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Preserving the Fruits of Labor: Impediments to University Inventor Mobility

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PRESERVING THE FRUITS OF LABOR: IMPEDIMENTS TO UNIVERSITY INVENTOR MOBILITY

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Academic inventors must overcome numerous obstacles when they seek to leave their parent universities. The results of their work are often intertwined in what I call "innovation-essential components," which are important aspects of the innovative process that create strong ties to the parent university, such as data, patents, trade secrets, grants, contracts, materials, and other agreements and restrictions. Innovation-essential components effectively bind university inventors to their parent institutions, making departure unworkable without the university's approval. Universities sometimes further complicate inventor mobility by entering into unlawful agreements with other academic institutions in their efforts to prevent inventor movement or by engaging in questionable practices in the process of "poaching" an inventor.

Impediments to mobility for academic inventors raise several issues. The unique knowledge university inventors gain about their nascent inventions is often essential to bring their ideas to market. Unduly burdening inventor use of their inventions may inhibit the full realization of their unique and valuable knowledge. Further, community norms and philosophical principles about inventors' ability to use their inventions may conflict with legal doctrine, creating tensions when limitations prevent inventors from using the technology they created. Inhibitions on inventor mobility may also contradict the foundational objectives of educational institutions. This Article discusses issues that may arise when academic inventors seek to leave their parent universities, providing a case study from the largely-overlooked strawberry industry. It concludes by evaluating mechanisms to mitigate potential harms caused by such conflicts.

INTRODUCTION

Universities have generally tolerated inventor movement between institutions.[1] Recently, some universities have been reluctant to allow

1. *See* Lisa Larrimore Ouellette & Andrew Tutt, *How Do Patent Incentives Affect University Researchers?* 15 (Stanford L. Sch. Int'l Rev. of L. & Econ. Working Paper Series, Paper No. 546, 2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id= 3505030 (finding that 31% of inventors with at least ten patents assigned to a university had moved between institutions); Paul Basken, *Grant*

departing inventors to continue building on their work.[2] Directly or indirectly, they inhibit inventor mobility. I have coined the term "innovation-essential components" to describe university ownership of a set of resources—such as data, patents, trade secrets, grants, industry contracts, materials, and inventor laboratory notebooks—that bind inventors to their institutions, making departure exceedingly difficult without the parent university's blessing. Universities have further complicated inventor mobility by entering into "no poach" agreements that raise very serious antitrust concerns or by engaging in questionable practices in the process of "poaching" an inventor.[3]

Departing inventors seek to leave their parent universities for a variety of reasons.[4] The financial allure of moving to a better-resourced university can be compelling.[5] Geographic preferences may influence the decision to leave.[6] Dissatisfaction with internal politics, power imbalances, and a drive for increased prestige may also motivate the inventor's departure.[7] Perhaps most important to the

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Dispute Throws an Unwritten Rule of Academic Poaching out the Window, CHRON. HIGHER EDUC. (July 23, 2015), https://www.chronicle.com/article/grant-dispute-throws-an-unwritten-rule-of-academic-poaching-out-the-window ("Among research universities a longstanding gentlemen's agreement has held that a scientist who moves from one institution to another is allowed to carry any grant support along to his or her new home.").

2. *See* Basken, *supra* note 1 (noting that "with universities counting every dollar, that bit of protocol may become a quaint courtesy of days gone by").

3. *See* discussion *infra* Part I.B.

4. *See* GRADUATE SCH. OF EDUC., HARV. UNIV., 2017 YEAR IN REVIEW: THE COLLABORATIVE ON ACADEMIC CAREERS IN HIGHER EDUCATION 6 (2017) [hereinafter 2017 YEAR IN REVIEW], https://coache.gse.harvard.edu/files/gse-coache/files/coache_annual_report_2017 (finding that the collegiality of a department and potential opportunities for partners or spouses may be more important considerations in departure decisions than salary); Saul Lach & Mark Schankerman, *Incentives and Invention in Universities*, 39 RAND J. ECON. 403, 428 (2008) ("There is some evidence that royalty incentives work . . . by sorting scientists across universities."); KerryAnn O'Meara et al., *To Heaven or Hell:. Sensemaking About Why Faculty Leave*, 85 J. HIGHER EDUC. 603, 603, 618 (2014), https://www.advance.umd.edu/sites/default/files/To%20Heaven%20or%20Hell%20Final.pdf [https://perma.cc/4ZLY-8FRF] (concluding that the main reasons for faculty departure include "better opportunities, the likelihood the faculty member would not get tenure, family and geographic reasons, and work environment and fit").

5. *See* 2017 YEAR IN REVIEW, *supra* note 4; Lach & Schankerman, *supra* note 4; O'Meara et al., *supra* note 4, at 619.

6. *See* O'Meara et al., *supra* note 4, at 603.

7. *See* 2017 YEAR IN REVIEW, *supra* note 4; Larry Gordon et al., *What's Behind UCSD, USC Court Battle?*, SAN DIEGO UNION-TRIB. (July 19, 2015, 9:15 AM),

innovative process, a university's lack of attention and resources devoted to an inventor's work may prompt the inventor to explore other opportunities.[8]

Excessive limitations on university inventor mobility are troubling for many reasons. Because university inventors typically work on early-stage research, they gain an intimate understanding of their inventions that is essential to later development of the technology.[9] Inventor involvement in developing new technology is often critical to firm success.[10] For example, entities that have the benefit of inventor participation are far more likely to succeed in commercializing inventions, as they can draw upon the inventor's particularized knowledge.[11] Restricting inventor movement may impede application of the valuable tacit knowledge inventors have gained about their embryonic inventions, hindering the exchange of information necessary for dissemination of technology and

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https://www.sandiegouniontribune.com/news/science/sdut-usc-ucsd-alzheimers-paul-aisen-court-legal-2015jul19-story.html (stating that a departing inventor felt that "bureaucratic and financial problems . . . made it difficult to maintain and expand his research").

8. *See, e.g.*, Martin Kenney & Donald Patton, *Reconsidering the Bayh-Dole Act and the Current University Invention Ownership Model*, 38 RSCH. POL'Y 1407, 1412 (2009) (explaining that "if an invention is not patented and marketed, inventors may threaten to leave, taking their laboratory and grants with them"); O'Meara et al., *supra* note 4, at 604.

9. *See* NAT'L RSCH. COUNCIL, THE NAT'L ACAD. PRESS, MANAGING UNIVERSITY INTELLECTUAL PROPERTY IN THE PUBLIC INTEREST 3 (2011) [hereinafter MANAGING UNIVERSITY IP] (explaining that "successful commercialization often depends on active inventor engagement and, in some cases, inventors playing a lead role"); Richard Jensen & Marie Thursby, *Proofs and Prototypes for Sale: The Licensing of University Inventions*, 91 AM. ECON. REV. 240, 243 n.12 (2001) (finding that most university patents "tend to be quite embryonic when licensed," as "[o]ver 75 percent of the inventions licensed were no more than a proof of concept . . . at the time of license"); Peter Lee, *Innovation and the Firm: A New Synthesis*, 70 STAN. L. REV. 1431, 1446–47 (2018) ("Although patents require technical disclosure, some amount of invention-related knowledge necessarily remains tacit and personal to the inventor.").

10. *See* LYNNE G. ZUCKER & MICHAEL R. DARBY, UNIV. OF CAL. L.A. & NAT'L BUREAU OF ECON. RSCH., STAR SCIENTISTS, INNOVATION AND REGIONAL AND NATIONAL IMMIGRATION 7 (2007), https://ssrn.com/abstract=1001112 ("Substantial involvement of one or more star bioscientists . . . dramatically improved the odds relative to those firms that did not have it."); Peter Lee, *Transcending the Tacit Dimension: Patents, Relationships, and Organizational Integration in Technology Transfer*, 100 CALIF. L. REV. 1503, 1511, 1515–20 (2012).

11. *See* Ajay Agrawal, *Engaging the Inventor: Exploring Licensing Strategies for University Inventions and the Role of Latent Knowledge*, 27 STRATEGIC MGMT. J. 63, 64, 66 (2006) (finding that "increasing the level of [inventor] engagement by 100 hours increases the odds of commercialization at the mean by 23 percent"); Lee, *supra* note 9, at 1447; ZUCKER & DARBY, *supra* note 10.

commercialization.[12] In addition, community norms and philosophical underpinnings about whether inventors should be allowed to use their inventions can conflict with legal doctrine.[13] The chasm between norms, beliefs, and the law suggests a reason why inventors engage in activity that sometimes appears capable of justification but is in fact proscribed.[14]

Unreasonably denying departing inventors the ability to continue working on their creations may be at odds with the legislative, financial, and reputational foundations of universities to support the dissemination of knowledge for public benefit. For example, the Bayh-Dole Act (the Act) allows universities to retain ownership rights in patents, seeking to minimize the likelihood that inventions will languish on the shelves of university laboratories.[15] Thus, a primary aim of the Act is to encourage universities to develop their technology in conjunction with industry.[16] Unduly burdening inventor involvement in development could contradict these objectives. Further, universities' dependence on public funding and preferential

12. *See* ORLY LOBEL, TALENT WANTS TO BE FREE: WHY WE SHOULD LEARN TO LOVE LEAKS, RAIDS, AND FREE RIDING 39–41 (2013) (arguing that increased mobility is beneficial to employees, employers, and the economy more broadly); ANNALEE SAXENIAN, REGIONAL ADVANTAGE: CULTURE AND COMPETITION IN SILICON VALLEY AND ROUTE 2–4 (1994) (describing how Silicon Valley's "network-based" system encourages informal intra- and inter-firm collaboration); Yochai Benkler, *Law, Innovation, and Collaboration in Networked Economy and Society*, 13 ANN. REV. L. & SOC. SCI. 231, 235 (2017) (explaining that networks with a "high rate of knowledge flow" encourage the innovative process); Ronald J. Gilson, *The Legal Infrastructure of High Technology Industrial Districts: Silicon Valley, Route 128, and Covenants Not to Compete*, 74 N.Y.U. L. REV. 575, 595 (1999) (concluding that "employee mobility is the mechanism by which the requisite knowledge spillover occurs"); Ulrich Kaiser et al., *Does the Mobility of R&D Labor Increase Innovation?*, 110 J. ECON. BEHAV. & ORG. 91, 103 (2015) (finding that "mobility is associated with an increase in the probability of the old and the new employer citing each other in subsequent patents, which suggests that mobility does lead to knowledge transfer between the firms"). *But see* Jonathan M. Barnett & Ted Sichelman, *The Case for Noncompetes*, 87 U. CHI. L. REV. 953, 977 (2020) (arguing that "the inability to enforce a non-compete may preclude the initial hire" and concluding that "talent may be freer but it could well be worse off").

13. *See* Liza Vertinsky, *Universities as Guardians of Their Inventions*, 2012 UTAH L. REV. 1949, 1960–62 (2012) ("Institutional norms and practices of the research university community have reinforced this understanding of universities as being focused on noncommercial research activities.").

14. *See* discussion *infra* Part II.C.

15. *See* University and Small Business Patent Procedures Act of 1980 (the Bayh-Dole Act), Pub. L. No. 96-517, § 6(a), 94 Stat. 3018 (1980) (codified at 35 U.S.C. §§ 200–212 (2018)); Rebecca S. Eisenberg, *Public Research and Private Development: Patents and Technology Transfer in Government-Sponsored Research*, 82 VA. L. REV. 1663, 1691–94 (1996).

