, results, and methodologies through scientific presentations and publication has provided the foundation for advances and discoveries in numerous scientific fields that have benefited humanity.⁴² The sociologist Robert Merton characterized academic scientific research as a communal enterprise with free sharing and critiquing of results among community members.⁴³ As one commentator explains:

The speed of progress is greatly enhanced by virtue of the fact the practitioners of science publish not only results, but methodology, and techniques. . . . This not only helps 'bootstrap' others into the field, to learn from the example set, but makes it possible for others to verify or refute the results (or techniques) under investigation.⁴⁴

⁴⁰ See Matthew Rimmer, *Japonica Rice: Intellectual Property, Scientific Publishing and Data-sharing*, 23 PROMETHEUS 325, 326 (2005).

⁴¹ COMM. ON RESPONSIBILITIES OF AUTHORSHIP IN THE BIOLOGICAL SCI., NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., SHARING PUBLICATION-RELATED DATA AND MATERIALS: RESPONSIBILITIES OF AUTHORSHIP IN THE LIFE SCIENCES 77 (2003).

⁴² For example, Emory University researcher Dr. Ray Schinazi, co-inventor of the blockbuster drug Emtriva, claims to have gotten the idea for the new compound from hearing a presentation by Canadian researcher Bernard Belleau at an AIDS research conference in Montreal. See Leaf, *supra* note 23, at 254.

⁴³ Robert K. Merton, *The Normative Structure of Science*, in THE SOCIOLOGY OF SCIENCE 274-75 (1973).

⁴⁴ Con Zymaris, *Shoulders of Giants—A Paper on the Inevitability of Open Source Dominance* ¶ 6 (Mar. 3, 2003) (unpublished paper), <http://www.cyber.com.au/users/conz/shoulders.html>.

Sir Isaac Newton's classic statement, "[i]f I have seen further . . . it is by standing on the shoulders of giants," visually captures the concept of cumulative learning from open science.⁴⁵

In the past twenty-five years, however, explicit and implicit evisceration of traditional notions of academic discourse in, and academic reward for, scientific endeavors has proceeded apace. The Bayh-Dole Act mandates that universities share royalties from patented inventions with researchers.⁴⁶ This requirement has created a pathway for some faculty to become millionaires, thus eroding, to some extent, the pull of the publication incentive structure.⁴⁷ Moreover, many researchers receive study funding from industry sources, and such sponsored research agreements often specify a term of secrecy for results generated under the agreement.⁴⁸

Encroachment on traditional sharing norms now often comes from university intellectual property policies codified in faculty handbooks and in the instructions of TTO personnel to vet inventive work through the office before publishing or presenting it to avoid the loss of potential patent rights.⁴⁹ In addition, with increasing numbers of

⁴⁵ Letter from Isaac Newton to Robert Hooke (Feb. 5, 1675/6), in 1 CORRESPONDENCE OF ISAAC NEWTON, 1661-1675, at 416 (H.W. Turnbull ed., 1959).

⁴⁶ 35 U.S.C. § 202(c)(7) (2000).

⁴⁷ For example, under Emory University's Intellectual Property Policy, inventors receive 100% of net royalties up to \$25,000, 33% of net royalties up to \$4 million, and 25% of net royalties over \$4 million. Consequently, Emory's \$540 million Emtriva sale made the three faculty inventors millionaires. See EMORY UNIV. OFFICE OF TECH. TRANSFER, EMORY UNIVERSITY INTELLECTUAL PROPERTY POLICY 6 (2002), available at http://www.ott.emory.edu/share/policies/intellectual_property.pdf.

⁴⁸ See Jerry G. Thursby & Marie C. Thursby, *Who Is Selling the Ivory Tower? Sources of Growth in University Licensing*, 48 MGMT. SCI. 90, 93 (2001) ("Half of the firms in our industry survey noted that they include delay of publication clauses in at least 90% of their university contracts. The average delay is nearly four months, and some firms require as much as a year's delay.") (citation omitted).

⁴⁹ See GARY RHOADES & SHEILA SLAUGHTER, *ACADEMIC CAPITALISM AND THE NEW ECONOMY* 115-16 (2004). The authors quote an assistant biology professor describing the problem:

If you think you have something commercially relevant, you are required to file a disclosure to the university before you publish it. So they are essentially sort of censoring what's being published . . . the university . . . is in business too . . . so it's annoying in one respect because being in academics, you need to have all this freedom, but if you actually read the university faculty handbook . . . anything that you think is commercially relevant has to be filed first and then they have up to six months to decide the fate of what you are working on . . . and that includes presentations at meetings. So, I don't know. The lines between industry and universities are sort of merging.

Id. (omissions in original); see also *infra* notes 147-57 and accompanying text.

academic researchers creating start-up companies to license and commercialize the faculty member's patented inventions, there has been a steady blurring of the lines between academic and industry research and their concomitant rewards. Universities have had to create conflict-of-interest policies to address these new revenue-generating incentive sources that can detract from faculty members fulfilling their traditional teaching, training, and disseminating duties in the academy. And all of these changes are developing in the name of the common good and the public interest, under the new regime of academic capitalism that "proposes that the market rules, and that its operation serves the interests of higher education and the larger society."⁵⁰

B. *Same End, New Means*

The new academic capitalism has created philosophical and practical quandaries for researchers. The philosophical conundrum arises from the tension between the lofty goals of academe and the lure of materialism. As Derek Bok, former president of Harvard University, notes, "Scholars, especially in the traditional disciplines, have deliberately chosen academic life in preference to the ways of commerce, in part because they look upon the search for truth and knowledge as a worthier calling than the quest for material wealth."⁵¹

Nevertheless, academe is now enhancing the common good through the increased transfer of technology from its hallowed halls to the marketplace via industry collaborations facilitated by changes in patent policy.⁵² Supporters of this new "means" to the historical "end" of benefiting the common good cite the numerous research parks, collaborations, patents, start-up companies, and consumer products made possible by the new academic capitalism.⁵³ For example, the website of

⁵⁰ Gary Rhoades, *Capitalism, Academic Style, and Shared Governance*, ACADEME, May-June 2005, at 39, available at <http://www.aaup.org/publications/Academe/2005/05mj/05mjrhoa.htm>.

⁵¹ DEREK BOK, *UNIVERSITIES IN THE MARKETPLACE: THE COMMERCIALIZATION OF HIGHER EDUCATION* 18 (2003).

⁵² RHOADES & SLAUGHTER, *supra* note 49, at 115-16 (discussing the pattern evident in many university intellectual property policies of the conflict between the values of the competing knowledge regimes of public good and academic capitalism).

⁵³ See, e.g., *Patent Law Reform Hearings*, *supra* note 3, at 3-4 (statement of Carl Gulbrandsen, Managing Director, WARF) (summarizing the results of successful university patents); 150 CONG. REC. S2559 (daily ed. Mar. 10, 2004) (statements of Sens. Hatch and Leahy) (noting the benefits of collaborations between university and industry); ASS'N OF UNIV. TECH. MANAGERS, *supra* note 13, at 4-11 (describing successful products resulting from technology transfer).

the Association of University Technology Managers ("AUTM") contains a list of "product stories" describing successful university-generated products and programs that is more than twenty-five pages long.⁵⁴ Detractors, however, note that several of these blockbuster innovations did not require patent protection for dissemination, that fundamental discoveries would have been widely used without patents, and that patents in fact exact a toll on the use of the technology.⁵⁵ Regardless, the impact of the widespread introduction of patenting and technology transfer at U.S. universities has been substantial, creating many benefits but also many controversial costs.

II. THE IMPACT OF PATENT LAW AND POLICY

Congress has many levers at its disposal to shape public policy, and patent law is one of them.⁵⁶ The choice of patent law as the policy tool to address the dearth of industry interest in university-generated research is explicitly affirmed in the text of the Bayh-Dole Act: "It is the policy and objective of the Congress to use the patent system to promote the utilization of inventions arising from federally supported research or development."⁵⁷ Results of this choice are visible in AUTM Licensing Survey statistics detailing the continuing increases in inventions disclosed, patents obtained, licenses executed, start-ups created, and products commercialized.⁵⁸ Less visible, but no less important, are the effects on the culture and norms of academic research in universities engaging in the technology transfer enterprise.

A. Benefits to Technology Transfer

On several occasions Congress has revised the patent statute to better aid the public good, but very few amendments have had as significant and widespread an impact as the Bayh-Dole Act of 1980.⁵⁹

⁵⁴ See Ass'n of Univ. Tech. Managers, *supra* note 5.

⁵⁵ See, e.g., Stix, *supra* note 24, at 37 (describing patents on upstream technologies as "tollbooths" impeding further development).

⁵⁶ See *From the Bench to the Bedside*, *supra* note 12, at 3 (statement of Sherrod Brown, Member H. Comm. on Energy and Commerce) ("Policy tools like patents, the Bayh-Dole Act, the Stevenson-Wydler Act, and incentives for commercialization, are important links in the bench to bedside chain.").

⁵⁷ 35 U.S.C. § 200 (2000).

⁵⁸ See ASS'N OF UNIV. TECH. MANAGERS, *supra* note 13, at 15-28.

⁵⁹ See Pub. L. No. 96-517, 94 Stat. 3015 (codified as amended at 35 U.S.C. §§ 200-211, 301-307). Other major revisions of the patent statute include the 1836 Patent Act, which instituted an examination system into the U.S. patent regime, replacing the flawed registration system of the 1793 Act. Also, the 1952 Patent Act contained the first statutory

Although not solely responsible for the technology transfer boom of the past several years, the impact of the Act has been profound. Bayh-Dole, and later legislation to benefit and promote collaborative research initiatives between university and industrial sector entities, are clear examples of congressional efforts to promote the commercialization of university-generated technology.⁶⁰

1. Bridging the Gap: Bayh-Dole

The year 1980 ushered in the era of technology transfer-related academic capitalism for U.S. universities with two landmark events, one legislative, the Bayh-Dole Act,⁶¹ and one judicial, the U.S. Supreme Court's *Diamond v. Chakrabarty* decision.⁶² Two years later, Congress gave technology transfer an additional, albeit perhaps inadvertent, boost with the creation of the Court of Appeals for the Federal Circuit.⁶³ These three events coincided with significant technological discoveries in biotechnology and computer science that combined to lead to a dramatic increase in patenting, licensing, and entrepreneurial activities on U.S. university campuses.⁶⁴

When Congress passed the Bayh-Dole amendments to the Patent Act in 1980, it gave universities presumptive title to inventions produced with federal funds, as long as they complied with specific requirements.⁶⁵ By allowing patent title to vest initially in universities, the Bayh-Dole Act paved the way for more interaction between universities and companies, which could now obtain exclusive licenses to such pat-

codification of the non-obviousness requirement, designed to eliminate the vague and subjective "invention" requirement and clarify patentability standards. See Patent Act of 1952, ch. 950, 66 Stat. 792 (1952) (current version in scattered sections of 35 U.S.C.); Patent Act of 1836, ch. 357, 5 Stat. 117 (1836) (current version in scattered sections of 35 U.S.C.).

⁶⁰ See *From the Bench to the Bedside*, *supra* note 12, at 55 (statement of Dr. Andrew Neighbour, Vice Chancellor for Research, UCLA) ("Passage of Bayh-Dole conferred not only the right to take title to inventions arising from government-funded research, but also an obligation to commercialize these inventions diligently for the benefit of the public.").

⁶¹ See Pub. L. No. 96-517, 94 Stat. 3015 (codified as amended at 35 U.S.C. §§ 200-211, 301-307).

⁶² See 447 U.S. 303, 310 (1980) (permitting a patent on genetically engineered bacteria).

⁶³ See Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (codified as amended at 28 U.S.C. §§ 41-49).

⁶⁴ See Wesley M. Cohen, *Patents and Appropriation: Concerns and Evidence*, 30 J. TECH. TRANSFER 57, 59 (2005) (including the 1984 Hatch-Waxman Act and the 1988 Process Patent Amendments Act as contributors to the pro-patent era).

⁶⁵ See 35 U.S.C. § 202 (2000 & Supp. III 2003).

ents and commercialize academic research that previously might have lain dormant and unused.⁶⁶

In a prepared statement before a congressional subcommittee, Dr. Phyllis Gardner, an associate professor of medicine at Stanford University, succinctly outlined the pre-Bayh-Dole problem:

Prior to Bayh-Dole, federal agencies would rarely relinquish ownership of federally funded inventions to the academic and private institutions, even when private sector scientists and engineers actually contributed to the inventions. Valuable technology was left languishing on the shelves of research institutions. For example, in the 1960s, the U.S. government asserted that it owned rights to 5-fluorouracil (an important anti-cancer drug) even though it had provided merely a fraction of the funding that went into discovery. As a result, market entry of this critical product was unnecessarily delayed and industry distanced itself from federally funded university research.⁶⁷

The impetus for Bayh-Dole was the belief that a wealth of basic, useful research developed in U.S. universities was languishing in those ivory towers. A frequently cited statistic in hearings on the Act was that as of 1976, less than 5% of the 28,000 government-owned patents were licensed.⁶⁸ This figure was attributed to private industry's reluctance to invest in commercializing federally funded research because they could not obtain exclusive rights to it.⁶⁹ Such reluctance created a "death valley" between publicly funded research and its commercialization by the private sector. The Bayh-Dole Act provided a "bridge" over this valley by allowing universities to take title to inventions developed with federal funds and to grant exclusive licenses to entities willing to commercial-

⁶⁶ Useful summaries of the history of the Bayh-Dole Act and the varying forces leading up to its enactment can be found in MOWERY ET AL., *supra* note 24, at 9-34 and Eisenberg, *supra* note 24, at 1671-95.

⁶⁷ *From the Bench to the Bedside*, *supra* note 12, at 50 (statement of Dr. Phyllis Gardner, representing the Biotechnology Industry Organization).

⁶⁸ MOWERY ET AL., *supra* note 24, at 90.

⁶⁹ Although the funding agency could make the decision to allow licensing, such decisions were rare and were made on a case-by-case basis, resulting in significant uncertainty regarding the likelihood of a favorable result. It was well understood, of course, that commercialization was beyond the mission, resources, and expertise of university researchers and should be handled by the private sector. See MOWERY ET AL., *supra* note 24, at 88-91.

ize such technology.⁷⁰ The resulting collaboration between industry, government, and academic labs has led to shorter delays between the invention of a new technology and its sale in the marketplace.⁷¹

Goals for Bayh-Dole were largely unexceptional. They included expediting the transfer of publicly supported research and development ("R&D") results to the marketplace by promoting collaborations between universities and industry, increasing small business participation in federal R&D efforts, and creating new jobs and profits for regional economies through the commercialization of inventions made in the United States.⁷² The Act brought to universities the lure of new money: a potential influx of new capital from licensing revenue derived from transferred technology. But in order to capitalize on the opportunity, universities had to comply with the myriad rules mandated by Bayh-Dole, such as seeking patents on inventions as well as licensees to commercialize the inventions.⁷³ With increasing frequency, universities began establishing TTOs to perform these functions. In 1980, twenty-five institutions of higher learning were involved in technology transfer; by 1990, that number had climbed to 200.⁷⁴ Similarly, the number of patents issuing to U.S. universities "more than doubled between 1979 and 1984, more than doubled again between 1984 and 1989, and more than doubled again over the 1990s."⁷⁵ Research by Rogers, Ying, and Hartman suggested a likely impetus for the rapid and widespread adoption of the TTO model by many universities across the country:

The diffusion of technology transfer offices may have been influenced by the so-called "big winner" technologies that have occurred at some universities. Examples are the \$160 million that Michigan State University has earned over the life of two cancer-related patents, the \$37 million that the University of Florida has earned from the sports drink Gatorade, the \$27 million that Iowa State University has been paid for the fax algorithm, and the \$143 million earned by Stanford Uni-

⁷⁰ See Stevenson-Wydler Technology Innovation Act of 1980, Pub. L. No. 96-480, 94 Stat. 2311 (codified as amended at 15 U.S.C. §§ 3701-3714) (addressing technology transfer in government laboratories).

⁷¹ Johnson, *supra* note 10, at 166.

⁷² 35 U.S.C. § 200 (2000).

⁷³ See COUNCIL ON GOVERNMENTAL RELATIONS, THE BAYH-DOLE ACT: A GUIDE TO THE LAW AND IMPLEMENTING REGULATIONS 4-6 (1999), available at http://www.cogr.edu/docs/Bayh_Dole.pdf.

⁷⁴ Nelson, *supra* note 26, at 14.

⁷⁵ *Id.* at 13.

versity for the recombinant DNA gene-splicing patent. A "big winner" can dominate the total license income at a research university; for example, \$18 million of Michigan State University's \$18.3 [million] license income in FY 1997 came from the two cancer-related drugs.⁷⁶

But very few universities that have set up TTOs have seen these types of blockbuster successes. In 2000, about half of the total licensing income generated by all universities was earned by the top five grossing institutions.⁷⁷ Creating a patenting culture in a university requires a substantial, long-term investment of resources with no guarantee of success. On average, it takes from five to ten years before a TTO breaks even, and poor management of the office can result in researchers having negative experiences with the technology transfer process, creating ill will that hinders progress for years to come.⁷⁸

Although the impact of Bayh-Dole in the technology transfer revolution has been profound, there also have been other changes in patent law and policy that have played a significant role in creating the dual-edged technology transfer sword that is both praised and reviled today.⁷⁹ The same year that Congress put technology transfer on the university map with the Bayh-Dole Act, the U.S. Supreme Court gave it a further boost with its decision in *Chakrabarty*.⁸⁰ "[A]nything under the sun that is made by man" is eligible for patent protection, according to

⁷⁶ Everett M. Rogers et al., *Assessing the Effectiveness of Technology Transfer Offices at U.S. Research Universities*, 12 AUTM J. 47, 55 (2000), available at <http://www.autm.net/pubs/journal/00/assessing.pdf> (citations omitted).

⁷⁷ ASS'N OF UNIV. TECH. MANAGERS, AUTM LICENSING SURVEY: FY 2000 SURVEY SUMMARY 13 (Lori Pressman ed., 2001), available at http://www.autm.net/events/File/Surveys/3_FY2000summary_public.pdf.

⁷⁸ See Jason Owen-Smith & Walter W. Powell, *To Patent or Not: Faculty Decisions and Institutional Success at Technology Transfer*, 26 J. TECH. TRANSFER 99, 112 (2001) ("[F]aculty decide to patent because of their beliefs about the positive personal and professional outcomes of establishing IP protection. . . . [T]he decision to disclose a new finding . . . depends upon conceptions of the patent benefits, framed by the costs of interacting with licensing professionals and technology transfer offices.").

⁷⁹ See, e.g., BOK, *supra* note 51, at 11–12 (citing government subsidies and tax credits as contributing to the growth of technology transfer); Nelson, *supra* note 26, at 14; Eyal Press & Jennifer Washburn, *The Kept University*, ATLANTIC MONTHLY, Mar. 2000, at 40–41 (describing university-industry collaboration as a response to shrinking federal research funds); Brett M. Frischmann, *Commercializing University Research Systems in Economic Perspective: A View From the Demand Side* 3–5 (Feb. 2005) (working paper on file with author) (listing some of the many economic pressures facing universities that have lead to an increase in technology transfer).

⁸⁰ See *Chakrabarty*, 447 U.S. at 313.

the Supreme Court.⁸¹ The Court lifted the phrase from the legislative history of the Patent Act of 1952 as evidence of the broad terrain Congress intended the patent laws to cover.⁸² The phrase provided the basis for the Court's path-breaking conclusion in *Chakrabarty*, that living organisms comprised patent eligible subject matter.⁸³ By expanding the scope of patent-eligible subject matter to comprise living organisms, including the genetically engineered bacteria at issue in the case, *Chakrabarty* jump-started the fledgling biotechnology industry and further fueled National Institutes of Health funding of university research in the life sciences.

The combined effects of the *Chakrabarty* decision and the Bayh-Dole Act on the increase in technology transfer-related patenting have been significant. As two commentators note in a recent article, "[A]t roughly the same time universities were permitted to claim intellectual property rights to the fruits of federally-funded research as a matter of course, the universe of potentially patentable research results expanded and the potential value of intellectual property increased."⁸⁴ For example, the relaxation of patent subject-matter standards meant that universities, often engaged in upstream research, could patent discoveries in the early stages of development that, prior to the *Chakrabarty* decision, likely would not have been eligible for patent protection.

Not long after the Supreme Court widened the scope of patent-eligible subject matter in *Chakrabarty*, Congress passed the Federal Courts Improvement Act of 1982 and created the Court of Appeals for the Federal Circuit.⁸⁵ This new court, with jurisdiction over appeals

⁸¹ *Id.* at 309 ("Congress intended statutory subject matter to include 'anything under the sun that is made by man.'") (quoting S. REP. NO. 82-1979, at 5 (1952); H.R. REP. NO. 82-1923, at 6 (1952)).

⁸² *See id.*

⁸³ *Id.* A much earlier decision, *Parke-Davis & Co. v. H.K. Mulford & Co.*, in subsequent combination with *Chakrabarty*, set the stage for the patenting of genes, DNA, and other naturally occurring biological material isolated from, and in a purified state relative to, its natural condition. *See Parke-Davis & Co. v. H.K. Mulford & Co.*, 196 F. 496, 498-99 (2d Cir. 1912). Although abstract ideas, natural phenomena, and products of nature are still nominally excluded from patent eligibility, the allowance of patents covering isolated genes and purified DNA narrows the scope of "natural phenomena" that is in the public domain and not eligible for patent protection. For a more in-depth discussion of patent eligibility standards in the United States, see generally Margo A. Bagley, *Patent First, Ask Questions Later: Morality and Biotechnology in Patent Law*, 45 WM. & MARY L. REV. 469 (2003).

⁸⁴ Joshua A. Newberg & Richard L. Dunn, *Keeping Secrets in the Campus Lab: Law, Values and Rules of Engagement for Industry-University R&D Partnerships*, 39 AM. BUS. L.J. 187, 196 (2002).

⁸⁵ Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (codified as amended at 28 U.S.C. §§ 41-49).

from all patent cases in the federal district courts,⁸⁶ was formed to eliminate the rampant forum-shopping in patent cases due to the presence of pro- and anti-patent regional circuit courts. This move had the ultimate effect of increasing patenting levels because the Federal Circuit's largely pro-patent decisions increased the certainty of patentability, making virtually all patents more valuable.⁸⁷ In turn, this boosted university-industry technology transfer because the rights universities could award under the Bayh-Dole Act also became more valuable.

But Congress did not stop there. Additional legislative efforts, culminating most recently in legislation to facilitate the patenting of the results of collaborative work, evince a continued desire to benefit university-industry partnerships through patent policy initiatives.⁸⁸

2. Facilitating Collaboration: The CREATE Act of 2004

In 2004, Congress reaffirmed its commitment to university-industry technology transfer with the passage of the Collaborative Research and Technology Enhancement Act (the "CREATE Act"), a provision narrowly tailored to remove a specific impediment to the patenting of collaborative research results.⁸⁹ The CREATE Act overturned the Court of Appeals for the Federal Circuit's 1995 *OddzOn v. Just Toys* decision and extended the non-obviousness safe harbor of 35 U.S.C. § 103(c) to include prior inventions of researchers from different organizations operating pursuant to a joint research agreement.⁹⁰

⁸⁶ This is a bit of an overstatement. The Federal Circuit has jurisdiction over appeals of cases in which the plaintiff's complaint contained a claim "arising under" the Patent Act. See *Holmes Group v. Vornado Air Circulation Sys.*, 535 U.S. 826, 834 (2002).

⁸⁷ See Fed. Trade Comm'n, *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy, Executive Summary*, 19 BERKELEY TECH. L.J. 861, 865 (2004) ("The Court of Appeals for the Federal Circuit, the sole court for most patent law appeals, has brought stability and increased predictability to various elements of patent law.").

⁸⁸ See Cooperative Research and Technology Enhancement (CREATE) Act of 2004, Pub. L. No. 108-453, 118 Stat. 3596 (codified as amended at 35 U.S.C. § 103); *infra* notes 89-94 and accompanying text.

⁸⁹ See CREATE Act of 2004, 118 Stat. 3596.

⁹⁰ As amended by the CREATE Act, 35 U.S.C. § 103(c) now provides:

(c) (1) Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title [35 USC § 102], shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person.

(2) For purposes of this subsection, subject matter developed by another person and a claimed invention shall be deemed to have been owned by the same person or subject to an obligation of assignment to the same person if—

Prior to the passage of the CREATE Act, the joint collaboration of coworkers for the *same* employer could not be used as prior art for obviousness against later work, but that protection did not extend to the collaborations of coworkers from *different* organizations, such as those in university-industry joint research agreements. The CREATE Act eliminated the "same/different" organization distinction by disqualifying from the state of the art for determining obviousness information that is the work of researchers from different research organizations *if* there had been a pre-existing agreement for research collaboration.⁹¹

In his remarks introducing the CREATE Act, Senator Orrin Hatch (R-Utah) explicitly related the new legislation to the goals of Bayh-Dole:

This bill makes a narrow but important change in our patent laws to ensure that the American public will benefit from the results of collaborative research efforts that combine the erudition of great public universities with the entrepreneurial savvy of private enterprises. . . . [W]e must encourage—not discourage—public institutions and private entrepreneurs to combine their respective talents in joint research efforts. Indeed Congress committed itself to this principle when it passed the Bayh-Dole Amendments to the Patent Act. The CREATE Act will simply conform the present language of the Patent Act to the intent that has always animated it.⁹²

Senator Patrick Leahy (D-Vt.) also praised the Bayh-Dole Act in introducing the CREATE Act:

When Congress passed the Bayh-Dole Act in 1980, the law encouraged private entities and not-for-profits such as universi-

(A) the claimed invention was made by or on behalf of parties to a joint research agreement that was in effect on or before the date the claimed invention was made;

(B) the claimed invention was made as a result of activities undertaken within the scope of the joint research agreement; and

(C) the application for patent for the claimed invention discloses or is amended to disclose the names of the parties to the joint research agreement.

(3) For purposes of paragraph (2), the term "joint research agreement" means a written contract, grant, or cooperative agreement entered into by two or more persons or entities for the performance of experimental, developmental, or research work in the field of the claimed invention.

35 U.S.C.A. § 103(c) (West 2001 & Supp. 2005).

⁹¹ See *id.*

⁹² 150 CONG. REC. S2558–59 (daily ed. Mar. 10, 2004) (statement of Sen. Hatch).

ties to form collaborative partnerships in order to spur innovation. Prior to the enactment of this law, universities were issued fewer than 250 patents each year. That this number has in recent years surpassed two thousand is owed in large measure to the Bayh-Dole Act. The innovation this law encouraged has contributed billions of dollars annually to the United States economy and has produced hundreds of thousands of jobs.⁹³

The CREATE Act was broadly supported by the U.S. Patent and Trademark Office (the "USPTO"), research universities, and the biotech industry, and met with little resistance as it moved through the House and Senate. In fact, one congressman described the CREATE Act as "a rare legislative achievement: [i]t is a truly noncontroversial patent bill."⁹⁴ Although the CREATE Act itself may be uncontroversial, the unintended side effects of Congress's earlier decision to use patent policy to facilitate university-industry technology transfer via the Bayh-Dole Act are cause for concern in the academy and beyond.