16. 35 U.S.C. § 200 (2018).

treatment for tax purposes raises the question of what the role of the university should be in encouraging technological development in the public interest.[17] Although the influence of increased private funding has sometimes blurred the boundaries between academia and industry, academic institutions continue to promote their missions of providing service to the public and disseminating knowledge to obtain reputational and philanthropic benefits.[18] Imposing undue limitations on departing inventors seems contrary to these organizing principles.

To add contextual richness to the theoretical discussion, this Article will set forth a case study examining the curious interplay between academic institutions and university inventors in the strawberry industry.[19] Surprisingly, innovation in the strawberry industry has not been well-examined in the literature, despite its financial significance.[20] Technological advancement is particularly important in the strawberry industry as it faces numerous challenges to production.[21] As the case study details, the departing university inventors at issue had worked on developing strawberry plants for

17. *See* PEW CHARITABLE TRS., FEDERAL AND STATE FUNDING OF HIGHER EDUCATION: A CHANGING LANDSCAPE 1 (2015), https://www.pewtrusts.org/-/media/assets/2015/06/federal_state_funding_higher_education_final.pdf [https://perma.cc/X93B-F4GN] (stating that the federal government provides assistance to specific research projects whereas the state provides assistance to pay for the "general operations of public institutions"); Vertinsky, *supra* note 13, at 1976 (describing how universities' increased patenting and assertion of patents has "challenged views of the university as a contributor to and protector of the public domain of knowledge").

18. *See* CAL. INST. OF TECH. ET AL., IN THE PUBLIC INTEREST: NINE POINTS TO CONSIDER IN LICENSING UNIVERSITY TECHNOLOGY 2 (2007), https://www.autm.net/AUTMMain/media/Advocacy/Documents/Points_to_Consider.pdf [https://perma.cc/7PG6-WTPB]; MANAGING UNIVERSITY IP, *supra* note 9, at 4; Vertinsky, *supra* note 13, at 1960–61.

19. The case study is not purported to be representative of relationships among departing university inventors and parent academic institutions. It does, however, provide interesting insights into an industry that has been largely ignored in the innovation literature.

20. *See* CAL. DEP'T OF FOOD & AGRIC., CALIFORNIA COUNTY AGRICULTURAL COMMISSIONERS' REPORTS CROP YEAR 2016-2017, at 9 (2018), https://www.cdfa.ca.gov/Statistics/pdfs/2017cropyearcactb00.pdf (reporting that strawberries had a gross annual production value of almost $2.3 billion in 2017).

21. *See* Melody M. Bomgardner, *Strawberries Hang in the Balance*, CHEM. & ENG'G NEWS, June 8, 2015, at 18, 19; Dana Goodyear, *How Driscoll's Reinvented the Strawberry*, NEW YORKER (Aug. 14, 2017), https://www.newyorker.com/magazine/2017/08/21/how-driscolls-reinvented-the-strawberry.

over thirty years.[22] The parent university denied the inventors' request for a nonexclusive license to continue their efforts, despite indications that the university was winding down its strawberry breeding program.[23] Some speculated that the university's refusal was the result of pressure from industry leaders, while others questioned the inventors' motivation and forthrightness.[24] The university ultimately brought suit against the departing inventors for continuing to use their strawberry plants without a license.[25] Although the parties settled their "custody battle" over the contested plants, it appears that the inventors will not be able to build upon a good deal of their prior work.[26] Further development using the inventors' valuable tacit knowledge from the past thirty years will likely be hindered.

This Article makes three important contributions to the literature. First, it sets forth a detailed account of barriers to academic inventor mobility and why they matter. Second, it recognizes, describes, and coins the concept of "innovation-essential components," which was not clearly set forth in literature. Third, it explores the fascinating interplay between departing inventors and academic institutions through the lens of the largely ignored strawberry industry and its implications for innovation more broadly.

In considering how best to promote innovation in the challenging situation of university inventor departure, various alternatives will be assessed, though none is without flaws. For many possibilities, the

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22. Complaint at 3–4, Regents of Univ. of Cal. v. Cal. Berry Cultivars, L.L.C., No. 16-cv-02477-VC, 2017 WL 9531948 (N.D. Cal. Apr. 27, 2017) [hereinafter CBC v. UC Complaint].

23. *Id.* at 2.

24. *See* Trial Brief of Cross-Complainant at 2, Regents of Univ. of Cal. v. Cal. Berry Cultivars, L.L.C., No. 3:16-cv-02477-VC, 2017 WL 6993395 (N.D. Cal. May 1, 2017) [hereinafter CBC v. UC Trial Brief]; Michael Hiltzik, *A Legal Conflict Brings a Sour Note to the Sweet History of California Strawberries*, L.A. TIMES (Apr. 26, 2019, 6:30 AM), https://www.latimes.com/business/hiltzik/la-fi-hiltzik-strawberry-legal-battle-20190426-story.html (stating that it appears that the "proprietary" growers "did not want competition from Shaw at UC, or at CBC after his retirement").

25. *See* Cross-Complaint at 8, Regents of Univ. of Cal. v. Cal. Berry Cultivars, L.L.C., No. RG16813870 (N.D. Cal. May 1, 2016), ECF No. 8 [hereinafter CBC v. UC Cross-Complaint].

26. *See* Transcript of Record at 1335, Cal. Berry Cultivars, L.L.C. v. Regents of Univ. of Cal., No. C 16-02477 vc (N.D. Cal. May 24, 2017), ECF No. 324, https://assets.documentcloud.org/documents/3732950/Chhabria-Clean.pdf; Michael Hiltzik, *The University of California Wins a Jury Verdict in Strawberry Case, Then Gets Blasted by the Judge*, L.A. TIMES (May 25, 2017, 9:05 AM), https://www.latimes.com/business/hiltzik/la-fi-hiltzik-uc-strawberry-20170525-story.html.

likelihood of deleterious effects on innovation incentives is concerning.[27] This Article proposes a measured approach: a narrow modification to the Bayh-Dole Act to provide a presumptive right for university inventors to practice their inventions on payment of a reasonable royalty. Because the proposed amendment would allow for the presumption to be overcome under certain circumstances, it would have a minimal adverse effect on innovation incentives, if any. As an alternative proposal, funding agencies could impose conditions on government incentive structures to encourage universities to support departing inventor involvement in development. Of course, any proposal should be informed through empirical analysis and additional discussion.

In Part I, this Article describes the many obstacles to mobility that academic inventors may face. It sets forth the importance of "innovation-essential components" and the phenomenon of "poaching" in academia and its implications. Part II discusses the consequences of overly burdensome limitations on university inventor mobility, which include difficulties using the inventor's tacit knowledge, obstacles to the dissemination of technology, tensions between community norms and legal doctrine, and contradictions with the foundational purposes of academic institutions. Part III sets forth a case study from the largely overlooked strawberry industry, detailing the relationship between the parent university and departing academic inventors and its implications for innovation. Part IV concludes with an analysis of measures to remedy potential harm.

I. OBSTACLES TO MOBILITY FOR ACADEMIC INVENTORS

Despite years of service to an academic institution, university inventors may seek to make a move. Academia often requires aspiring professors to be geographically flexible. A new opportunity in a geographically preferable location may encourage departure.[28] Private universities or industry may offer financial incentives that are too attractive for an inventor to refuse.[29] Along similar lines, academic inventors may feel that their parent university is not providing the financial support or attention that their project

27. *See* discussion *infra* Part IV.A.2.

28. *See* O'Meara et al., *supra* note 4, at 622.

29. *See* 2017 YEAR IN REVIEW, *supra* note 4; Lach & Schankerman, *supra* note 4; O'Meara et al., *supra* note 4, at 619.

deserves. [30] Sometimes, political considerations and power imbalances can prompt a change. [31] A new position may offer a better title, a named chair, or increased prestige. Or, perhaps the inventor simply seeks a change.[32]

Understandably, academic institutions may be hesitant to lose a particularly productive or esteemed inventor. They sometimes engage in practices that inhibit inventor mobility, directly or indirectly.[33] This Part introduces and describes the concept of "innovation-essential components" that may effectively tie inventors to their universities. It also sets forth the ways in which some universities limit mobility by entering into illegal "no-poach" agreements and how "poaching" institutions have engaged in questionable activities.

A. The Intertwining of Labor and "Innovation-Essential Components"

The ability of university inventors to depart from their parent institution may be constrained by numerous factors. Although inventors should be able to leave with their knowledge, skills, and experience gained from the parent university, [34] various considerations may inhibit mobility. I have coined the term "innovation-essential components" to identify important aspects of the innovative process that may hinder inventor mobility, such as intellectual property, data, grants, contracts, and other agreements and restrictions.

Materials, inventions, and data created during the inventor's tenure are typically owned by the parent university.[35] Employment agreements often contain assignment clauses in which intellectual property—such as patents, trade secrets, copyright, and

30. *See* Kenney & Patton, *supra* note 8 (explaining that "if an invention is not patented and marketed, inventors may threaten to leave, taking their laboratory and grants with them"); O'Meara et al., *supra* note 4, at 618.

31. *See* 2017 YEAR IN REVIEW, *supra* note 4; Gordon et al., *supra* note 7.

32. O'Meara et al., *supra* note 4, at 619.

33. See Gilson, *supra* note 12.

34. *See* Camilla A. Hrdy, *The General Knowledge, Skill, and Experience Paradox*, 60 B.C. L. REV. 2409, 2445–46 (2019) (describing tensions between trade secret law and unprotectable employee knowledge, skill, and experience, and recognizing the "motivating policy concern to protect individuals' right to acquire new knowledge and skills from their employer").

35. *See* Samuel Estreicher & Kristina A. Yost, *University IP: The University as Coordinator of the Team Production Process*, 91 IND. L.J. 1081, 1085 (2016) (examining university policies that "purportedly assign to the university patent rights to inventions created by faculty members within the scope of employment, using university resources or funding, or pursuant to a specific contractual arrangement with the university").

trademarks—are assigned to the parent university. [36] These agreements also typically indicate that any data, specimens, or laboratory notebooks are the property of the university, not the inventor.[37] Without a license, inventors do not have permission to use the intellectual property, data, or even their own notebooks if covered by an agreement vesting ownership in those materials with the university. [38] Indeed, inventors cannot practice their previous inventions without permission after they leave their original employer, even in situations where the patent covering the invention may not be valid. [39] Consequently, inventors' ability to move to another institution, or even start up their own company, may be severely hampered.

Further complicating mobility, agreements with outside entities and grants are generally made with the academic institution rather than an inventor.[40] There may be provisions, however, that specify an individual as the principal investigator on the project. [41] Because grants typically name a recipient university, the specified individual can transfer the grant to another institution only with the permission of the original recipient university.[42] Universities may have strong

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36. *See id. But see* Madey v. Duke Univ., 307 F.3d 1351, 1352–53 (Fed. Cir. 2002) (inventor-patent holder Madey brought suit against his parent university for continuing to use his patented invention after Madey's departure).

37. *See, e.g.*, UNIV. OF CAL., GENERAL UNIVERSITY POLICY REGARDING ACADEMIC APPOINTEES: APM – 020 - SPECIAL SERVICES TO INDIVIDUALS AND ORGANIZATIONS, UNIVERSITY REGULATIONS REVISED NO. 4 (1958) (rev. ed. Sept. 23, 2020) [hereinafter UNIV. OF CAL. ACAD. APPOINTEES POL'Y], https://www.ucop.edu/academic-personnel-programs/_files/apm/apm-020.pdf [https://perma.cc/S7PW-KPHQ] ("Notebooks and other original records of the research are the property of the University.").