B. *Costs to Academe*

The use of patent law as a tool to promote university-industry technology transfer via the Bayh-Dole Act is justifiable as a matter of policy, and its effectiveness has been borne out over time. Patents provide incentives for the disclosure, development, and commercialization of new discoveries.⁹⁵ Patents do this by providing patentees with the right to exclude others from practicing the invention for a term of

⁹³ 150 CONG. REC. S2559 (daily ed. Mar. 10, 2004) (statement of Sen. Leahy).

⁹⁴ 150 CONG. REC. H945 (daily ed. Mar. 10, 2004) (statement of Rep. Berman).

⁹⁵ Providing an incentive to disclose an invention is a well-established function of patent law. See, e.g., Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1029-30 (1989) ("Secrecy makes it difficult for inventors to sell or license their inventions to others because it is difficult to persuade someone to pay for an idea without disclosing it, yet once the invention is disclosed, the inventor has nothing left to sell. The patent system solves this problem by permitting inventors to disclose their patented inventions to potential users without losing their exclusive rights."); Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 277-78 (1977) (comparing the incentive that patents provide for disclosure to the incentive for secrecy in trade secrets law). The patent bargain requires inventors to forgo trade secret protection and make the invention known to the world through the patent document. Unfortunately, this disclosure generally does not take place until the patent application describing the invention is published, which normally is eighteen months after the filing date. Moreover, this particular incentive is not needed for the university researcher, since open science and discourse norms encourage early disclosure through publications and presentations.

years,⁹⁶ in exchange for adequately disclosing how to make and use the invention to the public. This right to exclude is valuable because it provides the basis for a legal monopoly that allows the inventor to set the price for access to the invention. Patent law, however, brought with it a whole regime of rules and regulations developed without the norms or needs of academic researchers in mind. The result has been a steady deterioration in the quality and quantity of scientific discourse, at least in some disciplines, as well as negative effects on the focus of academic research and the communal environment in which it takes place.

1. Discourse: "Mum's the Word"

According to one industry newsletter, "The first impulse for university researchers is to publish and present their results, which it should be."⁹⁷ This impulse has practical and normative origins as the road to tenure at most institutions of higher education is paved with publications.⁹⁸ "Publish or perish" is the oft-heard mantra, and issued patents and start-up companies, lucrative or not, may be considered poor substitutes for scholarly publications by tenure committees.⁹⁹ The nurturing of a publication mentality begins even before matriculation,

⁹⁶ The current term is twenty years from the date of filing the first non-provisional application. See 35 U.S.C. § 154 (2000 & Supp. III 2003).

⁹⁷ See Maclanahan, *supra* note 7, at 6.

⁹⁸ See, e.g., David B. Rivers, *When Tenure Standards Change*, INSIDE HIGHER ED, May 20, 2005, <http://www.insidehighered.com/workplace/2005/05/20/rivers> (describing the impact of the adoption of a requirement for three published articles in order to be considered for tenure); Lisa Whitten & Linda Anderson, *Getting Beyond the Academic Gatekeepers: The Tenure Process*, AM. PSYCHOL. ASS'N OF GRADUATE STUDENTS, at ¶ 2, <http://www.apa.org/apags/profdev/abtenure.html> (last visited Jan. 17, 2006) ("In general, a career as a 'tenure-track' faculty member in higher education is made up of four components: teaching, service to the institution, service to the community, and professional/scholarly development, which includes publishing, research and grants.").

⁹⁹ See RHOADES & SLAUGHTER, *supra* note 49, at 114. According to Rhoades and Slaughter:

About 60 percent of the faculty we interviewed held patents. Almost all valued publishing research papers more highly than patenting. A few thought patents had some merit, but they were the exception. As a professor of chemical engineering explained: "A patent is hard to get, okay, but a patent doesn't need to be a scientific document. . . . You can patent things that are just scientifically terrible. . . . I think the thing that is valued the most is a high-quality scientific publication."

Id. But see Erich E. Kunhardt, Op-Ed., *Necessity as the Mother of Tenure?*, N.Y. TIMES, Dec. 14, 2004, at A33 ("The quickest way to change this mind-set will be to get administrations and faculties to accept successful inventing as a step toward tenure.").

as evidenced by the following advice the authors of the guide *The Ph.D. Process* offer to budding graduate students:

[I]n order to increase your chances of future employment in this publish-or-perish business, you have to build and maintain an image of productivity—publishing your work should be a top priority that starts in graduate school and continues throughout your career. A publication tells the world that your work has been judged by outside reviewers and found deserving; your publication record is the official declaration of your “worth” and effectiveness, and *a good/consistent publication record is singularly the most important asset a scientist can have*.¹⁰⁰

Despite the pervasive indoctrination of publishing norms among academic scientists,¹⁰¹ more and more researchers in the United States appear to be delaying or forgoing acting on this impulse. A recent article in *Fortune* magazine notes that the U.S. contribution to global knowledge, as measured by published articles in top journals around the world, is “stagnating.”¹⁰² Although there may be other contributing factors, patents are one of the likely culprits for this disturbing result.¹⁰³

A recent analysis of the presentation, publication, and patenting patterns of university scientists in 1980 and 1990 revealed a troubling trend: an increase in scientists withholding presentation of their data in order to seek patents.¹⁰⁴ The analysis considered the difference in the “publication gap,” the delay between a scientist’s presentation of

¹⁰⁰ DALE F. BLOOM ET AL., *THE PH.D. PROCESS: A STUDENT’S GUIDE TO GRADUATE SCHOOL IN THE SCIENCES* 74–75 (1998).

¹⁰¹ See generally IPR Helpdesk, *Grace Period and Invention Law in Europe and Selected States*, IPR Helpdesk, [http://www.ipr-helpdesk.org/documentos/docsPublicacion/pdf_xml/8_GracePeriodinventionLaw\[0000004514_00\].pdf](http://www.ipr-helpdesk.org/documentos/docsPublicacion/pdf_xml/8_GracePeriodinventionLaw[0000004514_00].pdf) (last visited Feb. 20, 2006) (explaining the difficulties for university inventors caused by the lack of a grace period in Europe because publications are “decisive” for an academic researcher’s career and reputation).

¹⁰² See Leaf, *supra* note 23, at 262 (“While the number of journal articles produced by American researchers has risen slightly since 1988, the rest of the world has raced ahead . . .”).

¹⁰³ See Grushcow, *supra* note 16, at 67–68 (“[S]cientists seeking to patent their inventions face a conflict between the incentives created by patent law to keep their data secret until they are substantially finished and the norms of the scientific community, which dictate that data should be shared at an early stage.”) (citation omitted).

¹⁰⁴ *Id.* at 73–74. Jeremy M. Grushcow further notes that even non-patent-seeking academics are delaying publication, though to a lesser degree, perhaps as a response to increased secrecy by patent-seekers, or simply the increasing competitiveness of the academic research environment after Bayh-Dole. *Id.* at 75–78.

data at a scientific conference and the formal publication of that data in a peer-reviewed journal, as well as the increase in meeting abstracts associated with patents. Whereas in 1980, 4.5% of the meeting abstracts examined were associated with a patent, by 1990, the corresponding number was 19.2%.¹⁰⁵ Moreover, 88% of patents associated with meeting abstracts had patent application filing priority dates before the conference presentation, indicating that the researchers delayed presenting data until after a patent application had been filed. The author of the study observed that:

Consistent with the incentive to withhold data when seeking patents, the lag between abstract presentation at the meeting and the formal publication in a peer-reviewed journal was shorter for university and NIH scientists¹⁰⁶ who sought patents than for their peers who did not seek patents. University scientists who sought patents presented meeting abstracts only on work that was complete, on average publishing formally in the same year as the meeting abstract, whereas university scientists who were not seeking patents published on average 1.21 years after their data were presented as a meeting abstract.¹⁰⁷

The author concluded from the data that "scientists who seek patents are more secretive, withholding publication or presentation of their data so as not to jeopardize patentability."¹⁰⁸ What is it about patents that would cause such a shift in behavior? Quite simply, the need to comply with the patent novelty rules prompts researchers to delay publicizing their efforts.

a. *The Need to Be New: Patent Novelty Rules*

In the U.S. system, patents are awarded for new and useful "machines, processes, manufactures, and compositions of matter."¹⁰⁹ But

¹⁰⁵ *Id.* at 73.

¹⁰⁶ The Stevenson-Wydler Act applied the Bayh-Dole Act provisions to researchers in government labs, such as the NIH. See Stevenson-Wydler Act, Pub. L. No. 102-45, 106 Stat. 20 (codified at 15 U.S.C. § 3710). Consequently, such researchers also have increased incentives to patent and commercialize their work.

¹⁰⁷ Grushcow, *supra* note 16, at 74 (internal citation omitted). Ninety percent of meeting abstracts, however, were followed up with a formal publication. *Id.* at 75. This indicates that even though university researchers may withhold early data, they still seek the "kudos" ultimately associated with publication. *Id.*

¹⁰⁸ *Id.* at 82.

¹⁰⁹ 35 U.S.C. § 101 (2000).

it is not enough for an invention to fit in one of these categories, it must also be novel and non-obvious to a person having ordinary skill in the art to which the invention pertains.¹¹⁰

Both the novelty and non-obviousness requirements mandate a comparison of the invention with prior art identified by 35 U.S.C. § 102.¹¹¹ Prior art is defined as "knowledge that is available, including what would be obvious from it, at a given time, to a person of ordinary skill in an art," as long as that information is drawn from the sources of information identified in § 102(a)-(g).¹¹² Under these provisions, patent-defeating prior art can include printed publications from anywhere in the world, public knowledge or use of the invention before the applicant's date of invention, or public use or sale, even by the inventor, more than one year before the applicant's filing date.¹¹³ Sec-

¹¹⁰ See 35 U.S.C. § 102 (2000 & Supp. III 2003) (novelty); 35 U.S.C.A. § 103 (West 2001 & Supp. 2005) (non-obviousness). Section 102 contains the novelty requirement and provides that:

A person shall be entitled to a patent unless—

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States

....

35 U.S.C. § 102. The non-obviousness requirement is codified at 35 U.S.C. § 103, which provides, in pertinent part:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C.A. § 103.

¹¹¹ 35 U.S.C. § 102.

¹¹² *Kimberly-Clark Corp. v. Johnson & Johnson*, 745 F.2d 1437, 1453 (Fed. Cir. 1984). It is worth noting that an applicant need not be aware of prior art for the information to be used against her patent application. Knowledge of all of the relevant art is presumed on the part of the hypothetical person of ordinary skill. See *In re Carlson*, 983 F.2d 1032, 1038 (Fed. Cir. 1992); *In re Howarth*, 654 F.2d 103, 106 (C.C.P.A. 1981) ("Section 102 has as one objective that only the first inventor obtain a patent Foreign 'patents' and foreign 'printed publications' preclude the grant of a patent whether or not the information is commonly known. Under § 102 a conclusive presumption of knowledge of such prior art is, in effect, a statutorily required fiction.").

¹¹³ See *Carlson*, 983 F.2d at 1038; *Kimberly-Clark*, 745 F.2d at 1453; *Howarth*, 654 F.2d at 106.

tion 102 identifies the knowledge against which patentability is assessed and details the bases upon which an applicant can be denied a patent because of the lack of novelty of the invention itself or the loss of the inventor's right to the invention.¹¹⁴ Thus, an inventor can lose the right to obtain a potentially lucrative patent on an invention by publicly disclosing her invention, such as through presentation or publication, before filing a patent application.

As between an inventor seeking a patent and the preservation of the public domain, the courts have overwhelmingly interpreted the § 102 prior art rules in favor of the public domain. This is consistent with an understanding that "the novelty and non-obviousness requirements express a congressional determination that the purposes behind the [Intellectual Property] Clause [of the U.S. Constitution] are best served by free competition and exploitation of either that which is already available to the public or that which may be readily discerned from publicly available material."¹¹⁵

As a result, "printed publications," which are a category of prior art under the statute, have been interpreted to include microfilm, microfiche, Internet postings, videotapes, and, most recently, slides affixed to poster boards, as long as they are publicly accessible.¹¹⁶ That latest expansion of the phrase was enunciated in the Court of Appeals for the Federal Circuit's 2004 *In re Klopfenstein* decision.¹¹⁷ For the first time, the court held that university researchers who presented study results at a scientific conference more than two years before filing a patent application covering the advance were barred from patenting the disclosed invention even though no copies of any enabling document were distributed.¹¹⁸ The rejection was based on the fact that slides disclosing the later-claimed invention were displayed on posters at the conference for two and a half days without any notice that note-taking was prohibited.¹¹⁹

¹¹⁴ 35 U.S.C. § 102 (2000 & Supp. III 2003). Subsections (a), (e), (f), and (g) are considered novelty provisions, while subsections (b), (c), and (d) are loss-of-right provisions under which an inventor loses the right to a patent because the invention is legally deemed to lack novelty. See *OddzOn Prods., Inc. v. Just Toys, Inc.*, 122 F.3d 1396, 1403 (Fed. Cir. 1997).

¹¹⁵ *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 150 (1989).

¹¹⁶ See *In re Klopfenstein*, 380 F.3d 1345, 1352 (Fed. Cir. 2004) (holding that slides accompanying a poster presentation are a "printed publication"); *In re Hall*, 781 F.2d 897, 898 (Fed. Cir. 1986) (noting that the phrase printed publication "has been interpreted to give effect to ongoing advances in the technologies of data storage, retrieval, and dissemination").

¹¹⁷ *Klopfenstein*, 380 F.3d at 1352.