38. *See id.*

39. *See* Mentor Graphics Corp. v. Quickturn Design Sys., Inc., 150 F.3d 1374, 1378 (Fed. Cir. 1998) ("Without exceptional circumstances . . . one who assigns a patent surrenders with that assignment the right to later challenge the validity of the assigned patent."); Mark A. Lemley, *Rethinking Assignor Estoppel*, 54 HOUS. L. REV. 513, 537 (2016) (explaining that if an inventor starts a new company or changes employers, she will be unable to practice her prior inventions).

40. *See* NAT'L SCI. FOUND., NSF GRANT POLICY MANUAL 27 (2002) [hereinafter GRANT POLICY MANUAL] ("NSF grants are normally made to organizations rather than to individual Principal Investigator/Project Director(s).").

41. *See id.* at 28 (defining the principal investigator as "the individual designated by the grantee, and approved by NSF, who will be responsible for the scientific or technical direction of the project").

42. *See id.* at 38; *Change of Recipient Organization (Transfers)*, NAT'L INST. OF HEALTH [hereinafter *Changing Institutions*], https://www.niaid.nih.gov/grants-contracts/quick-refresher-make-smooth-transition-institutions (last visited Oct. 15, 2021) ("NIH prior approval is required for the transfer of the legal and administrative

financial incentives to retain a project that has been supported by a grant or industry contract after an inventor's departure.[43] The university can sometimes hire another inventor to oversee the program after the initial inventor's departure.[44] These financial considerations can also bind the departing inventor, as years of effort may be entangled with various funding agreements and grants that the parent university chooses to retain.[45]

Moreover, research projects are often executed by teams, rather than a sole inventor, and the entire team may not want to leave.[46] Team members that have contributed to early-stage research may retain tacit knowledge that may not be within the departing inventor's understanding.[47] Unless the key members of the team also agree to join the departing inventor, inventors may not be able to draw upon the team's expertise in development, and mobility may be hindered. Of course, the lack of team willingness to depart is less concerning than actions to encumber inventor mobility taken by the parent or recipient institution, as will be described in the next subpart.

B. The Art of "Poaching"

In addition to the mobility-impeding effects of invention-essential components, the ability of university inventors to leave may be constrained by actions taken by their parent institutions or by problematic practices undertaken in coordination with recipient institutions. In their efforts to limit competition for faculty, universities have entered into agreements with other academic institutions to prevent "poaching" that raise serious antitrust concerns and are likely illegal.[48] Acting in concert with their new

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responsibility for a grant-supported project or activity from one legal entity to another before the expiration date of the approved project period.").

43. *See* Gilson, *supra* note 12 (stating that individual employers have "an obvious competitive interest in protecting [their] intellectual capital").

44. *See* GRANT POLICY MANUAL, *supra* note 40, at 38.

45. *See id.* (stating that only in those cases where the transfer is agreed upon will the grant be transferred).

46. Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 709 (2012); Vertinsky, *supra* note 13, at 1977.

47. *See* Vertinsky, *supra* note 13, at 1969.

48. *See* Complaint at 1, 5, Seaman v. Duke Univ., No. 1:15-cv-462, 2016 WL 1043473 (M.D.N.C. June 9, 2015) [hereinafter Seaman v. Duke Complaint].

employers, departing inventors have also engaged in questionable activities in the process of transitioning to other institutions.[49]

1. Anti-Poaching Agreements

Historically, universities have coordinated with departing inventors to smooth the transition to a new academic institution.[50] In their attempts to limit the loss of highly regarded faculty, however, some universities have entered into anti-poaching agreements with other academic institutions.[51] While not uncommon in industry,[52] no-poach agreements are a fairly new development in the academic arena.

For example, in 2015, assistant professor of radiology Danielle Seaman brought a class action suit against Duke University.[53] She claimed that when she attempted to apply for a position at the medical school at the University of North Carolina (UNC), she learned that deans from the two medical schools had allegedly entered into an agreement to refrain from hiring each other's faculty under certain circumstances. [54] The agreement apparently arose after Duke previously had attempted to recruit all of UNC's bone marrow transplant team. [55] UNC then needed to offer "a large retention package to keep the team intact."[56] Consequently, the deans of the

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49. *See* CBC v. UC Complaint, *supra* note 22; Complaint at 3, Regents of the Univ. of Cal. v. Aisen, No. 37-2015-00022082-CU-BT-CTL, 2015 CA Sup. Ct. Pleadings LEXIS 17036 (Cal. App. Dep't Super. Ct. July 2, 2015) [hereinafter UC v. Aisen Complaint].

50. *See* Basken, *supra* note 1; Gordon et al., *supra* note 7.

51. *See, e.g.*, Brent Kendall, *Duke University Moves to Settle No-Poach Case for $54.5 Million*, WALL ST. J. (May 20, 2019, 6:53 PM), https://www.wsj.com/articles/duke-university-agrees-to-54-5-million-settlement-in-no-poach-case-11558392798 (describing how professors brought a class action suit because the no-poaching agreement between Duke and UNC hindered their ability to move to different institutions).

52. *See* Jeff John Roberts, *Tech Workers Will Get Average of $5,770 Under Final Anti-Poaching Settlement*, FORTUNE (Sept. 3, 2015, 10:40 AM), https://fortune.com/2015/09/03/koh-anti-poach-order/ (discussing no poach lists in the technology industry); Press Release No. 10-1076, Dep't of Justice, Justice Dep't Requires Six High Tech Cos. to Stop Entering into Anticompetitive Emp. Solicitation Agreements (Sept. 24, 2010) [hereinafter DOJ Press Release], https://www.justice.gov/opa/pr/justice-department-requires-six-high-tech-companies-stop-entering-anticompetitive-employee (discussing no-solicitation agreements in the technology industry).

53. Seaman v. Duke Complaint, *supra* note 48, at 1, 12.

54. *Id.* at 12–16.

55. *Id.* at 15.

56. *Id.*

medical schools entered into the anti-poaching agreement.[57] The Department of Justice (DOJ) filed a statement of interest, arguing that Duke should not have derivative immunity from antitrust liability if it entered into an unlawful agreement.[58] Duke ultimately agreed to settle the case for $54.5 million, though it did not admit to any wrongdoing.[59]

These types of agreements raise concerns because they can limit inventor mobility and depress wages.[60] In the private realm, the DOJ has brought antitrust actions against private companies for entering into similar no-poach agreements.[61] For example, in 2010, the DOJ alleged six companies had violated the Sherman Act by entering into "facially anticompetitive" agreements ("no cold call agreements") to prevent their employees from being recruited.[62] Such agreements adversely affected employees because they were "likely deprived of competitively important information and access to better job opportunities."[63] The settlement provided that the companies would refrain from entering into agreements that would limit reaching out to each other's employees for five years; however, no compensation was provided to affected employees.[64] A related class action lawsuit, claiming that the companies agreed not to hire employees from competitors, was later settled for over $400 million.[65] Like their counterparts in industry,[66] no-poach agreements among academic

57. *Id.*

58. Statement of Interest of U.S. at 25–28, Seaman v. Duke Univ., No. 15-cv-462 (M.D.N.C. Mar. 7, 2019) (stating that "[m]arket-allocation agreements have long been held *per se* illegal").

59. *See* Kendall, *supra* note 51.

60. Seaman v. Duke Complaint, *supra* note 51, at 16–17.

61. *See, e.g.*, Complaint at 1, United States v. Lucasfilm Ltd., No. 1:10-cv-02220-RBW (D.D.C. Dec. 21, 2010) (challenging "an agreement between Lucasfilm and Pixar that restrained competition between them"); Complaint, United States v. Adobe Sys., Inc., No. 10-cv-01629 (D.C. Sept. 24, 2010) [hereinafter Adobe Complaint]. The DOJ has also indicated its intent to criminally prosecute naked no-poaching agreements. *See generally* DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST GUIDANCE FOR HUMAN RESOURCE PROFESSIONALS 2 (2016), www.justice.gov/atr/file/903511/download (stating that employers competing in the employment marketplace may not enter into express or implied agreements not to compete with each other, including in the offering of employment opportunities).

62. Adobe Complaint, *supra* note 61, at 2.

63. *Id.*

64. United States v. Adobe Sys., Inc., No. 10-cv-01629, 2011 U.S. Dist. LEXIS 83756, at *4–5, *9 (D.C. Mar. 18, 2011).

65. Order Granting Plaintiff's Motion for Final Approval of Class Action Settlement, *In re* High-Tech Emp. Antitrust Litig., No. 11-cv-02509 (N.D. Cal. Mar. 3, 2015).

66. *See, e.g.*, Roberts, *supra* note 52; DOJ Press Release, *supra* note 52.

institutions that limit university inventor mobility raise very serious antitrust concerns.

2. Questionable Practices

University inventors have engaged in problematic behavior in conjunction with their recipient institutions.[67] Many innovation-essential components involve privacy and stewardship commitments that extend beyond the individual inventor associated with them. Data is a prime example. A university inventor that uses or restricts access to data may harm study participants as well as the university charged with responsible management of the data.[68]

For example, UC San Diego brought claims against USC, prominent researcher Paul Aisen, and other former employees for conspiring to take funding, employees, and data associated with over one thousand patients in its Alzheimer's Disease Cooperative Study (ADCS).[69] The ADCS seeks to advance research, development, and testing of drugs for treating Alzheimer's Disease.[70] The dispute began in 2015 when Aisen, the Director of ADCS, engaged in discussions with USC about the possibility of a lateral move.[71] According to the complaint, USC had been contemplating the creation of an institute for researching Alzheimer's Disease in San Diego by planning to "poach" UC San Diego researchers working in the ADCS as a way of staffing it.[72] USC had hoped to replace UC San Diego as the contracting party in agreements related to the ADCS.[73] USC thus appeared to not only be buying the grants and researchers,[74] but also

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67. *See* UC v. Aisen Complaint, *supra* note 49.

68. *See* MEGHAN B. COULEHAN & JONATHAN F. WELLS, CLINICAL TOOLS, INC., GUIDELINES FOR RESPONSIBLE DATA MANAGEMENT IN SCIENTIFIC RESEARCH 1–2, https://ori.hhs.gov/images/ddblock/data.pdf (last visited Oct. 16, 2021) (stating that "[d]ata management is one of the essential areas of responsible conduct of research").

69. UC v. Aisen Complaint, *supra* note 49, at 3–11; *see* Harriet Ryan & Teresa Watanabe, *USC Pays up for Poaching a Star UC Scientist*, L.A. TIMES (July 4, 2019), https://www.pressreader.com/usa/los-angeles-times/20190704/281479277969507 (describing the suit as "the first time a university has sued another over faculty poaching").

70. *About Us: Who We Are*, UC SAN DIEGO SCH. OF MED.: ALZHEIMER'S DISEASE COOP. STUDY, https://www.adcs.org/about-us/ (last visited Sept. 21, 2020).

71. UC v. Aisen Complaint, *supra* note 49, at 4.

72. *Id.*

73. *Id.*

74. *See* Gary Robbins & Bradley J. Fikes, *USC Continues to Build Alzheimer's Program in San Diego After Settling Painful Lawsuit with UC San Diego*, SAN DIEGO UNION-TRIB. (Aug. 18, 2019, 12:01 AM), https://www.sandiegouniontribune.com/news/science/story/2019-08-15/usc-expansion-alzheimers-research.

the reputation associated with the ADCS program.[75] Aisen began recruiting UC San Diego employees to join him, allegedly informing them that the ADCS funding would be transferred to USC and that the employees would not have jobs at UC San Diego after his departure.[76] Some of the UC San Diego employees apparently attempted to pressure a research sponsor to terminate its agreement with UC San Diego and enter into an agreement with USC.[77]

When Aisen announced his resignation, the dispute over the data began.[78] The National Institutes of Health (NIH) confirmed that UC San Diego was the grant holder and had custody of the data related to ADCS, so Aisen would not have the right to exert control over it.[79] Despite the NIH's statement, Aisen apparently refused to engage in the transition of his responsibilities.[80] Aisen and other researchers did not provide the information necessary to access data, such as passwords and account records.[81] Some of the property that was returned, such as laptops, had data erased even though that data was owned by UC San Diego.[82]

Funding agencies often place responsibility with principal investigators for maintaining data.[83] One of the main funding agencies of the ADCS project, the NIH, emphasized the importance of "the safety of study participants and the integrity and utility of data."[84] However, the actions of recipient university USC and departing researcher Aisen appeared to place the safety and integrity of the study participants' data in jeopardy. For example, Aisen and

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75. *Id.*; *see* Gary Robbins & Bradley J. Fikes, *USC Starts Alzheimer's Institute in San Diego*, SAN DIEGO UNION-TRIB. (June 25, 2015, 4:21 PM), https://www.sandiegouniontribune.com/business/biotech/sdut-alzheimers-aisen-rafii-mobley-2015jun25-htmlstory.html ("The moves reflects both the intense pressure to develop breakthrough Alzheimer's therapies and the ambitions of well-funded USC to elevate its research standing.").

76. UC v. Aisen Complaint, *supra* note 49, at 5.

77. *Id.* at 6 (stating that when the research sponsor raised business and legal concerns about the procedures, Aisen concealed his communications with the sponsor from UC San Diego).

78. *Id.* at 6–7.

79. First Amended Complaint at 23, Regents of the Univ. of Cal. v. Aisen, No. 15-CV-01766-BEN-BLM (S.D. Cal. Sept. 8, 2015) [hereinafter UC v. Aisen Amended Complaint].

80. *Id.* at 21.

81. *Id.*

82. *Id.*

83. Christine L. Borgman, *Open Data, Grey Data, and Stewardship: Universities at the Privacy Frontier*, 33 BERKELEY TECH. L.J. 365, 392 (2018).

84. Gordon et al., *supra* note 7.

the other defendants transferred the participant data to an Amazon account, which UC San Diego was unable to access.[85]

The significant amount of funding involved also raised the stakes in the dispute. UC San Diego claimed that Aisen conspired to take an estimated $100 million in funding.[86] In allocating funding when an inventor departs, the parent university often keeps some portion of the funding while agreeing to allow the researcher to transfer the rest to the new institution.[87] When grants are renewed, funding agencies then decide whether to leave the funding with the original institution or transfer it with the departing researcher to the new institution.[88]

According to USC and Aisen, UC San Diego was failing to adequately support ADCS.[89] They alleged that UC San Diego withheld funds, delayed projects, and hindered research.[90] To Aisen, it seemed that ADCS would not "remain viable at [UC San Diego]" because UC San Diego was not going to provide "meaningful assistance."[91] Because it is not uncommon for principal investigators to move between institutions,[92] the Steering Committee for the ADCS apparently encouraged Aisen to seek "a more supportive home for the ADCS."[93] Aisen informed sponsors and staff that he was considering a move to USC to obtain additional support.[94] Eventually, USC disclosed that it had convinced sponsors for eight of the ten main contracts associated with ADCS to shift to USC.[95] UC San Diego had asked Aisen to sign an "Oath of Loyalty" to protect UC San Diego's interest in the ADCS program, but Aisen refused.[96] In response, UC

85. UC v. Aisen Amended Complaint, *supra* note 79, at 23–24.

86. *Id.* at 5–8.

87. *See* GRANT POLICY MANUAL, *supra* note 40, at 39; *Changing Institutions*, *supra* note 42 (describing the procedures for transferring NIH funding to a new institution).

88. *See* GRANT POLICY MANUAL, *supra* note 40, at 39; *Changing Institutions*, *supra* note 42.

89. Cross-Complaint of Defendants at 3, Regents of the Univ. of Cal. v. Aisen, No. 37-2015-00022082-CU-BT-CTL (Cal. App. Dep't Super. Ct. July 31, 2015) [hereinafter UC v. Aisen Cross-Complaint].

90. *Id.* at 9.

91. *Id.* at 12.

92. *Id.*

93. *Id.* at 3.

94. *Id.* at 4. Some researchers and sponsors indicated their support for Aisen continuing to maintain control over the program. *See id.* at 13, 19–20.

95. Gary Robbins & Bradley J. Fikes, *USC to Pay $50 Million and Apologize to UC San Diego for Poaching Its Alzheimer's Research Program*, L.A. TIMES (July 3, 2019, 10:27 AM), https://www.latimes.com/local/lanow/la-me-usc-apologizes-uc-program-20190703-story.html.

96. UC v. Aisen Cross-Complaint, *supra* note 89, at 4.

San Diego allegedly discontinued Aisen's access to university systems, which he needed for aspects of his practice, including dose data.[97] The NIH had to intervene to restore access to the data.[98]

The case ultimately settled. USC agreed to pay UC San Diego $50 million.[99] Although the settlement seems sizable, UC San Diego claimed that the expected grants associated with the ADCS project would have been worth over $300 million.[100] USC also issued a rare public apology for the manner in which it took control of the ADCS program:[101]

> These actions did not align with the standards of ethics and integrity which USC expects of all its faculty, administrators, and staff. . . . These standards will apply to all aspects of University operations, including the recruitment and/or transition of faculty members to or from USC. USC regrets that actions in this case fell short of these standards.[102]

Nevertheless, USC has been able to move forward with developing its Alzheimer's Disease institute in San Diego.[103] Although the primary operation of ADCS remains with UC San Diego, most of the sponsors related to the program have transferred their contracts to USC.[104]

Compared with prior "poaching" practices, the distinguishing feature of the USC and UC San Diego dispute centers on the manner in which the departing inventor and USC handled the patient data involved. Although the amount of funding and size of the study were notable in this situation,[105] previous disputes that involved large

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97. *See id.* at 16, 24.

98. *Id.* at 4.

99. Robbins & Fikes, *supra* note 95.

100. Gary Robbins & Bradley J. Fikes, *USC Pays UCSD $50M, and Gives the School an Apology, for Raiding Its Alzheimer's Program*, SAN DIEGO UNION-TRIB. (July 3, 2019, 6:44 PM), https://www.sandiegouniontribune.com/news/science/story/2019-07-03/usc-pays-ucsd-50-million-to-settle-lawsuit.

101. *Id.*

102. Press Release, Univ. of S. Cal., Statement Regarding UCSD Case (July 2, 2019), https://pressroom.usc.edu/statement-ucsd-case/.

103. *See* Robbins & Fikes, *supra* note 74.

104. *See* Gary Robbins & Bradley J. Fikes, *USC Siphons Away Most of Alzheimer's Program*, SAN DIEGO UNION-TRIB. (Aug. 29, 2019, 12:45 PM), https://www.sandiegouniontribune.com/news/science/sdut-UCSanDiego-usc-alzheimers-aisen-cooperative-study-2015aug29-htmlstory.html.

105. *See* Kenney & Patton, *supra* note 8 ("Resignation by professors with large federal grants results in the loss of significant overhead income."); Robbins & Fikes, *supra* note 100.

amounts of funding did not result in litigation.[106] USC and Aisen's decision to take control of participant data before the transition was finalized and place it on a non-HIPAA compliant third-party server went too far.[107] The ethical foundations of research, as well as funding agencies, require that inventors and institutions act as stewards of patient data.[108] As this dispute illustrates, even though innovation-essential components may inhibit mobility, their appropriation by inventors should be subject to reasonable limits.

II. WHY UNIVERSITY INVENTOR MOBILITY MATTERS

This Part describes how overbroad restrictions on the mobility of academic inventors can raise concerns. University inventors often work on basic research, from which they gain personal insights about their inventions that are critical to developing nascent technology.[109] Unduly restricting inventor movement, such as by placing overly broad limits on data sharing or patent licensing, may stymie the transfer of tacit knowledge and development.[110] Although universities may be within their legal rights[111] to limit inventor use of innovation-essential components, this Part will explain how institutional norms and philosophical foundations about inventor labor may contradict legal rules. Limiting inventor participation in development may also be at odds with the legislative, financial, and reputational foundations of universities.

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106. *See* Basken, *supra* note 1; Larry Gordon & Eryn Brown, *USC Steals 2 Star Brain Researchers from UCLA*, L.A. TIMES (May 10, 2013, 12:00 AM), https://www.latimes.com/health/la-xpm-2013-may-10-la-me-0510-usc-ucla-brain-research-20130510-story.html (describing how even though USC enticed two star neuroscientists from UCLA to join USC, no litigation arose despite a substantial loss of funding and employees).

107. *See* UC v. Aisen Amended Complaint, *supra* note 79, at 23.

108. *See* Borgman, *supra* note 83, at 368–70, 385, 392; Gordon et al., *supra* note 7.

109. *See* NAT'L RSCH. COUNCIL, *supra* note 9, at 2; Lee, *supra* note 9, at 1446–47; Lee, *supra* note 10, at 1527; Mark Lemley, *Are Universities Patent Trolls?*, 18 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 611, 621–22 (2008).

110. *See* EVAN STARR, ECON. INNOVATION GRP., THE USE, ABUSE, AND ENFORCEABILITY OF NON-COMPETE AND NO-POACH AGREEMENTS: A BRIEF REVIEW OF THE THEORY, EVIDENCE, AND RECENT REFORM EFFORTS 10 (2019), https://eig.org/wp-content/uploads/2019/02/Non-Competes-Brief.pdf [https://perma.cc/9LAS-CNU2].

111. *See* 35 U.S.C. § 202 (2018).

A. Troubles Transferring Tacit Knowledge

Inventors typically retain unique knowledge about aspects of their inventions that is not completely documented.[112] For example, licensing a patent provides the right to make and use an invention, but it does not typically convey all of the attendant technical information for practicing it.[113] To obtain patent protection, an inventor must adequately describe the invention in a way that would teach a scientist of ordinary skill how to make and use the invention as well as indicate possession.[114] Yet, the disclosure requirements are notoriously insufficient for conveying complete knowledge of the invention. Numerous scholars have described how the limitations of language, the difficulty of codifying information, and insufficient incentives for full disclosure limit the value of information obtained through patents.[115] Significantly, inventors retain some amount of personal, tacit knowledge that is typically not part of the patent document and often requires multiple interactions over time to convey effectively.[116] For instance, a researcher may disclose the materials and methods used for creating a biologic compound, but the specifics of the process and the researcher's intuitive sense cannot be easily described—they are personal.[117]

Difficulties arise because conveying this type of individual, tacit knowledge is time-consuming, expensive, and intensely

112. *See* Dan L. Burk, *The Role of Patent Law in Knowledge Codification*, 23 BERKELEY TECH. L.J. 1009, 1021 (2008) ("Information specific to the invention will inevitably be left out of the patent disclosure."); Michael J. Burstein, *Exchanging Information Without Intellectual Property*, 91 TEX. L. REV. 227, 261 (2012) ("[T]he exchange of commercially useful information often requires parties to go beyond patents."); Brenda M. Simon, *Patents, Information, and Innovation*, 85 BROOK. L. REV. 727, 737 (2020) (describing how inventors can "retain tacit knowledge to optimize the development and execution of the invention after disclosure").