¹¹⁸ *Id.*

¹¹⁹ *Id.*

The court's reliance on a "totality of the circumstances" approach could have a further chilling effect on conference presentations by university researchers seeking to disseminate early results, since its analysis fails to provide clear guidelines on which presenters can rely to avoid losing patent rights. This is quite unfortunate considering the importance of conference presentations to knowledge dissemination. As one commentator explains:

Conference presentations of early data are not only consistent with the communalist norms of scientists, they also serve an important economic function by helping scientists avoid wasteful effort both by sending signals to other scientists and by receiving information from other scientists. First, early data sharing may avoid the expenditure of duplicative effort by allowing scientists working on similar projects to identify each other. They then have the opportunity to either diversify their efforts, collaborate . . . , or abandon one of the projects. Second, early data sharing can reduce wasted effort by allowing other scientists to shed light on a project that is not duplicative but merely misguided. . . . Therefore, the increased financial reward for inventive activity increases the risk of rent dissipation in the form of wasted expenditures both from duplicative races to invent and from misguided research that continues unchecked.¹²⁰

Unfortunately, the *Klopfenstein* decision may discourage this important form of data sharing and waste avoidance.

b. *The Trouble with Grace*

In most countries, when an inventor discloses an invention to the public before filing a patent application, she creates prior art that will prevent her from later obtaining a patent on her invention.¹²¹ In the United States, inventors have a one-year grace period during which they can disclose the invention to the public and still retain the right to obtain a patent on the invention.¹²² The grace period is an important policy tool that recognizes an inventor's need to assess an inven-

¹²⁰ Grushcow, *supra* note 16, at 68.

¹²¹ Specifically, this is the case in most European countries and in Japan. See *infra* notes 201-14 and accompanying text.

¹²² 35 U.S.C. § 102(b) (2000).

tion's commercial potential before making the expensive decision to seek patent protection.

There are, however, two significant problems with the current grace period. First, the lack of a one-year grace period in major foreign patent systems virtually eliminates the benefit of the U.S. grace period for inventors whose discoveries will require patent protection abroad to fulfill their commercial potential.¹²³ Despite the fact that blockbuster successes tend to be limited to the life sciences,¹²⁴ TTOs generally take a prophylactic approach to invention disclosures, advising virtually *all* researchers to seek patent protection before making a public disclosure that could eliminate the opportunity to obtain foreign patent rights.¹²⁵ This approach is understandable, as it is impossible to know for certain *ex ante* which inventions will be hugely successful. But it is also regrettable, because it unnecessarily delays the disclosure of much information that either does not need patent protection to be commercializable or would not be sufficiently successful to justify the costs of obtaining foreign patent protection. As David C. Mowery, Richard R. Nelson, Bhaven N. Sampat, and Arvids A. Ziedonis note in a recent work:

Patent protection is strong and economically significant in biomedical research, and the dominance of licensing revenues by biomedical inventions reflects this fact. But in other areas, such as electronics, a commercial device may require access to dozens or hundreds of patents, and the average value of a patent often is much lower. Patent licenses are typically less important in these fields. . . . Indeed, in such fields, the insistence by university administrators on extensive agreements covering intellectual property may serve as a source of friction rather than as a lubricant for research collaborations. It is important for university research administrators to adjust their intellectual property policies to accommodate these intersectoral differences, rather than con-

¹²³ See *infra* notes 201–14 and accompanying text.

¹²⁴ See MOWERY ET AL., *supra* note 24, at 56.

¹²⁵ Such a disclosure requirement may be mandated by the university's intellectual property policy. See, e.g., EMORY UNIV. OFFICE OF TECH. TRANSFER, *supra* note 47, at 5 ("Emory Personnel will promptly disclose the existence of any Intellectual Property (that is, Intellectual Property to which Emory may assert ownership rights . . .)"); OFFICE OF FACULTY SUPPORT SERVS., GA. INST. OF TECH., FACULTY HANDBOOK 180–81 (2005), available at http://www.academic.gatech.edu/handbook/Georgia_Institute_of_Technology_Faculty_Handbook_Oct2005.pdf ("To assure protection and potential Commercialization, Georgia Tech faculty, staff, and students are encouraged to disclose Intellectual Property to GTRC in a timely manner prior to any disclosure outside of Georgia Institute of Technology.").

ceptualizing all research collaborations as resembling those common in biomedical research.¹²⁶

Likewise, patent protection, foreign or otherwise, may not be necessary for the commercialization of inventions in all areas of technology. In one recent study, licensees of patents held by universities were asked, "How often are the technologies that you license protected by a patent at the time you negotiate the license agreement?"¹²⁷ Only 12% of responding licensees answered "almost always," 13% said "often," 48% said "sometimes," and 28% said "rarely."¹²⁸ Yet with TTOs focused on revenue generation and unable to make clear commercialization determinations with limited information on inventions in the early stages of development,¹²⁹ researchers are routinely encouraged not to present or publish research results or, at a minimum, to hold off on doing so until a provisional patent application can be filed by the TTO.¹³⁰ This builds an inevitable delay into the otherwise early disclosure of research results in written or oral form. Moreover, researchers who intentionally or inadvertently make disclosures of their research before filing a patent application may then be discouraged from seeking, or be unable to obtain, even U.S. patent protection for their inventions.¹³¹ Although this may seem a positive result for opponents of rampant university patenting, this is not necessarily a good result, if the justifications for Bayh-Dole were correct.

Second, even a one-year grace period often is not long enough to accommodate the needs of many researchers due to the realities of academic research and TTO practices. It is not uncommon for more

¹²⁶ MOWERY ET AL., *supra* note 24, at 190–91.

¹²⁷ Jerry G. Thursby et al., *Objectives, Characteristics and Outcomes of University Licensing: A Survey of Major U.S. Universities*, 26 J. TECH. TRANSFER 59, 62 (2001).

¹²⁸ See *id.*; see also Nelson, *supra* note 26, at 15–16 ("[W]e also have observed several cases of embryonic inventions in which companies were interested in taking the work further, even if they did not have an exclusive license.").

¹²⁹ Thursby et al., *supra* note 127, at 61–62. The study authors also note that over 80% of licensed university technologies are only a proof of concept or lab scale prototype. *Id.* at 62.

¹³⁰ See, e.g., Heisler, *supra* note 7, at 1 (warning about losing patent rights as a result of disclosing research results); Maclanahan, *supra* note 7, at 6 (same); Univ. of Va. Patent Found., Frequently Asked Questions, ¶¶ 2, 4, 5, http://www.uvafp.org/about/index.cfm/fuseaction/viewpage/page_id/66?CFID=479884&CFTOKEN=62273255& (last visited Mar. 2, 2006) (suggesting that researchers should submit potentially patentable ideas to the University of Virginia Patent Foundation before presenting results in a paper or risk losing patent rights).

¹³¹ This could occur if, for example, a TTO refused to assume the cost of patent protection because of the disclosure and the university researcher was unable to afford the patent procurement costs.

than a year to transpire before academic research progresses to the point where its commercial potential can be assessed effectively. University inventions tend to be at a very early stage when they are first disclosed to TTO personnel, who generally have limited resources and data for making decisions about which inventions to attempt to patent.¹³² This situation is complicated by the propensity of TTOs to use provisional patent applications to save money while securing a priority filing date for university-generated inventions.

Introduced into U.S. law in 1995, provisional applications offer applicants a lower filing fee and an additional twelve months beyond the grace period in which to determine whether to file a regular non-provisional application for a patent.¹³³ Provisional applications also protect an applicant's right to file in other countries as long as the provisional application is filed before the invention is disclosed to the public.¹³⁴ The provisional application is not examined by the USPTO and simply lapses after twelve months, with no further effect unless a regular non-provisional application is filed before that time. Provisional applications are attractive to TTOs precisely because of the embryonic nature of most university inventions. Funding and staffing are perpetual problems for most university TTOs, and provisional applications provide benefits in both areas. For a university, the filing fee for a provisional application is \$100, while combined filing, search, and examination fees of \$500 are required for non-provisional patent applications.¹³⁵ Moreover, since the provisional application will not be examined, TTOs may choose to spend less time and money on the drafting of the provisional application based on an understanding that in a year's time, many will lapse because the covered technology ultimately will not justify the cost of filing a further non-provisional application.

Although the USPTO does not report the number of provisional applications filed by type of entity in its statistical reports, the AUTM

¹³² See Thursby et al., *supra* note 127, at 63 ("Products and processes based on early stage technologies are often years away from commercialization. . . . [I]t is difficult to specify royalty income based on sales . . . for very early stage technologies since the nature of the final product is often unknown . . .").

¹³³ See 35 U.S.C. §§ 111(b), 119(e) (2000).

¹³⁴ Paris Convention for the Protection of Industrial Property art. 4, July 14, 1967, 21 U.S.T. 1583, 828 U.N.T.S. 303.

¹³⁵ U.S. Patent & Trademark Office Fiscal Year 2006 Fee Schedule, 37 C.F.R. § 1.16(a)(1) (2005), available at <http://www.uspto.gov/web/offices/ac/qs/ope/fee2005/oct01.htm>; see 35 U.S.C. § 41(h)(1) (qualifying universities for reduced fees as small entities). The \$500 filing fee includes search and examination fees, both of which are required upon filing non-provisional applications. U.S. Patent & Trademark Office Fiscal Year 2006 Fee Schedule, *supra*.

now provides provisional application filing data in its annual survey.¹³⁶ According to the survey, in fiscal year 2004, of the 8286 new U.S. utility applications filed by U.S. universities, hospitals, and research institutes, 75% were provisional applications.¹³⁷ Conversely, the USPTO reports that provisional application filings for fiscal year 2004 only accounted for approximately 30% of total utility application filings across all applicants.¹³⁸ This suggests that universities may indeed rely much more heavily on provisional applications than other types of patent applicants. For example, in its "Technology Transfer Flow Diagram," the University of Virginia Patent Foundation notes "[i]nventions and patent applications go hand-in-hand. If patentable subject matter is identified during initial review, and there is sufficient market potential, a Patent Foundation attorney will file a Provisional Patent Application as an initial step to protect the invention."¹³⁹

A provisional application, however, is still a patent application, and it should be well-drafted if it is to provide any real long-term benefit.¹⁴⁰

¹³⁶ See ASS'N OF UNIV. TECH. MANAGERS, *supra* note 1, at 16.

¹³⁷ *Id.*

¹³⁸ U.S. PATENT & TRADEMARK OFFICE, PERFORMANCE AND ACCOUNTABILITY REPORT FOR FISCAL YEAR 2004, at 116 tbl.1 (2004), available at http://www.uspto.gov/web/offices/com/annual/2004/060401_table1.html.

¹³⁹ Univ. of Va. Patent Found., Technology Transfer Flow Diagram, <http://www.uvafp.org/> (follow "Our Technology Transfer Flow Diagram" hyperlink; then follow "Patent Protection" hyperlink) (last visited Mar. 2, 2006); see also TECH. TRANSFER OFFICE, UNIV. OF COLO., BULLETIN—COMMERCIAL TECHNOLOGY LICENSING AND INTELLECTUAL FREEDOM 1, <http://www.cusys.edu/techtransfer/downloads/bulletins/Bulletin-Commercial%20Technology%20Licensing%20and%20Intellectual%20Freedom.pdf> (last visited Feb. 20, 2006) ("The first step in obtaining patent protection is drafting and filing a provisional patent application. This document, which is prepared by outside legal counsel, can range in thoroughness from a complete patent application, to a cover sheet on a manuscript (which is done in emergency situations).").

¹⁴⁰ See, e.g., Arnold B. Silverman, *Proceed with Caution with U.S. Provisional Patent Applications*, JOM, Feb. 2000, at 88, available at <http://www.tms.org/pubs/journals/JOM/matters/matters-0002.html>. Arnold B. Silverman notes:

One problem that occurs frequently is that the provisional application, which was filed with a somewhat sketchy disclosure and no claims, is the subject of a later-filed complete application based upon the provisional. With the benefit of additional technical information generated in the intervening period between the two filings or the need for the first time to claim the invention, serious issues as to whether the provisional had adequate disclosure to satisfy the statute's disclosure requirement regarding broadening or to support the breadth of the claim can arise. This results in uncertainty as to whether the effective date of the added increment of disclosure or claiming is the date when the provisional application was filed or when the actual complete application was filed.

This is because claims in any later-filed non-provisional application that require the prior art protection of an earlier-filed provisional application must be adequately supported by the information disclosed in the earlier application.

In a further complication for university inventors, the wisdom of heavy reliance on provisional applications has recently come into question as a result of the Court of Appeals for the Federal Circuit's 2005 *Phillips v. AWH Corp.* decision.¹⁴¹ In *Phillips*, a closely watched and highly anticipated case, the court articulated the components of the claim construction inquiry that often determines the validity and infringement issues in patent litigation.¹⁴² The court accorded the patent specification a high level of importance in the analysis, noting that "the specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the *single best guide* to the meaning of a disputed term.'"¹⁴³ This focus on the specification suggests inventors and practitioners would do well to place more emphasis on drafting a good disclosure that includes claims, a practice that may not be the norm for most TTOs with numerous early-stage invention disclosures and a limited prosecution budget.¹⁴⁴

One way to avoid this dilemma or minimize the risk is to file a provisional that has a complete specification and claims directed toward all aspects of the invention known at the time the provisional was filed. This approach, *while increasing the cost of the provisional filing*, minimizes the risk that important aspects of the technology will be of uncertain value, depending upon the filing date of the provisional, the filing date of a later-filed complete application, and any intervening prior art or conduct that could generate a forfeiture of patent rights. It also preserves all of the other benefits of the provisional application.

Id. (emphasis added).

¹⁴¹ See 415 F.3d 1303, 1314 (Fed. Cir. 2005).

¹⁴² *Id.* at 1315.

¹⁴³ *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)) (emphasis added).

¹⁴⁴ See Posting of Dennis Crouch, *Including Claims in Provisional Patent Applications?*, to Patently-O: Patent Law Blog, http://patentlaw.typepad.com/patent/claim_drafting_tips/index.html (Sept. 16, 2005). Even if no claims are included in the application, the following advice from Dennis Crouch, a patent attorney and blogger, seems apt:

In the wake of *Phillips v. AWH*, it has become even more important to ensure that a patent's specification accurately describes the meaning of the associated claim terms. This task is all but impossible in the absence of any claim terms to describe. Thus, it is important to draft at least a few model claims with the provisional application.

Id.

If TTOs follow the counsel from *Phillips* and put a greater investment into preparing and filing first applications (provisional or non-provisional), they will probably file fewer applications,¹⁴⁵ resulting in fewer inventions with commercial potential being covered by patents. This could be a blessing in disguise as it potentially would put more information into the public domain. Alternatively, the effect could be negative, since university-generated inventions tend to be disclosed at a much earlier stage of development and require significant inventor assistance for commercialization.¹⁴⁶ Inventors unable to secure patent protection may discontinue the exploration of those relevant lines of research, a result that flies in the face of the policies underlying Bayh-Dole and thus could be detrimental to society over the longer term. Because so many university-generated inventions are embryonic in nature, however, and their commercial potential so uncertain, TTOs may continue to rely on provisional applications, choosing to let questions of the value of any resulting patent be evaluated by potential investors. This could lead to more uncertainty and lower values being assigned to university patents that rely on the benefit of provisional application filing dates.

2. Research Focus and Academic Community

I think that faculty members deciding not to patent would be rare indeed here Even if you were so inclined it would be hard to ignore how fabulously successful some of your peers are. You know, from the kind of cars they park in the parking lot and your children might be interacting with their children and say hey dad, why does Joe have all of this while we're living in a thatched roof hut? It would just be astonishing not to notice.¹⁴⁷

The above quote from a faculty member at a large private research university highlights another side effect of the patent/technology transfer boom: erosion of the sense of community in academia. Bayh-Dole's requirement that universities must share profits from subject inventions with inventors has created millionaires among the faculty ranks at some institutions.¹⁴⁸ Although a strong patenting culture can be beneficial in

¹⁴⁵ This assumes no change in resource level.

¹⁴⁶ Thursby et al., *supra* note 127, at 62.

¹⁴⁷ Owen-Smith & Powell, *supra* note 78, at 112 (quoting a life scientist at an elite private university).

¹⁴⁸ See 35 U.S.C. § 202(c)(7)(B) (2000); see also Leaf, *supra* note 23, at 252 (discussing the millions of dollars reaped by Emory University professors in the sale of patent royalty rights).

terms of attracting like-minded new faculty and socializing academy members to engage in that pursuit,¹⁴⁹ it can also be detrimental, leading in some cases to rancor, turf disputes, loss of collegiality, and more, within and between academic departments.¹⁵⁰ Moreover, the desire to share in the material benefits successful patent licensing can provide may lead some academics to shift the focus of their research into areas more likely to generate proprietary, commercializable results.

A loss of community is also a consequence of increased secrecy among scientists. One study in 2000 reported that 63% of geneticists surveyed reported that data withholding harmed the quality of their relationships with peers, 45% said it affected their satisfaction with their careers, and 28% reported ending a research collaboration because of it.¹⁵¹ Of course, patents are not the only cause of the loss of community observable at some institutions of higher learning. Certainly the Bayh-Dole Act's requirement that universities share profits on patented inventions with inventors, along with industry sponsorship agreements mandating secrecy in exchange for funding and consulting opportunities, are also to blame. Furthermore, the seeming lack of institutional will on the part of university administrations to create stronger policies cabin disclosure requirements in industry agreements only exacerbates the problem.¹⁵²

¹⁴⁹ See Owen-Smith & Powell, *supra* note 78, at 111.

¹⁵⁰ See Nelson, *supra* note 26, at 17 ("[L]arge across-department differences [in remuneration] clearly are a source of tension. . . . These tensions are real. To the extent that those parts of the university generating the license revenues have their way, universities will tend to divide into communities of the 'have' and a large community of the 'have not.'"). Loss of community is not just a result of university patenting, but is also attributable to other aspects of the increase in academic capitalism across the United States. As one commentator notes:

Capitalism, academic style, was once most evident in the realm of patenting and technology transfer; . . . [b]ut now it extends to instruction

Academic capitalism is a cultural system within higher education; it is an internal, not just external, threat. It shapes the way we talk about and define our role in the academy. University presidents increasingly see themselves as CEOs, and ask to be paid accordingly. More faculty view themselves as small businesspeople

Capitalist consciousness reveals itself in the tendency of universities to conflate productivity with generation of external monies, and in that of faculty who get grants to talk of how they "subsidize" other fields.

Rhoades, *supra* note 50, at 39. Although the overall loss of community is important, non-patent-driven losses in the areas of focus and community are beyond the scope of this Article.

¹⁵¹ Campbell et al., *supra* note 18, at 478.

¹⁵² Wesley M. Cohen et al., *Industry and the Academy: Uneasy Partners in the Cause of Technological Advance*, in CHALLENGES TO RESEARCH UNIVERSITIES 171, 194 (Roger G. Noll ed.,

Whether benefits associated with patenting or obtaining sponsored research funds are causing many researchers to shift from a focus on basic to applied research is unclear.¹⁵³ Nevertheless, it appears that the incentives of the patent system are affecting the publication norms and practices of some academics. Consider the following scenario:

Peter, a twenty-three year old Ph.D. student in Chemistry at Big X University, discovers some interesting properties of a class of compounds he is experimenting with and decides to publish an article disclosing some of his early findings. Based on counsel from the Big X University TTO, Peter waits until a provisional patent application covering his results is on file with the USPTO before publishing his article. Peter's research continues to proceed but not as quickly as he had hoped, and, twelve months after the filing of the provisional application, he still has several technical hurdles to clear, and commercial applications of his work are still years away.

Forced to make a prediction of the commercial potential of Peter's work, the TTO chooses not to file a non-provisional application at the end of twelve months and the provisional application lapses. Peter makes more progress over the next several months but is then counseled by his advisor to change the direction of his research significantly. This is because the publication of the article covering his early findings is now prior art to any future patent application he might file on his new, related discoveries, which probably would not be considered to be different enough from the earlier public disclosure to overcome an obviousness rejection. Despite Peter's great interest in the area, he follows the instruction and changes his research focus.¹⁵⁴

Peter's predicament is troubling for a variety of reasons. First, Peter's delay in publishing his results until after the filing of a provisional application is part of a growing trend of secrecy among university researchers in scientific disciplines (the life sciences in particular) that runs counter to traditional academic and scientific community norms

1998) ("The leverage academics hold may be strengthened if, during their negotiations with firms, they could invoke strong guidelines for research disclosure. Individual universities or research universities collectively could create such guidelines and could even back them up by monitoring the disclosure restrictions that come with industry support.").

¹⁵³ See Thursby & Thursby, *supra* note 48, at 92 ("Much of the concern of those who question the [Bayh-Dole's Act's] impact comes from fears that financial returns to licensing would divert faculty from basic to applied research. . . . [W]e cannot reject the notion that faculty research has shifted.") (emphasis added).

¹⁵⁴ Based on an actual event. Names and identifying features have been changed.

of open discourse and knowledge sharing. By delaying publication of his research until after the filing of the provisional patent application, Peter potentially has retarded the expansion of knowledge in his area by limiting the pool of information available for others to build upon.

Second, by failing to file a non-provisional application before the provisional application lapsed, the Big X University TTO inadvertently may have led Peter to believe he had protection that he really did not have. Consequently, he may be (1) more secretive in the future regarding his research results or (2) more hesitant to participate in the patent process.¹⁵⁵ These are both detrimental effects but for different reasons. Greater secrecy on the part of university researchers further stifles discourse and keeps more information from being built upon, and for longer periods of time. Hesitation by university researchers to participate in the patent process, while not facially a negative result, is harmful if patents are important to the commercialization of university-generated research. This problem also could be mitigated through better TTO education of and communication with academic inventors regarding the patent application timeline and the percentage of provisional applications that are normally converted to non-provisionals at that university. Such communication could help the inventor make a more informed decision about, for example, whether to engage in prior-art-generating presentation or publication activities on the strength of a provisional application filing. But the information would not change the fact that twelve months simply may be an insufficient period of time in which to assess the commercial potential and technical difficulty of a discovery.

Perhaps the most troubling aspect of this scenario is Peter's advisor's attitude, reflected in his recommendation that Peter change the direction of his research to one in which patent rights might still be obtainable. The goal of Bayh-Dole was to commercialize the results of university research, not to change its focus. Although this experience is anecdotal and may not be a widespread phenomena in academia, that it happens at all is concerning and suggests a misguided lust for patents over progress that is the antithesis of both academic inquiry and the fundamental goals of the patent system.¹⁵⁶

¹⁵⁵ See Owen-Smith & Powell, *supra* note 78, at 110 ("The failure to pursue smaller scale 'bread and butter' disclosures limits future chances for commercial success by encouraging faculty to bypass the TTO or avoid commercial activities altogether.").

¹⁵⁶ See RHOADES & SLAUGHTER, *supra* note 49, at 109-12 (citing cases of faculty conflicts with Ph.D. students relating to patents).

A variety of solutions have been proposed to deal with various issues associated with university-industry technology transfer, including heightening the utility requirement so that fewer upstream inventions (such as research tools) are eligible for patent protection, codifying an experimental use exemption into patent law, and giving funding agencies more latitude in deciding whether to take title to certain fundamental inventions away from universities.¹⁵⁷ These are promising initiatives, but without a more fundamental change in the strictures of patent law, they are unlikely to affect the publication delay and deterioration of academic norms spreading throughout academia today. Perhaps a different approach, targeted to the specific problems that contribute to the perceived need for increased secrecy in the academy, can stem the rising tide of secrecy and enable, at least in part, the revival of communal sharing norms and discourse.

III. CAN WE TALK?: PROPOSALS FOR IMPROVING ACADEMIC DISCOURSE

*[T]he patent system will influence the behavior of research scientists more effectively if it takes into account the norms and incentives that guide behavior in the scientific community.*¹⁵⁸

The one-year grace period is an aid to university researchers because it enables them to engage in scholarly discourse through presentations and publications while still retaining the right to obtain a U.S. patent. I propose that the strictures of patent law that have contributed to the increasing strain on scholarly discourse be relaxed to allow university researchers¹⁵⁹ more time in which to disclose aspects of their early-stage research while still retaining the right to obtain a patent on better defined, down-stream inventions. More specifically, I propose amending the U.S. Patent Act to create an opt-in system whereby academic researchers could choose to have two years from the time they first disclose the invention to the public to file an application with the USPTO. This would extend the amount of time available to inventors and TTOs to determine whether to file a patent application.

In exchange for a front-end grace period extension, researchers availing themselves of the provision would agree to give up the nor-

¹⁵⁷ See, e.g., Lopez-Beverage, *supra* note 26, at 92; Rai & Eisenberg, *supra* note 26, at 56.

¹⁵⁸ Rebecca S. Eisenberg, *Proprietary Rights and the Norms of Science in Biotechnology Research*, 97 YALE L.J. 177, 231 (1987).

¹⁵⁹ For simplicity of implementation, similar rules could be made available for other small entities as defined in 37 C.F.R. § 1.9. See 37 C.F.R. § 1.9 (2005).

mal eighteen-month patent application pre-publication period.¹⁶⁰ In essence, inventors would agree to the publication of their applications, provisional or non-provisional, immediately after the filing date. Such an amendment should improve scholarly discourse and benefit the public good by lowering the risk to researchers of complying with academic norms of early disclosure of results. It should also be a boon to technology transfer by enabling TTOs to better allocate patent-obtaining resources to inventions with the most commercial potential.

Such a provision might be even more palatable to third parties if accompanied by an experimental use exemption, allowing for experimentation on and perhaps with the disclosed invention without fear of infringement liability.¹⁶¹ Such an exemption could be useful because under the extended grace period, even with immediate publication, third parties may have longer to wait before they know whether the inventor will seek patent protection and for what aspects of the disclosed information protection will be sought.

In addition, to have any impact on the deterioration of disclosure norms in the life sciences, the United States must use its considerable influence, with at a minimum its trilateral harmonization partners the European Union and Japan, to encourage the adoption of a one-year prior art grace period abroad.¹⁶² This would allow university inventors seeking to secure U.S. and foreign patent protection to engage in academic discourse during the extant one year grace period that they currently must forgo.

¹⁶⁰ See 35 U.S.C. § 122 (2000).

¹⁶¹ See, e.g., Brief for Bar Ass'n of D.C.—Patent, Trademark, & Copyright Section as Amici Curiae Supporting Neither Party, at 11, *Merck KGaA v. Integra LifeSciences I, Ltd.*, 125 S. Ct. 2372 (2005) (No. 03-1237), 2005 WL 435891 (arguing that it is “an absolute necessity to maintain some experimental use exemption for the operation of the patent system”); Janice M. Mueller, *The Evanescent Experimental Use Exemption From United States Patent Infringement Liability: Implications for University and Nonprofit Research and Development*, 56 BAYLOR L. REV. 917, 972 (2004) (proposing legislative codification of an experimental use exemption); Katherine J. Strandburg, *What Does the Public Get? Experimental Use and the Patent Bargain*, 2004 Wis. L. Rev. 81, 121–22 (distinguishing two kinds of experimental use exemptions, one for experimenting on a patented invention, and one for experimenting with a patented invention).

¹⁶² In 1983, the three major patent-granting offices in the world, the USPTO, the European Patent Office, and the Japanese Patent Office began formally cooperating with each other by, among other things, sharing information regarding procedures in each office, holding annual trilateral conferences, and gathering and comparing statistical reports. The Trilateral website is the repository for reports and news items relating to the cooperation and its current projects. See Website of the Trilateral Co-operation, <http://www.trilateral.net> (last visited Feb. 20, 2006).