113. *See* Brenner v. Manson, 383 U.S. 519, 534 (1966) (describing patent claims as disclosing "as little useful information as possible").

114. 35 U.S.C. § 112 (2018).

115. *See Brenner*, 383 U.S. at 534 (recognizing that patent drafters write claims so that they "disclose as little useful information as possible"); Agrawal, *supra* note 11, at 64; Lee, *supra* note 9, at 1446; Lee, supra note 10, at 1515–24.

116. *See* Lisa Larrimore Ouellette & Rebecca Weires, *University Patenting: Is Private Law Serving Public Values?*, 2019 MICH. ST. L. REV. 1329, 1353–54 (2019) (defining tacit knowledge as "knowledge that is conveyed more easily in person than in writing").

117. *See* W. Nicholson Price II, *Regulating Secrecy*, 91 WASH. L. REV. 1769, 1794–95 (2016) (defining biologics as "large biological macromolecules made by living cells" using complex manufacturing processes).

collaborative.[118] The process often requires in-person communication and ongoing interaction to be successful.[119] Continuing, active relationships with inventors is a key factor in facilitating the information exchange necessary for commercialization of inventions.[120] Not surprisingly, licenses often require some form of ongoing interaction, such as consulting, to facilitate the transfer of tacit knowledge.[121] Research has shown that licenses that include conveying know-how and interaction command a premium over those that only cover patents.[122]

By sharing their personal knowledge, inventors make an important contribution to the success of the private companies with which they interact.[123] The expertise and insights of inventors is often extremely valuable, for they can bridge the lacuna of knowledge

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118. *See* Burk, *supra* note 112, at 1015 ("Tacit knowledge might be conveyed by observation, emulation, or by instinct."); Burstein, *supra* note 112, at 261 (describing tacit knowledge as "costly to transfer"); Lee, *supra* note 9, at 1447 ("Transferring invention-related tacit knowledge is costly . . . ."); James E. Bessen, *From Knowledge to Ideas: The Two Faces of Innovation* 4 (Bos. Univ. Sch. of Law, Working Paper No. 10-35, 2010), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1698802 (concluding that "knowledge is communicated via costly personal instruction").

119. *See* Lee, *supra* note 9, at 1447 ("Interpersonal interactions with the inventor herself are particularly important."); Peter Lee, *Patents and the University*, 63 DUKE L.J. 1, 48 (2013) [hereinafter Lee, *Patents*]("[P]atent-mediated technology transfer necessarily involves a high degree of personal contact between faculty inventors and licensees."); David J. Teece, *Firm Organization, Industrial Structure, and Technological Innovation*, 31 J. ECON. BEHAV. & ORG. 193, 196 (1996) (describing the importance of "key individuals" in effectuating technology transfer).

120. *See* ZUCKER & DARBY, *supra* note 10, at 9 (explaining that "direct involvement of the very best academic scientists in commercialization of cutting-edge discoveries is the key to determining which firms will win the competitive race and which will fall by the wayside").

121. *See, e.g.*, Ashish Arora, *Contracting for Tacit Knowledge: The Provision of Technical Services in Technology Licensing Contracts*, 50 J. DEV. ECON. 233, 246 (1996) (describing the importance of know-how in patent licensing); Burk, *supra* note 112 ("Licenses routinely include provisions for the transfer, protection, and updating of know-how incident to the patent."); Lee, *supra* note 9, at 1447 ("[S]ophisticated licensees often negotiate for the transfer of tacit knowledge (usually in the form of consulting arrangements) in parallel to patent rights."); Jerry G. Thursby & Marie C. Thursby, *Are Faculty Critical? Their Role in University-Industry Licensing*, 22 CONTEMP. ECON. POL'Y 162, 170 (2004) (estimating that 40% of licenses require inventor involvement).

122. *See* GAURAV KANKANHALLI & ALAN KWAN, BARGAINING POWER IN THE MARKET FOR INTELLECTUAL PROPERTY: EVIDENCE FROM LICENSING CONTRACT TERMS 11 (2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3171920 (determining that licenses covering exchange of know-how command higher royalty rates based on a sample of licensing agreements from filings by public corporations).

123. *See* ZUCKER & DARBY, *supra* note 10, at 9.

between the inventor that conceived of the invention and the individual that will commercialize it. Increasing inventor involvement in commercialization by 10% has been shown to increase mean revenues by almost 30%.[124] These "star scientist" inventors often lay the groundwork on which a new company will be built or an existing company will evolve.[125] Inventors have been analogized to "gold deposits," given their ability to improve the odds that a company will succeed in its formative years.[126] Conversely, inventors' failure to transmit their unique tacit knowledge may frustrate commercialization of a licensed invention.[127]

While not all technology licensees require the transmission of tacit knowledge for commercialization to be successful, the benefits of inventor involvement have been shown across a variety of technological fields, especially in the context of developing nascent research.[128] For example, Stanley Cohen and Herbert Boyer's discovery of recombinant DNA in 1973 was a fundamental breakthrough in biotechnology.[129] Any scientist who sought to understand the invention that would eventually launch the biotechnology industry would need to acquire significant experience with it.[130] Not surprisingly, both scientists were instrumental in translating the invention into practice, participating in the founding of two leading biotechnology firms.[131] In the biotechnology realm, academic scientists helped contribute to the success of many firms

124. Agrawal, *supra* note 11, at 66.

125. *See* Lynne G. Zucker & Michael R. Darby, *Star Scientists and Institutional Transformation: Patterns of Invention and Innovation in the Formation of the Biotechnology Industry*, 93 PROC. NAT'L ACAD. SCIS. U.S., 12709, 12712 (1996).

126. *Id.* at 12714.

127. *See, e.g.*, Thursby & Thursby, *supra* note 121, at 167–68 (finding that businesses that license technology believe a lack of inventor involvement caused approximately 18% of licensed inventions to fail to be commercialized).

128. *See* Agrawal, *supra* note 11, at 65 (discussing the benefits of inventor engagement in electrical engineering, mechanical engineering, and computer science); Lee, *supra* note 10, at 1527 ("[T]he importance of tacit knowledge to technology transfer depends on the nature of the invention at issue."); Lynne G. Zucker et al., *Geographically Localized Knowledge: Spillovers or Markets?*, 36 ECON. INQUIRY 65, 81 (1998) (describing the benefits of inventor collaboration with biotechnology firms).

129. *See* Stanley N. Cohen et al., *Construction of Biologically Functional Bacterial Plasmids in Vitro*, 70 PROC. NAT'L ACAD. SCIS. U.S. 3240, 3240, 3244 (1973).

130. *See* Zucker & Darby, *supra* note 125, at 12710.

131. *See* FREDERICK BETZ, MANAGING TECHNOLOGICAL INNOVATION: COMPETITIVE ADVANTAGE FROM CHANGE 286 (3d ed. 2011) (noting that Boyer helped found Genentech, while Cohen joined Cetus).

through close, ongoing relationships that allowed for the transfer of their tacit knowledge.[132]

University inventors often conduct basic research and work on technology in its embryonic state, so a patent disclosure by itself is unlikely to adequately transfer the tacit knowledge necessary to facilitate development. [133] The groundbreaking discoveries from universities often allow for "natural excludability," meaning that any entity wanting to use these technologies will need to gain familiarity with the inventor's tacit knowledge related to them.[134] Much of the information about these paradigm-shifting inventions is never documented—it is within the mind of the inventor.[135] To facilitate the transfer of tacit knowledge, university inventors often form startups to commercialize their inventions. [136] After an academic scientist invents the technology, the university obtains a patent and then often licenses the technology to the startup for commercialization.[137] By engaging the inventor directly, startups ensure that the tacit knowledge necessary for development can be conveyed in an ongoing relationship. [138] Both universities and the firms they work with recognize that ongoing inventor involvement is essential to commercialize technology evolving from basic university research.[139]

B. The Effects of Inhibiting Mobility on Innovation

Limiting university inventor mobility has many implications for innovation. Overly burdensome restrictions on mobility inhibit the information exchange often essential to technological development.[140] Increased restrictions on inventor mobility may impose barriers to innovation "as the potential for ideas to recombine and cross-pollinate

132. *See* Lee, *Patents*, *supra* note 119, at 38.

133. *See* Jensen & Thursby, *supra* note 9; Lee, *supra* note 10, at 1527 ("Tacit knowledge is most relevant for university inventions that are highly embryonic."); Ouellette & Weires, *supra* note 116, at 1355–56.

134. Zucker & Darby, *supra* note 125, at 12710.

135. *See* Lee, *supra* note 9, at 1446–47.

136. *See* Gary P. Pisano, *Can Science* Be *a Business?: Lessons from Biotech*, HARV. BUS. REV., Oct. 2006, at 114.

137. *See id.*

138. *See* Thursby & Thursby, *supra* note 121, at 170.

139. *See* Jensen & Thursby, *supra* note 9, at 243 (reporting that a survey of technology transfer office managers indicated that over 70% of licenses require inventor cooperation for effective development); Thursby & Thursby, *supra* note 121 (reporting that a survey of firms emphasized the importance of the "specialized knowledge" of faculty in developing inventions licensed from universities).

140. *See* STARR, *supra* note 110.

across firm boundaries also declines." [141] Such limitations can "dampen the learning effects of the network."[142] The dissemination of information resulting from mobility can also enrich the overall welfare and diversity of an innovation community.[143]

From the parent university's perspective, however, increased inventor mobility imposes numerous costs. First, the parent university must find a replacement for the departing inventor. [144] Second, without any limits on mobility, academic institutions may hesitate to invest relationship-specific capital, as investments in developing the employee's human capital may be lost.[145] Finally, and perhaps even more concerning to the parent university, departing inventors may disclose valuable information to their new employers, potentially putting the prior institution at a competitive disadvantage. [146] Limiting mobility may provide incentives for institutions to expend greater resources in developing human capital. [147] Close relationships between inventors and the parent university can also foster the exclusivity necessary to incentivize

141. *Id.* at 10, 12 (describing how noncompetes may be burdensome on innovation and discussing more tailored alternatives to capture "the protectable interests of the firm"); *see also* Lemley, *supra* note 39, at 538 (arguing that assignor estoppel is analogous to a 20–year partial noncompete agreement, which would place too great a burden on innovation).

142. Benkler, *supra* note 12.

143. *See generally* ALFRED MARSHALL, PRINCIPLES OF ECONOMICS 225 (8th ed. 1946) (describing how the "mysteries of the trade" in a localized industry become "as it were in the air"); Orly Lobel, *Exit, Voice & Innovation: How Human Capital Policy Impacts Equality (& How Inequality Hurts Growth)*, 57 HOUS. L. REV. 781, 782, 784–85 (2020) (concluding that mobility restrictions disproportionately harm gender diversity in innovation).

144. *See* Barnett & Sichelman, *supra* note 12, at 970.

145. *See id.*; Edmund W. Kitch, *The Law and Economics of Rights in Valuable Information*, 9 J. LEGAL STUD. 683, 685 (1980).

146. *See* Barnett & Sichelman, *supra* note 12, at 970; Kitch, *supra* note 145, at 690–91.