A. *Extending Grace and Prompt Publication*

As noted above, the period of time during which an invention can be exposed to the public without impacting its novelty for patentability purposes is generally known as a grace period.¹⁶³ Inventors must file patent applications in the USPTO within one year of disclosing the invention to the public or forfeit the right to obtain a patent on that invention.¹⁶⁴ Although disclosures of early-stage research may not be "enabling" as required for rejections under § 102(b), even a non-enabling reference can be used in a rejection for obviousness under § 103 of the Patent Act.¹⁶⁵ Moreover, the enablement requirement applies to patent *claims*.¹⁶⁶ Generally, a researcher will not know the scope of final patent claims at the time a public disclosure is made even if a provisional application is filed prior to the disclosure, because (1) provisional applications are not required to contain claims and (2) claims invariably are amended during the prosecution of the later-filed non-provisional patent application. Thus, the status of the disclosure, as enabling or not, cannot be known with certainty at the time the disclosure is being made.

Under my proposal, the current one-year prior art grace period and the eighteen-month publication system would remain intact. The patent laws would be amended, however, to create an optional two-year grace period for university researchers needing the additional prior art protection because of public disclosures made through presentation or publication activities. In exchange for the front-end extension of grace, researchers choosing to avail themselves of the provision would agree to immediate publication of their patent application upon filing, instead of relying on the eighteen-month blanket of secrecy provided to other applications.¹⁶⁷ This two-part system would have the effect of enabling academic researchers to engage in the discourse so necessary to norms of open science while still giving third parties an early indication, through immediate publication, of whether patent protection would be sought for information disclosed in public forums. By narrowly tailoring these proposed changes for exclusive use by academic

¹⁶³ See *supra* notes 121–46 and accompanying text.

¹⁶⁴ See *supra* notes 109–20 and accompanying text.

¹⁶⁵ See 35 U.S.C.A. § 103 (West 2001 & Supp. 2005).

¹⁶⁶ See U.S.C. § 112 (2000).

¹⁶⁷ See *id.* § 122. Immediate publication should not be a burden to academic researchers because the only inventors taking advantage of the extended grace period would be those who had previously disclosed the invention to the public.

researchers, the impact of increased uncertainty on third parties should be minimized.

Creating special rights for a certain category of inventors, however, generates other costs associated with discriminating between types of inventors, including incentives for inefficient behavior and the added statutory complexity of the need to develop effective definitions for determining who qualifies as an academic researcher. Consequently, an alternative course might be to adopt an opt-in provision that would be available to all inventors. While a narrowly drawn provision is preferable, such a broad provision could end up having the same positive effects as a narrowly tailored provision since the inventors most likely to make use of the provision would be academic researchers. Industry inventors by and large still value secrecy in obtaining a competitive edge and could be expected to be less likely to concede immediate publication of their patent applications. Individual inventors also tend to rely more on secrecy than do academic researchers. In fact, the provision of the American Inventor's Protection Act of 1999 allowing inventors who would not be filing for protection in a foreign country to have their application maintained in secrecy throughout its pendency was largely driven by the independent inventor lobby.¹⁶⁸

Pending legislation, in the form of the Patent Reform Act of 2005, contains a very different prior art provision than the current U.S. standard, but it does retain the one-year grace period.¹⁶⁹ Various modifications to the language of the bill have been proposed, including one called the "Coalition Draft" from the Coalition for 21st Century Patent Law Reform, a group of major U.S. corporations.¹⁷⁰ The prior art provision of this draft would amend § 102 of the Patent Act to provide, in pertinent part:

102(a): A patent for a claimed invention may not be obtained if—

(1) the claimed invention was patented, described in a printed publication, or otherwise publicly known—

(A) more than one year before the effective filing date of the claimed invention; or

¹⁶⁸ Mark Janis, *Patent Abolitionism*, 17 BERKELEY TECH. L.J. 899, 919 (2002).

¹⁶⁹ See Patent Reform Act of 2005, H.R. 2795, 109th Cong. § 3 (2005).

¹⁷⁰ See generally Coalition for 21st Century Patent Law Reform, Amendment in the Nature of a Substitute to H.R. 2795 Offered by Mr. Smith of Texas (Sept. 1, 2005), http://www.fr.com/news/2005-09-14_Coalition_Draft.pdf [hereinafter *Coalition Draft*].

(B) before the effective filing date of the claimed invention, other than through disclosures made by the inventor or a joint inventor or by others who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor ¹⁷¹

To implement the opt-in extended grace period for academic researchers, the above provision could be amended to add, for example:

102(b): A patent for a claimed invention may not be obtained by an inventor associated with a small entity as defined in 37 C.F.R. 1.9 if (1) the claimed invention was patented, described in a printed publication, or otherwise publicly known—

(A) more than two years before the effective filing date of the claimed invention; or

(B) before the effective filing date of the claimed invention, other than through disclosures made by the inventor or a joint inventor or by others who obtained the subject-matter disclosed directly or indirectly from the inventor or a joint inventor

Alternatively, the opt-in provision could be made broadly available to all applicants by deleting the “associated with a small entity as defined in 37 C.F.R. 1.9” language, or narrowly tailored to academic researchers only by adding the appropriate language.

To take advantage of either provision, eligible applicants would need to make a notation to that effect in their application at filing. In addition, 35 U.S.C. § 122(b), which authorizes the publication of pending patent applications eighteen months after their earliest filing date, would also be amended to include a new provision, such as:

122(b)(2)(C): Each application for a patent claiming the benefit of the two-year grace period provided in 35 U.S.C. § 102(b) shall be published promptly after the filing date of such application.

The narrowly tailored opt-in provision, tying the extended grace period to early publication, would, like the CREATE Act, maintain Bayh-Dole incentives for university technology transfer while simultaneously allowing academic researchers greater freedom to engage in early and full discourse.¹⁷² The provision also would protect such inventors against third parties trying to patent discoveries already disclosed by the inventor. The broader provision hopefully would have

¹⁷¹ *Id.* at 2.

¹⁷² See *supra* notes 61–94 and accompanying text.

the same effect while avoiding the costs associated with attempting to discriminate between classes of inventors.

In either the broad or the narrow form, this proposal recognizes the reality that many universities are experiencing an inexorable push to establish TTOs and secure patents despite the fact that for many universities, technology transfer is a losing proposition.¹⁷³ More universities, faced with dwindling budgets and dazzled by the lure of blockbuster success stories, are establishing TTOs to generate revenue from patentable inventions. According to AUTM, nearly all research universities have established TTOs and the membership of AUTM keeps growing.¹⁷⁴ The 2003 AUTM survey reports:

[O]ne of the themes that emerges—and is reflected in the increase of AUTM's membership from 1,015 in 1993 when the first survey was published to 3,155 now—is how the mission of technology transfer is permeating all parts of academia. Even the smallest colleges and universities are creating the infrastructure to translate the fruits of their research into products that serve the public good.¹⁷⁵

If more and more universities ramp up TTO activities, we can expect over time to see more delays in disclosures of scientific results across all technology areas as more university inventors become subsumed in the patenting culture and feel compelled to comply with its novelty rules.

Should university inventors be able to have their cake (disclose inventive concepts through discourse) and eat it too (still obtain patents on their disclosed inventions)? Congress has provided a grace period to all inventors since 1839 as, according to the U.S. Supreme Court, “an amelioration in favor of the inventor.”¹⁷⁶ Taking the presence of a grace period as a given in the U.S. system, it would seem the better question is not one of whether inventors should be able to do this, but for how long.

When the grace period was first introduced in the Patent Act of 1839, it provided an inventor two years from the first public use or sale of an invention to file a patent application claiming the inven-

¹⁷³ ASS'N OF UNIV. TECH. MANAGERS, *supra* note 13, at 24–26 (reporting that most universities see licensing royalties far below the millions of dollars that a “mega-license” can generate).

¹⁷⁴ *Id.* at ix.

¹⁷⁵ *Id.*

¹⁷⁶ *Andrews v. Hovey* (The Driven-Well Cases), 123 U.S. 267, 273 (1887).

tion.¹⁷⁷ The provision provided new, broader rights for inventors, because under the previous Act any public use or sale of the later-patented invention that took place with the inventor's consent before the filing of a patent application would void the later patent.¹⁷⁸ However, the provision also narrowed inventor rights. Under the prior Act, even if an invention had been in public use or on sale for a long time before the inventor filed her patent application, if the uses or sales had taken place without the inventor's consent, they would not bar her right to obtain a patent.¹⁷⁹

The Patent Act of 1939, enacted during a period of strong anti-patent, anti-monopoly sentiment,¹⁸⁰ reduced the grace period from two years to one year.¹⁸¹ As explained in the Senate Report accompanying the Act:

In 1839, when the period of 2 years was first adopted, it may have been a proper length of time for an inventor to make up his mind whether or not to file an application for patent. Under present conditions 2 years appears unduly long and operates as a handicap to industry. Reduction of the period would serve to bring the date of patenting closer to the time when the invention is made

One year is believed to be a very fair period for all concerned.¹⁸²

It seems unlikely that the "all" with whom the Senate was "concerned" included serious contemplation of university inventors, considering the relatively miniscule levels of university patenting taking place at the time. The first university-affiliated TTO was the Wisconsin Alumni Re-

¹⁷⁷ Patent Act of 1839, ch. 88, § 7, 5 Stat. 353, 354 (current version at 35 U.S.C. § 102(b)).

¹⁷⁸ See Patent Act of 1836, ch. 357, § 7, 5 Stat. 117, 119-20 (current version at 35 U.S.C. §§ 101-103); see also *Andrews*, 123 U.S. at 273 (calling the 1839 Act "an amelioration in favor of the inventor, in this respect, of the strict provisions of the act of 1836").

¹⁷⁹ See § 7, 5 Stat. at 119-20; see also *Andrews*, 123 U.S. at 274 ("The right of an inventor to obtain a patent was in this respect narrowed, and the rights of the public as against him were enlarged, by the act of 1839.").

¹⁸⁰ See, e.g., MARTIN J. ADELMAN ET AL., *CASES AND MATERIALS ON PATENT LAW* 13 (2d ed. 2003) ("The Depression era, with all its sentiments against monopoly, brought with it a vigorous distrust of patents.").

¹⁸¹ Patent Act of 1939, ch. 450, § 1, 53 Stat. 1212, 1212 (current version at 35 U.S.C. § 102(b)).

¹⁸² S. REP. NO. 76-876, at 1 (1939).

search Foundation ("WARF"), and it had only been formed in 1925.¹⁸³ Moreover, Congress likely wanted to "bring the date of patenting closer to the time when the invention [was] made" because at that time, patent applications were maintained in secrecy by the USPTO until the patent issued, which often was many years after the application was filed. There was no eighteen-month publication provision to let third parties know that an inventor was seeking to patent an invention that appeared to be in the public domain. The immediate publication aspect of the proposed opt-in provision alleviates this concern.

Alternatively, the opt-in system could provide a shorter, eighteen month grace period. Although a full two-year grace period would be preferable for academic inventors, eighteen months could be a reasonable compromise, considering third-party needs for certainty regarding the proprietary status of publicly disclosed information. Also, a study comparing changes in early data sharing by university scientists between 1980 and 1990 seems to indicate support for an eighteen-month window: "When Bayh-Dole was implemented in 1980, university scientists presented data that were on average 1.37 years from publication. By 1990, they presented significantly fewer early data, with abstracts being on average only 0.83 years from publication"¹⁸⁴

The 1980 average of 1.37 years is close to the 1.5 years an eighteen-month grace period would provide. Moreover, by allowing for immediate publication of applications, the eighteen-month option should have a minimal effect on certainty for third parties interested in the proprietary status of such research, since information regarding filed patent applications would be publicly available sooner.¹⁸⁵

This proposal would not be applicable to every invention a university generates, however. To the extent the commercial potential of an invention is readily apparent, a TTO likely would take steps to obtain patent protection swiftly, without seeking the benefit of an extended grace period. Also, inventors of pharmaceutical compounds and other discoveries for which foreign patent protection is important likely would not take advantage of the extended grace period.¹⁸⁶ Nev-

¹⁸³ MOWERY ET AL., *supra* note 24, at 39. Mowery, Nelson, Sampat, and Ziedonis also note that "[t]he debates over federal patent policy largely ignored U.S. universities during the 1940s and 1950s. . . . U.S. universities historically had limited their direct involvement in patenting and licensing activities." *Id.* at 87.

¹⁸⁴ Grushcow, *supra* note 16, at 75.

¹⁸⁵ Because of differing grace period rules outside of the United States, this would be true only in situations where the applicant is seeking only U.S. patent protection.

¹⁸⁶ Such inventions could begin to take advantage of the one-year grace period if Japan and the European Union were to adopt it. See *infra* notes 201-14 and accompanying text.

ertheless, as one economist notes, "It does not take a high frequency of occurrence of a problem to impose significant social costs if the problem emerges for a technology of sufficient importance."¹⁸⁷ This provision would be most useful for those embryonic ideas that are just well-defined enough to be dangerous in a patent prior art sense, but not well defined enough to be clearly commercializable—the kind of information that traditionally would have been freely shared by researchers before the passage of the Bayh-Dole Act.

Extending the printed publication grace period also would provide a significant benefit to TTOs in their efforts to manage limited financial resources efficiently. There is a real dollar cost to each patent application a TTO files.¹⁸⁸ Moreover, although a TTO may be able to file numerous provisional applications, if a regular non-provisional application is not filed within twelve months from the filing date of the provisional, the provisional application lapses and is essentially wasted.¹⁸⁹

It is understandable that TTO personnel are pro-patent and seek to educate researchers about the dangers of disclosure to potential patent rights. Obtaining patent rights and licensing revenue, however, are not the only values important to universities, and TTOs must balance those values against the value of academic discourse and the importance of sharing fundamental information for others to build upon. This proposal should make it easier for that balancing to take place by making it easier for researchers to disclose early-stage research results while still retaining the ability to patent downstream innovations.

Although university TTO reliance on the filing of "quickie" provisional patent applications to preserve patent rights is also understandable, it is problematic for several reasons. First, the heightened importance of the patent specification in claim construction analyses mandated by the Court of Appeals for the Federal Circuit in the recent *Phillips v. AHW Corp.* decision puts a premium on well-drafted original applications.¹⁹⁰ While a shotgun approach to filing skimpy provisional

¹⁸⁷ Cohen, *supra* note 64, at 68.