147. STARR, *supra* note 110, at 9 (finding innovation may increase with greater restrictions on mobility); Barnett & Sichelman, *supra* note 12, at 966 ("[N]oncompetes may encourage firms to cultivate employees' human capital."); *see* Robert W. Gomulkiewicz, *Leaky Covenants-Not-to-Compete as the Legal Infrastructure for Innovation*, 49 U.C. DAVIS L. REV. 251, 261 (2015) ("[N]on-competes can protect an American employer's investment in training its employees."); Jonathan M. Barnett & Ted Sichelman, *Revisiting Labor Mobility in Innovation Markets* 35 (Univ. of S. Cal. Legal Stud. Rsch. Papers Series, No. 16-15, 2016), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2758854 (generally describing the risks of "underinvestment by firms in cultivating employees' capital").

outside firms to take on the expense of commercialization.[148] Without robust intellectual property licensing of employee inventions, universities may lack the resources to provide the initial capitalization and infrastructure necessary for innovation, though at least one study suggests that most universities fail to convert their discoveries into a source of income.[149]

In the context of academic institutions, the social costs of placing extensive limitations on university inventor mobility will often outweigh the benefits for several reasons. As described in the previous subpart, academic researchers play a special role in the innovative process, given their involvement in nascent research.[150] Researchers at higher education institutions carried out approximately 49% of all basic research in the United States in 2015.[151] Basic research forms the building blocks of technological advancement, yet there is not much of a private market for nascent inquiry.[152] The significance of tacit knowledge in innovation for university-created inventions can help "explain why individual mobility appears to be so important to knowledge networks."[153]

Greater movement of inventors can allow knowledge spillovers, which may benefit both the parent university and new institution, and ultimately the economy. [154] Enhanced mobility can foster the formation of a network of talented employees and may contribute to greater diversity.[155] Inhibitions on mobility could keep university

148. *See* Benjamin N. Roin, *Unpatentable Drugs and the Standards of Patentability*, 87 TEX. L. REV. 503, 513 (2009) (describing the importance of exclusivity in pharmaceutical innovation).

149. *See* Walter D. Valdivia, *University Start-Ups: Critical for Improving Technology Transfer*, BROOKINGS (Nov. 20, 2013), https://www.brookings.edu/research/university-start-ups-critical-for-improving-technology-transfer.

150. *See* Jensen & Thursby, *supra* note 9.

151. NAT'L SCI. BD., SCIENCE & ENGINEERING INDICATORS 2018, at 4–4 (2018) [hereinafter INDICATORS], https://nsf.gov/statistics/2018/nsb20181/assets/nsb20181.pdf.

152. *See* Eisenberg, *supra* note 15, at 1669.

153. Benkler, *supra* note 12, at 235, 237 (finding a "legal regime that privileged free flow of knowledge among firms outperformed one that empowered firms to enclose their intellectual resources").

154. *See* LOBEL, *supra* note 12; SAXENIAN, *supra* note 12, at 2–3, 6; Benkler, *supra* note 12; Gilson, *supra* note 12, at 596; Kaiser, *supra* note 12, at 101. *But see* Barnett & Sichelman, *supra* note 12 (arguing that without enforcement of non-compete agreements, the initial firm may refuse to invest in training or sharing of sensitive information).

155. *See* Lobel, *supra* note 143, at 802; Orly Lobel, *The New Cognitive Property: Human Capital Law and the Reach of Intellectual Property*, 93 TEX. L. REV. 789, 838–39 (2015).

inventors at a less than optimal institution, rather than allowing transfer to a place where they could be more motivated, effective, creative, and productive.[156] As will be set forth in the next subpart, the traditional sharing norms and culture of openness of academia would seem to welcome, or at least tolerate, the occurrence of such knowledge spillovers.[157]

C. Tensions with Community Norms and Philosophical Principles

Community norms and philosophical principles about whether departing inventors should be allowed to continue using their inventions can diverge from legal doctrine. This subsection provides a brief background describing norms, doctrine, and philosophical perspectives related to ownership of innovation-essential components. It then offers examples where inventors opted to engage in activity that might appear capable of justification based on these norms and principles, though it was in fact proscribed.

The traditional norms of academic research may incorrectly lead inventors to believe that their work should be freely useable by the inventors themselves by virtue of their efforts in creating the invention.[158] In setting forth his account of the normative system of

156. *See* On Amir & Orly Lobel, *Driving Performance: A Growth Theory of Noncompete Law*, 16 STAN. TECH. L. REV. 833, 846 (2013) (arguing that employees who understand "their market opportunities are significantly reduced due to an enforceable noncompete restriction will be less driven to perform well"); Lobel, *supra* note 155, at 839–40 (examining societal harms as employers shift from claiming the outputs of innovation to the inputs, including loss of motivation and productivity); Barnett & Sichelman, *supra* note 147, at 3 (discussing how mobility restrictions may "preclude otherwise efficient employment relationships and, over time, diminish innovation by impeding the circulation of intellectual capital (as well as raise personal autonomy concerns)").

157. *See* Gilson, *supra* note 12, at 606 (describing the importance of a "complementary business culture" for mobility to translate into enhanced innovation); Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. L. REV. 77, 145 (1999) (stating that "many major research universities share a basic commitment to open exchange, which they justify by appealing to traditional academic and research values favoring the free flow of information").

158. *See* Melissa S. Anderson et al., *Extending the Mertonian Norms: Scientists' Subscription to Norms of Research*, 81 J. HIGHER EDUC. 366, 367–69 (2010) (discussing how the Mertonian norms of communality, universalism, disinterestedness, and organized skepticism are modified as applied); Joshua B. Powers & Patricia P. McDougall, *University Start-Up Formation and Technology Licensing with Firms That Go Public: A Resource-Based View of Academic Entrepreneurship*, 20 J. BUS. VENTURING 291, 299 (2005) (explaining that university inventors "usually have a high degree of psychological ownership for their inventions").

science, Robert Merton articulated the norm of "communism."[159] As used by Merton, communism is the concept that scientific methods and results should be owned in common and shared freely.[160] The rationale is that scientific research is the result of collaboration and comprises "a common heritage in which the equity of the individual producer is severely limited."[161] Although many of the norms Merton described have evolved over time in response to financial pressures and other influences, universities still maintain that they will use their licensing practices to further norms of knowledge dissemination and technological advancement.[162] A departing inventor's reliance on such norms and principles would not provide a sound basis to absolve activity that is not legal; nonetheless, inventors may engage in questionable actions because they appear justifiable using these rationales.

The employer-university typically has a superior ownership interest in inventors' intellectual property and other invention-related materials by virtue of employment and other agreements.[163] The Bayh-Dole Act allows patents resulting from federally-funded research to be assigned to universities.[164] Some faculty inventors, however, circumvent university procedures requiring coordination with the university's technology transfer office (TTO) and apply for

159. ROBERT K. MERTON, THE SOCIOLOGY OF SCIENCE: THEORETICAL AND EMPIRICAL INVESTIGATIONS 273–75 (Norman A. Storer ed., 1973). *Cf.* Lee, *Patents*, supra note 119, at 11 (noting that some scholars view the Mertonian norms as more "prescriptive" than "descriptive").

160. *See* MERTON, *supra* note 159, at 273 ("The substantive findings of science are a product of social collaboration and are assigned to the community."); *see also* Lee, *Patents*, supra note 119, at 10 ("[A]cademic science relies heavily on the sharing of information, theories, and research materials for collective progress.").

161. MERTON, *supra* note 159, at 273.

162. *See e.g.*, Lee, *Patents*, *supra* note 119, at 36, 46 ("While university patenting is much more explicitly commercial than in past generations, universities are conscientiously using patents to 'push' certain noncommercial, academic norms into the marketplace.").

163. *See, e.g.*, UNIV. OF CAL. ACAD. APPOINTEES POL'Y, *supra* note 37; STANFORD UNIV., RSCH. POL'Y HANDBOOK: RULE 1.9 RETENTION OF AND ACCESS TO RESEARCH DATA (1997), https://doresearch.stanford.edu/policies/research-policy-handbook/conduct-research/retention-and-access-research-data#anchor-505 [https://perma.cc/B7TD-WB8F] ("If a PI leaves Stanford, . . . ownership of the data may be transferred [with Stanford's approval] and with written agreement from the PI's new institution . . . .").

164. *See* 35 U.S.C. § 202 (2018).

patents on their own.[165] One study found that over 42% of university inventors who obtained patents bypassed their university's TTO at least once.[166] Other university inventors have launched firms without obtaining university licenses, or they have entered into financially beneficial relationships with firms aligned with their research, effectively creating a "gray market" for inventions.[167]

Despite entering into agreements and contracts that vest ownership in invention-related materials with the university-employer, some inventors may not fully appreciate that items incorporating their personal reflections and a career's worth of data and effort are within the university-employer's ownership realm.[168] Items such as laboratory notebooks, data, and raw materials may capture the inventor's thoughts and expression.[169] In addition, institutional norms with regard to academic research impose responsibility on university scientists to protect the data arising from both external and internal sources.[170] For example, funding agencies typically expect principal investigators to exercise responsibility over the management of data.[171] In the process of publication, inventors are generally required to follow rules about providing access to data to ensure reproducibility.[172] Perhaps these requirements lead some

165. *See* Kenney & Patton, *supra* note 8; Gideon D. Markman et al., *Full-Time Faculty or Part-Time Entrepreneurs*, 55 IEEE TRANSACTIONS ON ENG'G MGMT. 29, 29–36 (2008); Donald S. Siegel et al., *Toward a Model of the Effective Transfer of Scientific Knowledge from Academicians to Practitioners: Qualitative Evidence from the Commercialization of University Technologies*, 21 J. ENG'G & TECH. MGMT. 115, 139–40 (2004).

166. Markman et al., *supra* note 165, at 33.

167. *See* Kenney & Patton, *supra* note 8, at 1414.

168. *See* Borgman, *supra* note 83, at 393 ("Although many universities . . . claim ownership of research data, researchers may be largely unaware of these regulations unless disputes arise, or an individual faculty member wishes to take a substantial trove of data to another university when changing jobs.").

169. *See, e.g.*, Kalpana Shankar, *Order from Chaos: The Poetics and Pragmatics of Scientific Recordkeeping*, 58 J. AM. SOC'Y FOR INFO. SCI. & TECH. 1457, 1463 (2007) (explaining how records can capture both personal reflections and professional norms).

170. *See* COULEHAN & WELLS, *supra* note 68 (stating that "[d]ata management is one of the essential areas of responsible conduct of research").

171. Borgman, *supra* note 83.

172. *See* COUNCIL OF SCI. EDS., CSE'S WHITE PAPER ON PROMOTING INTEGRITY IN SCIENTIFIC JOURNAL PUBLICATIONS 26 (2018), https://www.councilscienceeditors.org/wp-content/uploads/CSE-White-Paper_2018-update-050618.pdf. *See generally* B. R. Jasny et al., *Fostering Reproducibility in Industry-Academia Research*, SCI. MAG., Aug. 25, 2017, at 759 (discussing the importance of collecting data in order to foster reproducibility).

inventors to conclude, mistakenly, that with great responsibility comes great power.[173]

Philosophical principles relating to inventorship may also conflict with legal doctrine. The dominant view justifying modern U.S. patent law is utilitarian.[174] The patent system seeks to promote technological progress "in a way that maximizes social welfare."[175] Through the use of economic principles as well as empirical data, utilitarianism seeks to advance the greatest positive outcome that will result from competing policies.[176] Although I agree with the majority consensus that grounds modern patent law in utilitarian justifications, a very brief introduction to alternative philosophical rationales can provide additional insights about the implications of restraints on inventor mobility.

Some scholars have described the influence of labor and deontological theory in examining the rationales for intellectual property law.[177] For example, Rob Merges sets forth philosophical bases for justifying intellectual property, drawing upon the philosophical writings of John Locke, Immanuel Kant, and John Rawls.[178] Consistent with Lockean "labor theory," if an inventor has expended effort in the process of invention, the inventor's labor can provide support that the inventor should have a property claim to it.[179] As Professor Merges explains, an inventor's ability to maintain personal autonomy may partly depend on legal ownership in the

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173. *See* STAN LEE, AMAZING FANTASY #15, 13 (1962) ("[I]n this world, with great power there must also come—great responsibility!").

174. *See, e.g.*, John M. Golden, *Principles for Patent Remedies*, 88 TEX. L. REV. 505, 509 (2010) (describing utilitarianism as the "standard," explaining that "the patent system should act to promote the development, disclosure, and use of new technologies, ideally in a way that maximizes social welfare"); Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 379 (2010) (describing how the main obstacle to "these natural rights approaches to patents" is that the constitutional basis for patent law is "decidedly utilitarian").

175. Golden, *supra* note 174; *see* Sichelman, *supra* note 174.

176. *See* Robert P. Merges, *Philosophical Foundations of IP Law: The Law and Economics Paradigm*, *in* 1 RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW 72, 73 (Ben Depoorter & Peter S. Menell eds., 2019).

177. *See generally* ROBERT P. MERGES, JUSTIFYING INTELLECTUAL PROPERTY 31–101 (2011) (describing the influence of Locke and Kant on intellectual property theory); Justin Hughes, *The Philosophy of Intellectual Property*, 77 GEO. L.J. 287, 296–330 (1988) (setting forth an analysis of Lockean labor theory and intellectual property); Matthew G. Sipe, *Patent Law's Philosophical Fault Line*, 2019 WIS. L. REV. 1033, 1038–48 (2019) (describing how some of patent law's central doctrines are influenced by moral principles).

178. *See* MERGES, *supra* note 177, at 31–136.

179. *Id.* at 14–15.

inventor's creations, providing the ability for the inventor to develop an object over time.[180] ,An inventor would need "both control and the prospect of compensation" over the products of the inventor's creativity to be able to "steer oneself according to one's own plan and design." [181] In light of these perspectives, Merges concludes that "dedicated development and application of talent" can form the basis of a "legitimate desert claim."[182]

Merges applies these philosophical principles to the "rules of exit," which are legal doctrines that determine how difficult it should be for inventors seeking to depart from their employers.[183] He argues that claims by former employers with regard to ownership of their departing employees' ideas and technology should be "carefully scrutinized" because the assertion of those rights appears to go "directly against the formative principles (effort, autonomy, and so forth) on which the IP system is based."[184] Merges's discussion of the philosophical underpinnings of the intellectual property system and the "rules of exit" in a corporate employment relationship can be analogized to the situation of departing university inventors. Parent universities may claim ownership of the innovation-essential components necessary for an inventor to be able to depart, but such a claim may contradict the "formative principles" of effort and autonomy that provide a philosophical rationale on which the intellectual property system can be based.[185] Such reasoning might explain why departing university inventors perhaps feel justified engaging in behavior that is clearly not supported by legal doctrine.

Several examples highlight the inconsistencies between norms, philosophical principles, and legal doctrine. In *Suppes v. Katti*, Professor Suppes was bound by an employment agreement providing that the University of Missouri owned and controlled inventions developed in the course of his employment.[186] Despite awareness of the agreement with the university, Suppes felt strongly enough about his ownership claim that he brought suit after the university decided not to pursue patent applications for some of his inventions, refused to allow him to file applications, and required assignment where he filed applications in his own name. [187] Even though his employment

180. *See id.* at 17.
181. *Id.* at 18.
182. *Id.* at 19.
183. *Id.* at 23.
184. *Id.*
185. *See id.*
186. Suppes v. Katti, 710 F. App'x 883, 885 (Fed. Cir. 2017).
187. *Id.*

agreement specified clear legal ownership rights for his parent university, Suppes appeared to believe the inventions were "his," perhaps seeming justifiable based on labor desert theory and Mertonian norms related to communism.

Another example of the discrepancy between norms, principles, and doctrine is illustrated in *Fenn v. Yale University*.[188] Nobel Laureate John Fenn's actions directly contradicted the university's patent policy.[189] Fenn was "contractually bound" by Yale's policy that provided the university with the "right of first refusal to patent any faculty inventions."[190] Despite the clear terms of the policy to which he agreed, Fenn surreptitiously applied for and received a patent on his invention related to chemical mass spectrometry and licensed it.[191] The court held that Fenn was not "straightforward," for he had represented to Yale "that he did not believe the invention had the potential for much commercial value."[192] The court required Fenn to assign his ownership interests in the patent to Yale and awarded royalties, legal costs, and treble damages to Yale, amounting to over one million dollars.[193]

A final, particularly dramatic account of the divergence between university rights and inventor expectations involved researcher Peter Taborsky and the University of South Florida.[194] Both the inventor and the university claimed ownership of Taborsky's invention related to wastewater treatment, and as a result the university brought criminal charges against Taborsky for stealing his laboratory notebooks.[195] Ultimately, Taborsky served over three years in prison, which included working on a chain gang.[196] He even refused an offer of clemency, as he felt so strongly that his ownership claim should be superior to that of the university.[197]

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188. Fenn v. Yale Univ., 283 F. Supp. 2d 615 (D. Conn. 2003).

189. *Id.* at 624–26.

190. Fenn v. Yale Univ., No. Civ.A. 396CV(CFD), 2005 WL 327138, at *2 (D. Conn. Feb. 8, 2005).

191. *See Fenn*, 283 F. Supp. 2d at 627.

192. *Id.* at 625, 633.

193. *Fenn*, 2005 WL 327138, at *5–6.

194. Bd. of Regents *ex rel.* Univ. of S. Fla. v. Taborsky, 648 So. 2d 748 (Fla. Dist. Ct. App. 1994).

195. *See id.* at 749–50.

196. IPADVOCATE, TABORSKY CASE STUDY: WASTEWATER TREATMENT 7, http://ipadvocatefoundation.org/studies/taborsky/Taborsky.pdf (last visited Oct. 23, 2021).

197. *Disputes Rise over Intellectual Property Rights*, NPR SHOW: MORNING EDITION (Sept. 30, 1996, 11:23 AM), http://www.cptech.org/ip/npr.txt.

As these examples demonstrate, even though universities have the legal right to limit departing inventors' use of their inventions, community norms and philosophical principles may be at odds with those rights. Acknowledging this disconnect, some universities have refused to bring suit against departing inventors who have continued to use their inventions without a license from the parent university.[198] For example, while at the University of Texas, researcher William Decker invented methods of treating tumors.[199] He assigned the resulting patents to the University of Texas, which then exclusively licensed the patents to a third party who assigned his rights to Gensetix.[200] Decker later left the University of Texas and joined the Baylor College of Medicine.[201] Baylor and Decker continued to use his inventions without a license.[202] Exclusive licensee, Gensetix, brought suit against Baylor and Decker, but the University of Texas refused to join the litigation.[203] The university apparently decided it did not want to be part of a lawsuit against its former inventor, possibly in recognition of the community norms and philosophical principles described above.

D. Contradictions with Institutional Foundations

This subsection describes how overly-broad limits on inventor mobility may be inconsistent with the legislative and financial underpinnings of universities, as well as their reputational aims. In terms of the legislative foundations of academic research policies, restricting inventor involvement in commercialization seems to contradict the main objectives of the Bayh-Dole Act, which will be described below.[204] In addition, government funding of universities may affect how the public considers the role of universities in developing technology to advance social welfare.[205] Further, unduly restricting inventor participation in development would seem to

198. *See* Gensetix, Inc. v. Bd. of Regents, 966 F.3d 1316, 1319 (Fed. Cir. 2020); Arti K. Rai & Rebecca S. Eisenberg, *Bayh-Dole Reform and the Progress of Biomedicine*, 66 L. & CONTEMP. PROBS. 289, 296 (2003); Brenda M. Simon, *Patent Cover-Up*, 47 HOUS. L. REV. 1299, 1340 (2011) (explaining that patentees may refrain from suing academic researchers to avoid bad publicity, among other reasons).

199. *Gensetix*, 966 F.3d at 1319.

200. *Id.*

201. *Id.* at 1319 n.1.

202. *Id.* at 1319.

203. *Id.*

204. 35 U.S.C. § 200 (2018).

205. *See* PEW CHARITABLE TRS., *supra* note 17.

undermine the missions that universities strive to advance as well as their historical foundations.[206]

1. Legislative Underpinnings

In 1980, Congress passed the Bayh-Dole Act largely in response to concerns about a lull in productivity in the United States as well as increasing international economic competition.[207] The Bayh-Dole Act has been the subject of both extensive praise and criticism.[208] The primary goal of the highly-controversial Act was to encourage commercialization.[209] In practice, Bayh-Dole moved the emphasis from the costs of invention to the costs of developing an invention into a product.[210] The Act permits academic institutions to obtain patents on inventions resulting from research that was funded by the federal government provided certain requirements are met, such as encouraging commercial development.[211] Legislators reasoned that enabling universities to retain ownership of inventions would provide a way for universities to attract firms with the resources to develop inventions and encourage them to make the necessary investments to bring inventions into the marketplace.[212] Thus, the Bayh-Dole Act

206. *See* discussion *infra* Part II.D.3.

207. *See* Dov Greenbaum, *Academia to Industry Technology Transfer: An Alternative to the Bayh-Dole System for Both Developed and Developing Nations*, 19 FORDHAM INTELL. PROP., MEDIA & ENT. L.J. 311, 340, 343 (2009).

208. *See, e.g.*, Sara Boettiger & Alan B. Bennett, *Bayh-Dole: If We Knew Then What We Know Now*, 24 NATURE BIOTECHNOLOGY 320, 320 (2006); Greenbaum, *supra* note 207, at 325; Daniel J. Hemel & Lisa Larrimore Ouellette, *Bayh-Dole Beyond Borders*, 4 J.L. & BIOSCIENCES 282, 283–84 (2017); Lemley, *supra* note 109, at 614, 622; Ouellette & Weires, *supra* note 116, at 1330. *See generally* LORI PRESSMAN ET AL., BIOTECHNOLOGY INNOVATION ORG. & ASS'N OF UNIV. TECH. MANAGERS, THE ECONOMIC CONTRIBUTION OF UNIVERSITY/NONPROFIT INVENTIONS IN THE UNITED STATES: 1996–2015 (2017), https://www.autm.net/AUTMMain/media/Partner-Events/Documents/Economic-_Contribution_University-Nonprofit_Inventions_US_1996-2015_BIO_AUTM.pdf ("estimating the economic impact of academic licensing and summing that impact over 20 years of available data").

209. 35 U.S.C. § 200 (2018) (stating that the Act seeks to promote "utilization of inventions arising from federally supported research" and "collaboration between commercial concerns and nonprofit organizations, including universities").