¹⁸⁸ For a university, the filing fee for a provisional patent application is \$100, while combined filing, search, and examination fees of \$500 are required for non-provisional patent applications. See U.S. Patent & Trademark Office Fiscal Year 2006 Fee Schedule, *supra* note 135; see also 35 U.S.C. § 41(h)(1) (2000) (qualifying universities for reduced fees as small entities).

¹⁸⁹ See *supra* notes 133–35 and accompanying text; see also Silverman, *supra* note 140, at 88.

¹⁹⁰ See *supra* notes 141–44 and accompanying text.

applications still may result in enforceable patents for universities, the chances that patents based on such applications will be held invalid or not infringed is certainly higher now than before that decision. Also, academic researchers who rely on the filing of provisional applications for protection before publicly disclosing their work may become disillusioned with the patent process when the TTO does not follow up the provisional application with a non-provisional application.¹⁹¹ As such, they may be more reluctant to participate in the patent process in the future, or may alter the focus of their research based on its commercialization potential.

As academic researchers generate more invention disclosures, TTOs have to make tough decisions about which inventions are worthy of patent protection. According to one 2001 survey of TTOs, "universities often seek patent protection only when commercial potential is clear, and this is often not the case for early stage technologies."¹⁹² Moreover, if an invention is developed with federal funds, the university must decide whether to take title to it under Bayh-Dole, a decision which brings with it an obligation to attempt to commercialize the invention.¹⁹³ Dr. Andrew Neighbour, vice chancellor of research at the University of California, Los Angeles, provides a good assessment of the process:

If supported with any NIH grants or contracts (or any other federal agency), the invention will fall under the conditions of the Bayh-Dole Act requiring that we report the invention and decide whether or not to elect title and file for intellectual property protection through the US Patent and Trademark Office. To arrive at this decision, the TTO must exercise professional judgment based on a scientific, technical, and business assessment to determine the commercial viability of the invention. Is it a profound scientific breakthrough with no commercial utility? Is it perhaps, simply a better mousetrap for which there is no market need? Or perhaps it is so new, that there are no comparable products in the market. . . . [T]echnology transfer is not a straightforward process . . .¹⁹⁴

Considering the early stage of most university technologies when they reach the TTO and the fact that TTOs seldom have enough licens-

¹⁹¹ See *supra* note 147 and accompanying text.

¹⁹² Thursby et al., *supra* note 127, at 68.

¹⁹³ See 35 U.S.C. §§ 202(c)(5), 203(a)(1) (2000 & Supp. III 2003).

¹⁹⁴ *From the Bench to the Bedside*, *supra* note 12, at 57 (statement of Dr. Andrew Neighbour).

ing personnel to evaluate all invention disclosures thoroughly,¹⁹⁵ it is not surprising that many provisional applications are not followed up with regular patent application filings.¹⁹⁶ Dr. Neighbour further noted:

A certain medical school dean once asked me why we didn't only patent "the good ones." Because many University inventions are so unrefined and untested, it is difficult to determine with certainty the future path for the majority of the inventions that faculty researchers disclose.¹⁹⁷

Allowing the patenting decision to be made further along in the research cycle should enable TTOs to better assess commercial potential and avoid filing provisional applications that will never be supported through to patenting, as is described in the following scenario:

*Felicia is a Ph.D. student who published some early, non-enabling (she believes) results of her research almost one year ago and is now approaching the deadline for filing a provisional application to avoid the use by the USPTO of her early publication in an obviousness rejection over her later work. Felicia's research is still not far enough along for the TTO to make a firm assessment of its commercial potential, and she is having difficulty convincing the TTO to file an application, yet she does not have the funds to try to prosecute the application herself. She feels sure that in a few more months, she will have strong results that would justify patent protection.*¹⁹⁸

Like Peter, Felicia could benefit from some additional time to decide whether to file a provisional application.

TTOs, the inventors they work with, and the larger scientific community would be better served by both a longer total grace period for those inventions that would still have meaningful value without foreign patent protection, and a true one-year grace period (which would require adoption by Japan and the European Union) for those inventions, like pharmaceuticals, for which both foreign and U.S. pat-

¹⁹⁵ See Thursby et al., *supra* note 127, at 66 (noting that a number of TTO professionals reported having insufficient staff to determine the commercial potential of disclosed inventions).

¹⁹⁶ For example, the Georgia Institute of Technology's Office of Technology Licensing reports that for the past four years the office has filed more than three times as many provisional patent applications as non-provisionals. *Technology Licensing Statistics*, TECH. TRANSFER BUZZ (Ga. Tech Research Corp., Office of Tech. Licensing, Atlanta, Ga.), Fall 2004, at 8, available at http://otl.gtrc.gatech.edu/OTL_Fall_2004.pdf.

¹⁹⁷ *From the Bench to the Bedside*, *supra* note 12, at 57 (statement of Dr. Andrew Neighbour).

¹⁹⁸ Based on an actual incident. Names and identifying features have been changed.

ent protection are critical. In each case, the grace period should then be followed by the filing of a rigorously drafted application based on a better assessment of the invention's commercial potential.

Why do we care if university researchers are able to file for patents? First, as has already been noted, although some inventions will be commercialized without patents, many technologies will not be commercialized without the assurance (or at least the strong potential) of proprietary rights.¹⁹⁹ Because university-generated research is often in the early stages of development at the point at which it is licensed, patents can provide the necessary incentive for inventors to continue developing the discovery, often in conjunction with an industry partner.²⁰⁰

For some, creating the option of an expanded grace period will seem too radical; for others, it will appear too tame. As an opt-in provision, however, it simply is designed to inject needed flexibility into the system to allow academic researchers to act upon the impulses that are in society's best interest, without destroying their own interests. Without such a provision, the likelihood of increasing academic discourse in the current university patenting environment is virtually non-existent.

B. Caveats and Concerns

Some may question whether university inventors should receive special treatment in the patent system. The answer is they should not, unless the special treatment will inure to the public good. Provisions such as 35 U.S.C. § 41(h)(1), which allows universities to pay reduced patent filing and prosecution fees, the CREATE Act, and even the Bayh-Dole Act, express a belief that facilitating the patenting of inventions by universities, as well as university interaction with industry, will ultimately benefit society at large. The proposals outlined above pragmatically acknowledge this belief and seek to ameliorate some of the negative side effects of this policy decision on academic discourse and scientific knowledge sharing. These proposals do, however, present some challenges.

1. Foreign Proprietary Rights

Since at least as early as the 1967 *Report of the President's Commission on Patent Reform*, there have been sporadic efforts to pass legislation that

¹⁹⁹ Nelson, *supra* note 26, at 15.

²⁰⁰ See Thursby & Thursby, *supra* note 48, at 93 (noting that most inventions licensed by TTOs require further development, often with the aid of a faculty researcher).

would convert the U.S. from a first-to-invent regime to a first-inventor-to-file ("FITF") regime.²⁰¹ A move to FITF would create a "race" to the patent office in the sense that whichever true inventor filed first would be entitled to the patent. This move would bring the U.S. into harmony with the other major patent-granting organizations, the European Patent Office ("EPO") and the Japanese Patent Office ("JPO"), on the issue of priority.²⁰² The current legislative effort, part of the Patent Reform Act of 2005, was introduced in the spring of 2005 by Rep. Lamar Smith (R-Tex.).²⁰³ If enacted, that legislation would eliminate priority disputes in the USPTO and courts, since the time of invention would no longer be relevant. The first inventor to file a patent application covering the claimed invention would be entitled to the resulting patent.²⁰⁴

Although the Patent Reform Act contains some provisions to aid global patent harmonization,²⁰⁵ the opt-in extended prior art grace period proposed in this Article would put the U.S. even further out of step with its global counterparts. The USPTO, EPO, and JPO account for 89% of patents worldwide.²⁰⁶ The JPO has a general six-month grace period, but the EPO operates on an absolute novelty basis, with only limited exceptions for certain types of disclosures occurring within six months of the application filing date—quite different from the grace period provided in 35 U.S.C. § 102(b).²⁰⁷

²⁰¹ See SUBCOMM. ON PATENTS, TRADEMARKS, & COPYRIGHTS OF THE SENATE COMM. ON THE JUDICIARY, TO PROMOTE THE PROGRESS OF USEFUL ARTS: REPORT OF THE PRESIDENT'S COMMISSION ON THE PATENT SYSTEM, S. DOC. NO. 90-5, at 14 (1967). In 1992 alone, two bills were introduced for that purpose: S. 2605, 102d Cong. (1992), and H.R. 4978, 102d Cong. (1992). This legislation was debated but not enacted. See 43 BNA PAT. TRADEMARK & COPYRIGHT J. 519, 519 (1992).

²⁰² See European Patent Convention art. 54, Oct. 5, 1973, 13 I.L.M. 268; Tokkyohô [Patent Law], Law No. 121 of 1959, translated at http://www.wipo.int/clea/docs_new/en/jp/jp006en.html.

²⁰³ Patent Reform Act of 2005, H.R. 2795, 109th Cong. (2005).

²⁰⁴ H.R. 2795 § 3.

²⁰⁵ In addition to instituting FITF, House Bill 2795 would eliminate other oddities of U.S. patent law, including the best mode requirement and prior art provisions discounting inventive activity occurring outside of the United States. See H.R. 2795 § 3(d) (repeal of requirements for inventions made abroad); *id.* § 4(d) (eliminating best mode requirements).

²⁰⁶ EUROPEAN PATENT OFFICE, JAPANESE PATENT OFFICE & U.S. PATENT & TRADEMARK OFFICE, TRILATERAL STATISTICAL REPORT: 2003 EDITION, at 5 (2003), available at http://www.trilateral.net/tsr/tsr_2003/2003tsr.pdf.

²⁰⁷ The European Patent Convention (the "EPC") only provides a narrow six-month grace period for disclosures resulting from an "evident abuse" or display in a qualified international exhibition. European Patent Convention, *supra* note 202, at art. 55. Moreover, the grace period dates from the filing of the actual European patent application, not a priority application, effectively eliminating the benefit of the grace period for foreign ap-

The vigorous debate in the European Patent Organization over the issue of establishing even a one-year grace period suggests a proposal for a longer period would meet with significant resistance.²⁰⁸ According to Mr. Jan Galama, a European industry representative and author of a position paper against the adoption of a grace period in Europe, "If scientists, universities, etc. wished to become players in the economic world, they would have to disregard some old habits."²⁰⁹

Europe, however, may yet be induced to institute a one-year grace period, which would breathe new life into the nominal one-year grace period of § 102(b) that U.S. inventors seeking foreign protection simply cannot take advantage of currently. In a detailed opinion countering the view of Mr. Galama, Dr. Joseph Strauss of the Max Plank Institute argued for the adoption of a general grace period noting in particular the needs of academic researchers:

A further fact and the actual reason for the entire evaluation of the possible introduction of a grace period into the EPC may also not be overlooked: *The role and importance of academic and other non-industrial research institutions for innovation, as well as for the progress and well-being of the society at large.* It should be beyond doubt that in view of their double, or even triple role (education, generation and dissemination of knowledge), they are in need of a fine tuned legal treatment, securing at the same time early publication, in their own and the society's, including industry, interests, and, on the other

plicants who choose to take advantage of the Paris Convention right of priority after filing a first application in their home country. See Case G 03/98, Univ. Patents, Inc. v. Smith-Kline Beecham Biologicals SA, 2001 E.P.O.R. 33 (EPO Enlarged Bd. App. 2000), available at <http://legal.european-patent-office.org/dg3/pdf/g980003ex1.pdf>. The Japanese Patent Act also provides a six-month grace period that covers the same items as the EPC provision as well as disclosures made by the patent applicant. See Tokkyohō [Patent Law], Law No. 121 of 1959.

²⁰⁸ See JAN E.M. GALAMA, EXPERT OPINION ON THE CASE FOR AND AGAINST THE INTRODUCTION OF A GRACE PERIOD IN EUROPEAN PATENT LAW 11–14 (2000), available at <http://www.european-patent-office.org/news/info/pdf/galama.pdf> (arguing against the introduction of a grace period in the European patent system); see also Comm'n of the European Communities, *An Assessment of the Implications for Basic Genetic Engineering Research of Failure to Publish, or Late Publication of, Papers on Subjects Which Could Be Patentable as Required Under Article 16(b) of Directive 98/44/EC on the Legal Protection of Biotechnological Inventions*, at 15, COM (2002) 2 final (Jan. 14, 2002) (noting industry opposition to introduction of a grace period in the European patent system), available at http://europa.eu.int/eur-lex/en/com/rpt/2002/com2002_0002en01.pdf.

²⁰⁹ GALAMA, *supra* note 208, at 23.

hand, the appropriation of their research results by the instruments of intellectual property, in particular patents."²¹⁰

As a report discussing Dr. Strauss's analysis further noted:

It is not only inventors who suffer whenever a useful invention is excluded from patent protection but society at large. Statistics from Japan, US and Germany make clear that early disclosure is of particular importance for academic/research institutions and independent inventors and the needs of this sector should be given more recognition in Europe.²¹¹

Many European countries had grace period provisions before joining the European Patent Convention, and many still retain varying types of grace periods.²¹² Moreover, the Patent Reform Act of 2005 contains an incentive for Europe and Japan to adopt a one-year grace period: until they do, foreign inventors will not be able to take advantage of the U.S. grace period when filing U.S. applications based on earlier-filed foreign applications.²¹³

In fact, the experience of the European Union, where no meaningful grace period currently is available, provides a clear example of the importance of extending grace in the university context. One in-

²¹⁰ JOSEPH STRAUSS, EXPERT OPINION ON THE INTRODUCTION OF A GRACE PERIOD IN EUROPEAN PATENT LAW 77 (2000), available at <http://www.european-patent-office.org/news/info/pdf/strauss.pdf>. Dr. Strauss also noted that even though industry in Europe is vigorously opposed to a grace period, in Japan, where the grace period must be invoked, 47% of patent applications invoking the grace period were filed by large companies. *Id.* at 39. He also noted the greater significance of the grace period to independent and academic inventors, since the grace period was invoked in 43% of all of their applications. *Id.*

²¹¹ See Comm'n of the European Communities, *supra* note 208, at 18.

²¹² See IPR Helpdesk, *supra* note 101, at 3-4 (describing grace periods in Portugal, Spain, Russia, China, Canada, Japan, and other countries).

²¹³ Patent Reform Act of 2005, H.R. 2795, 109th Cong. § 10(h) (2005). The provision reads:

Before the date, if ever, that the Director of the United States Patent and Trademark Office publishes a notice in the Official Gazette of the Office declaring that both the European Patent Convention and the patent laws of Japan afford inventors seeking patents a 1-year period prior to the effective filing date of a claimed invention during which disclosures made by the inventor or by others who obtained the subject matter disclosed directly or indirectly from the inventor do not constitute prior art, the term "effective filing date" as used in section 102(a)(1)(A) of title 35, United States Code, shall be construed by disregarding any right of priority, except that provided under section 119(e) of title 35, United States Code.

Id.

tellectual property guide aimed at the European research community notes:

In order to contribute to scientific discourse and not to endanger the success of their publications, researchers often follow the traditional strategy of a quick publication. Questions of commercial exploitation—if they are considered at all—are usually secondary. This leads to situations where researchers often overlook the fact that the prompt and ill-considered distribution of an invention without a previous patent application will cause the complete and irremediable loss of all patent rights, and, finally, the fundamental limitation of economic usability. This is one of the main reasons why the inventions generated at universities [in Europe] . . . are rarely patented, although they are often valuable and exploitable.²¹⁴

Such commentary, combined with the increasing importance of university-industry technology transfer and the lure of beneficial treatment under U.S. law for European and Japanese inventors, may yet result in the expansion of grace periods abroad.

2. Trading Costs

Using patent policy to facilitate the transfer of technology out of universities has imposed significant costs on academic discourse over the past several years. Thus it is not surprising that extending the grace period in order to improve academic discourse likely will entail costs as well, both for third parties and for university inventors. Costs to third parties could include increased uncertainty regarding the availability of publicly disclosed information for use free from proprietary claims. Even with immediate application publication, extending the grace period to a total of eighteen or twenty-four months from the first filing date means that third parties may have to wait an additional six to twelve months before seeing initial application claims. This is because a provisional application, which is often the first filed application, is not required to include claims.²¹⁵ This may not be a major disadvantage, however, because claims often change significantly during prosecution

²¹⁴ IPR Helpdesk, *supra* note 101, at 1–2. In the meantime, the fact that only 13% of new patent applications filed by AUTM respondents in FY 2004 were foreign applications suggests that amending U.S. law to include an optional extended grace period will still be beneficial for academic inventors. See ASS'N OF UNIV. TECH. MANAGERS, *supra* note 1, at 16.

²¹⁵ See U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 601(b)(2) (8th ed. 2005).

and beyond. In fact, patentees are even allowed to broaden claims up to two years *after* a patent issues.²¹⁶ Moreover, as a result of the *Phillips* decision,²¹⁷ applicants may begin to include claims in provisional applications to aid arguments of adequate claim support in the event of future litigation.²¹⁸

One of the policy justifications for tying the 35 U.S.C. § 102(b) bar to patentability to an applicant's filing date is that it prevents inventors from commercializing their inventions for long periods of time before seeking patent protection.²¹⁹ In the absence of such a provision, inventors could, in effect, extend their term of exclusivity by marketing the invention for several years and then filing a patent application only when competition developed. Thus, unintended costs to the public of extending the grace period as proposed above are that such an extended grace period would delay the entry of the patented invention into the public domain and could create the opportunity for inventors to receive up to an extra year of commercial exclusivity before filing a patent application. A seemingly simple solution to these unintended consequences would be to subtract a year from the term of patents issuing on inventions benefiting from the expanded grace period. Such a solution may make sense in conjunction with the broadly drafted proposal; however, it likely would create disincentives for inventors to use the opt-in provision. Because the inventors the provision is designed to aid—academic researchers—are more likely to be engaged in early-stage research that they lack the capacity to commercialize, the risk of extended commercialization should be very low under the narrowly drafted proposal. Nevertheless, these are additional potential costs of the proposals that must be balanced against the expected gains.

For university inventors, the costs of opting in to the extended grace period could include less overall patent protection, as a result of either eliminated foreign rights or the efforts of third parties to patent variations of earlier-disclosed technology. An extended grace period may increase the chances that a third party, aware of the disclo-

²¹⁶ 35 U.S.C. § 251 (2000 & Supp. III 2003).

²¹⁷ See *supra* notes 141–44 and accompanying text.

²¹⁸ See Crouch, *supra* note 144, ¶ 2 (describing the importance of including claims in provisional applications in light of *Phillips*' changes to claim construction).

²¹⁹ See, e.g., *Baxter v. Cobe Labs*, 88 F.3d 1054, 1058 (Fed. Cir. 1996); *Tone Bros., Inc. v. Sysco Corp.*, 28 F.3d 1192, 1198 (Fed. Cir. 1994).

sure, may seek to obtain a patent on the disclosed subject matter in advance of the true inventor.²²⁰

Under the current U.S. patent system, 35 U.S.C. § 102(f) prevents the patenting of inventions by other than a true inventor who actually conceived of the claimed invention.²²¹ Although a form of this requirement would remain even if the United States changes to a FITF regime as proposed in the Patent Reform Act,²²² third parties may be able to file applications on improvements of earlier-disclosed technology in advance of university applicants, thus potentially limiting the scope of subject matter the university researcher ultimately could have patented. If, however, a "Coalition Draft"-type provision were enacted, the potential for such third-party activity would be greatly minimized, since prior public disclosure of claimed subject matter would bar third parties from patenting it.²²³

Moreover, even without the protection envisioned in the Coalition Draft, there is no guarantee the university researcher would have conceived the same improvements as a third-party inventor. Consequently, the public ultimately would benefit in both of these scenarios because more information would have been injected into the public domain in accordance with the original academic mission. As Professor Eisenberg wisely notes: "Patents undoubtedly have a critical role to play in facilitating technology transfer in some contexts. But they can also interfere with technology transfer and with the broader goal of promoting continuing technological progress. These goals may sometimes be better served by allocating new knowledge to the public domain."²²⁴

3. Unresolved Issues

Unfortunately, extending the prior art grace period will not necessarily impact the other important factor driving secrecy in scientific academic research: disclosure restrictions in industry sponsorship agreements.²²⁵ According to one 2001 survey, half of the research-

²²⁰ University research, however, is generally early-stage research requiring years of development before it is commercializable. See *supra* note 132 and accompanying text. If an invention appeared to be close to commercialization (making it an attractive candidate for third-party "stealth patenting"), a university likely would not wait two years to file an application and simply would bypass the opt-in provisions.

²²¹ 35 U.S.C. § 102(f) (2000).

²²² Patent Reform Act of 2005, H.R. 2795, 109th Cong. § 3 (2005).

²²³ See *Coalition Draft*, *supra* note 170, § 3(b)(1).

²²⁴ Eisenberg, *supra* note 24, at 1727.

²²⁵ See, e.g., Eisenberg, *supra* note 10, at 1363 ("The potential for corruption of academic values is manifest in research sponsored by industry and by the Department of De-

sponsoring companies surveyed include disclosure restrictions in 90% of such agreements.²²⁶ The restrictive terms may preclude a researcher from publicly disclosing research results before and several months after the filing of a patent application covering the discovery. Consequently, absent other changes to such agreements, an extended grace period would not benefit researchers bound by contract to limit or delay disclosures.

Although industry sponsorship is important, it accounts for only a small portion of the research funds U.S. universities receive. The federal government provides 60% of university funding while industry funding provides just 6%.²²⁷ However, some industry-university research collaboration agreements include disclosure restrictions even though the collaboration is supported by federal funding.²²⁸ Amending Bayh-Dole to bar such restrictions on outputs created with the use of federal funds could provide an additional incentive to increase prompt scientific discourse by members of the academy.

Although relying on universities to forsake patenting and sponsored research for the sake of academic discourse may be unrealistic, there is a role for university administrators to play in reestablishing the primacy of knowledge-sharing norms. Institutional policymakers can also choose to bar overly restrictive disclosure provisions in industry sponsorship agreements. The *Statement on Academic Freedom*, drafted during the first annual Global Colloquium of University Presidents

fense. These sponsors often have a palpable interest in directing the choice of research topics and restricting the publication of research results.”); Walsh & Hong, *supra* note 16, at 802 (discussing the rise of secrecy among academic scientists over the past thirty years).

²²⁶ Thursby & Thursby, *supra* note 48, at 93.

²²⁷ See ASS'N OF UNIV. TECH. MANAGERS, *supra* note 13, at 13–14; see also Risa L. Lieberwitz, *Confronting the Privatization and Commercialization of Academic Research: An Analysis of Social Implications at the Local, National, and Global Levels*, 12 IND. J. GLOBAL LEGAL STUD. 109, 123 (2005) (“Given the continued dominant role of federal funding to support academic research, the Bayh-Dole Act remains the most important instrument for encouraging universities to increase their market activities through patents and licenses of publicly funded research results.”). According to the 2003 AUTM survey, the balance of research funding comes from state and local governments, foundations, individuals, and the universities themselves. See ASS'N OF UNIV. TECH. MANAGERS, *supra* note 13, at 14. Although relatively low compared to federal funding, industry funding levels have increased significantly over the past few decades—in 1970, the share of university research funding provided by industry was only 2.6%. Cohen et al., *supra* note 152, at 183. Actual industry funding, however, may be higher because the above numbers may not reflect all sources of industry support, such as “in kind” contributions of laboratory equipment. See ASS'N OF UNIV. TECH. MANAGERS, *supra* note 13, at 13–14.

²²⁸ Wesley M. Cohen & John Walsh, *Public Research, Patents and Implications for Industrial R&D in the Drug, Biotechnology, Semiconductor and Computer Industries 3* (Aug. 2000) (working paper, on file with author).

held at Columbia University in January 2005, seems to provide a mandate for such action to be taken by universities as it states:

Academic institutions bear a heavy responsibility to protect the scholars and students who work with them from improper pressures Universities must maintain and encourage freedom of inquiry, discourse, teaching, research, and publication, and they must protect all members of the academic staff and student body against external and internal influences that might restrict the exercise of these freedoms.²²⁹

University action to facilitate scientific academic discourse would be a welcome addition to the extended grace period proposals because patent law rules do not operate in a vacuum and the ultimate impact of implementing the proposals can only be surmised. Just as the full effects of Bayh-Dole could not be envisioned at the time of its enactment, so the full effects of these proposals cannot be anticipated with certainty *ex ante*. What seems certain is that without some relaxation in patent rules here and abroad, disclosure norms will continue to deteriorate as the technology transfer boom expands to more and more universities.

CONCLUSION

*Academic freedom does not exist for its own sake; it exists in the interests of advancing scholarly inquiry. There is a reciprocal and mutually reinforcing relationship between academic freedom and scholarly inquiry, and those who care about preserving academic freedom—which presumably includes all of us—should be very careful to identify forces which diminish or undermine scholarly enquiry [sic].*²³⁰

For good or ill, patent law and policy and university technology transfer are inextricably linked. The Bayh-Dole and CREATE acts provide clear examples of Congress choosing to facilitate technology

²²⁹ Report of the First Global Colloquium of University Presidents, Statement on Academic Freedom ¶ 18 (May 26, 2005), <http://www.columbia.edu/cu/president/communications%20files/globalcolloquium.htm>. Hosting responsibilities for the Colloquium will rotate among Columbia University, the University of Pennsylvania, New York University, Princeton University, and Yale University, the five sponsoring institutions. *Id.* ¶ 2.

²³⁰ Peter MacKinnon, *Administering and Protecting Academic Freedom*, in *PURSUEING ACADEMIC FREEDOM: "FREE AND FEARLESS"?* 37, 40 (Len M. Findley & Paul M. Bidwell eds., 2001).

transfer policy through patent law. Conversely, the patent policy in effect as a result of the *In re Klopfenstein* decision (as expounded through the Federal Circuit's statutory interpretation) has the potential to chill further the pre-patent dissemination of academic research and hamper innovation.²³¹ The statutory amendments I am proposing would allow Congress to facilitate university technology transfer consistent with the Bayh-Dole and CREATE acts while ameliorating some of the problems created by the blending of patent law with the academic enterprise.

Will extending the prior art grace period combined with early application publication resolve all of the conflicts surrounding university-industry technology transfer? Of course not. Are these tools that can alleviate some of those tensions? I believe so. Just as changes in patent law and policy largely created the growth and growing pains of technology transfer, further changes in patent law can be expected to have meaningful effects on the future of technology transfer in ways that cannot fully be predicted.

In order to optimize the patent system's ability to promote the progress of science and the useful arts, the "one-size-fits-all" approach must give way to the realities of the changing technology creation landscape. As its name implies, an extended grace period will bestow unmerited favor on researchers choosing to take advantage of it; they will receive "grace" without having done anything to deserve it.²³² But if that extension of "grace" can serve the larger societal goals of increasing academic discourse and knowledge dissemination within the academy while enhancing the transfer of technology outside of those ivory walls, the resulting benefits will be nothing short of "amazing."

²³¹ See *In re Klopfenstein*, 380 F.3d 1345, 1352 (Fed. Cir. 2004); *supra* notes 19–23 and accompanying text.

²³² They will, however, have to agree to immediate application publication. See *supra* notes 163–200 and accompanying text.