210. Eisenberg, *supra* note 15, at 1669.

211. *See* 35 U.S.C. § 202 (2018). The Act also provides that inventors can obtain patent rights to their inventions if their university does not choose to retain its title if the specified requirements are met. *Id.*

212. Rai, *supra* note 157, at 97 (describing the view that patents would enable universities to "attract exclusive licensees with the resources to undertake such commercialization").

attempted to increase the likelihood of realizing federal research investments by encouraging commercialization of inventions.[213]

Whether the Act has effectively promoted commercialization has been the subject of debate.[214] One prominent example questioning the necessity of university patents for development involves the previously-discussed discovery of recombinant DNA by Stanley Cohen and Herbert Boyer. [215] After the inventors applied for patent protection, assignee Stanford entered into nonexclusive licenses with over 400 firms.[216] Because a nonexclusive license would not confer an advantage over the competition, some have suggested that perhaps university patenting is not always necessary to encourage commercialization. [217] However, nonexclusive licensing can still support innovation, as a university could determine that it is simply more profitable to license technology broadly rather than exclusively.[218] The revenue from nonexclusive licensing could then be used to support further university research, ultimately resulting in increased innovation gains.

Many commentators have also lamented that the Bayh-Dole Act affected scientific norms in a negative way.[219] As industry funding of university research and partnerships with universities thrived, a greater emphasis on secrecy and publication delays sometimes

213. 35 U.S.C. § 200; *see* Gary Pulsinelli, *Share and Share Alike: Increasing Access to Government-Funded Inventions Under the Bayh-Doyle Act*, 7 MINN. J.L., SCI. & TECH. 393, 404 (2006).

214. *See, e.g.*, Ian Ayres & Lisa Larrimore Ouellette, *A Market Test for Bayh-Dole Patents*, 102 CORNELL L. REV. 271, 275–77, 288–90 (2017) (proposing a market test to evaluate whether Bayh-Dole is an effective commercialization mechanism for inventions created at universities); Lemley, *supra* note 109, at 622–23 (explaining that "the validity of commercialization theory depends a great deal on the industry in question and the particular nature of the technology").

215. *See* discussion *supra* Part II.A.

216. Oullette & Tutt, *supra* note 1, at 3.

217. Eisenberg, *supra* note 15, at 1710 (reasoning that "nonexclusive licenses . . . are unlikely to enhance the profitability of product development"); *see* Ayres & Ouellette, *supra* note 214, at 275–77.

218. Lemley, *supra* note 109, at 626 ("Universities can still earn revenue from nonexclusive licenses, and for enabling technologies they might even maximize their revenue in the long term by granting nonexclusive rather than exclusive licenses.").

219. *See* Ayres & Ouellette, *supra* note 214, at 275–76 (concluding that "if the conventional wisdom is correct that Bayh–Dole patents are justified only by their commercialization incentive, then a nonexclusive license is prima facie evidence that the invention ought not to have been patented at all"); Teo Firpo & Michael S. Mireles, *Monitoring Behavior: Universities, Nonprofits, Patents, and Litigation*, 71 SMU L. REV. 505, 534–37 (2018) (listing three criticisms of the Bayh-Dole Act).

followed.[220] Academic institutions and inventors began to reject the Mertonian norms of sharing and openness as they prioritized seeking patent protection for inventions.[221] Examples of sharing affected by these changing priorities included not only data and research results but also research materials and tools.[222] Although the effects of increased patenting on academic culture have been fiercely contested, some scholars have suggested that academic science was already trending toward increased competition, secrecy, and consideration of financial incentives long before Bayh-Dole was enacted.[223]

Encouraging university inventor engagement in development aligns with the main goals of Bayh-Dole in promoting the dissemination of new technologies.[224] At least two surveys have indicated that most university research falls within the definition of basic research, concluding that over 80% of licensed university inventions require further development.[225] In the precursor legislation to the Bayh-Dole Act, numerous experts testified before the Senate Judiciary Committee that inventor involvement is "absolutely essential" when inventions are in "the embryonic stage of development."[226] The special position of universities in enhancing access to faculty inventors and promoting the transfer of tacit knowledge also supported the adoption of the Act.[227] However,

220. *See* Margo A. Bagley, *Academic Discourse and Proprietary Rights: Putting Patents in Their Proper Place*, 47 B.C. L. REV. 217, 240–41 (2006) (explaining that "the need to comply with the patent novelty rules prompts researchers to delay publicizing their efforts").

221. *See* Rai, *supra* note 157, at 109–10.

222. *See id.* at 149.

223. *See* Greenbaum, *supra* note 207, at 327; Bhaven N. Sampat, *Patenting and US Academic Research in the 20th Century: The World Before and After Bayh-Dole*, 35 RSCH. POL'Y 772, 774 (2006).

224. *See* Arti K. Rai, et al., *University Software Ownership and Litigation: A First Examination*, 87 N.C. L. REV. 1519, 1550–51 (2009) ("[T]he prospect of licensing royalties induces university researchers to work with industry licensees and thereby transfer tacit knowledge necessary for commercialization.").

225. Jerry G. Thursby & Marie C. Thursby, *Pros and Cons of Faculty Participation in Licensing*, *in* 16 UNIVERSITY ENTREPRENEURSHIP AND TECHNOLOGY TRANSFER: PROCESS, DESIGN, AND INTELLECTUAL PROPERTY 190, 190 (Gary D. Libecap ed., 2005) (finding that "88% and 84% of licensed university inventions require further development").

226. DAVID C. MOWERY, ET AL., IVORY TOWER AND INDUSTRIAL INNOVATION: UNIVERSITY-INDUSTRY TRANSFER BEFORE AND AFTER THE BAYH-DOLE ACT IN THE UNITED STATES 205 (2004) (citing S. REP. NO. 96-480 (1979)).

227. *See* Eisenberg, *supra* note 15, at 1697 (describing testimony supporting the Bayh-Dole Act: "[T]he firm that makes a discovery is generally in a better position to develop it commercially than other firms that do not employ the inventor or have ready

compelling financial incentives might dissuade universities from sharing technology, potentially leading academic institutions to reject traditional academic norms that would ordinarily encourage inventor mobility.

2. Financial Foundations

Universities' reliance on government funding may affect public perception of the role of universities in disseminating technology to further social welfare.[228] Public universities and colleges depend on federal and state funding for over one-third of their revenue.[229] Both public and private academic institutions rely on government funding to carry out basic research.[230] Although federal government spending on basic research has fallen to less than 50% of the funds spent on basic research, it is still the largest funder of basic research and an important source of university research funding.[231]

Tax incentives also support inventor involvement in the development of technology to further public benefit. Universities are supposed to conduct research for noncommercial purposes to obtain preferential tax treatment. [232] The Tax Code requires that an organization receiving a tax exemption for educational or scientific purposes must "serve[] a public rather than a private interest."[233] To secure the benefit of nonprofit status, universities' assets are to be

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access to the unpatented know-how associated with the discovery"); Lee, *Patents*, *supra* note 119, at 65 (summarizing statements by university representatives focusing on how universities "had direct access to faculty inventors" and would be able to "facilitate the direct interaction between inventors and licensees that is often critical to technology transfer").

228. *See* PEW CHARITABLE TRUSTS, *supra* note 17, at 1.

229. *Id.* at 9.

230. *See* Jeffrey Mervis, *Data Check: U.S. Government Share of Basic Research Funding Falls Below 50%*, SCI. MAG., Mar. 9, 2017, https://www.sciencemag.org/news/2017/03/data-check-us-government-share-basic-research-funding-falls-below-50.

231. *Id.*; INDICATORS, *supra* note 151, at 4-4 to 4-5.

232. *See* Vertinsky, *supra* note 13, at 1960.

233. I.R.C. § 501(c)(3) (2018) (exempting educational institutions from Federal income taxes); 26 C.F.R. § 1.501(c)(3)-1(d)(1)(ii) (2019) (stating that an organization will not be exempt for educational purposes if it is "operated for the benefit of private interests"); 26 C.F.R. § 1.501(c)(3)-1(d)(5)(i) (2019) ("[A]n organization may meet the requirements of section 501(c)(3) only if it serves a public rather than a private interest."); NAT'L RES. COUNCIL, *Committee on the Future of the Colleges of Agriculture in the Land Grant University System*, *in* COLLEGES OF AGRICULTURE AT THE LAND GRANT UNIVERSITY: PUBLIC SERVICE AND PUBLIC POLICY 1, 14 (1996) [hereinafter *Land Grant System*].

used for public benefit.[234] Further, academic institutions' receipt of funding, such as bonds and donations, enjoys tax-exempt status because their use is supposed to serve educational purposes and advance the public interest.[235] Unreasonably denying inventors the ability to continue using their inventions could be contrary to the statutory provisions that undergird these incentives.

Given the intermingling of industry and academic interests, however, strong private financial incentives may counter the influence of governmental financial support and tax incentives.[236] The increased reliance on private sources of funding may prove too alluring, sometimes resulting in universities making unreasonable decisions to deny departing inventors use of their creations.

3. Reputational and Philanthropic Considerations

Despite an increased reliance on private funding and overlap of academic and industry interests, universities continue promoting their stated educational missions and furthering philanthropic efforts.[237] One of the distinguishing features of universities, as opposed to industry, is the emphasis on noncommercial research activities.[238] Universities are founded and organized to advance the production and dissemination of knowledge, emphasizing the importance of collaboration.[239] According to the National Research Council, universities' mission statements should strive to "embrace

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234. I.R.C. § 501(c)(3) (2018); 26 C.F.R. § 1.501(c)(3)-1(d)(1)(ii) (2019); 26 C.F.R. § 1.501(c)(3)-1(d)(5)(i) (2019); Vertinsky, *supra* note 13, at 1960.

235. I.R.C. § 501(c)(3) (2018); 26 C.F.R. § 1.501(c)(3)-1(d)(1)(ii) (2019); 26 C.F.R. § 1.501(c)(3)-1(d)(5)(i) (2019); COUNCIL ON GOV'T RELS., UNIVERSITY-INDUSTRY RELATIONS BROCHURE 10 (2007), https://www.cogr.edu/sites/default/files/University-Industry_Relations_brochure.pdf [https://perma.cc/NCS5-QENN] ("From the university's perspective, losing the tax-exempt status of a bond issuance would be disastrous."); COUNCIL ON GOV'T REL, MANAGING EXTERNALLY FUNDED RESEARCH PROGRAMS II-6 (rev. ed. Mar. 4, 2016), https://www.cogr.edu/COGR/files/ccLibraryFiles/Filename/000000000316/Effective%20Practices%20January%202016.pdf [https://perma.cc/8ARM-D7E9] (describing management practices related to external funding, including complying with requirements to maintain nonprofit and tax exempt status); Vertinsky, *supra* note 13, at 1960.

236. INDICATORS, *supra* note 151, at 4-30 (noting that the business sector was a "substantial funder" of basic research, "providing 27% of the total" amount of basic research funding).

237. *See* Vertinsky, *supra* note 13, at 1960–61.

238. *Id.*; Anderson et al., *supra* note 158 (discussing how Mertonian norms are modified as applied).

239. Michael J. Madison et al., *The University as Constructed Cultural Commons*, 30 WASH. U. J.L. & POL'Y 365, 379—80 (2009).

and articulate the university's foundational responsibility to support smooth and efficient processes to encourage the widest dissemination of university-generated technology for the public good."[240]

Adopting reasonable approaches to licensing, even for departing inventors, is important to carry out the missions that universities strive to uphold. The Association of University Technology Managers (AUTM) represents technology transfer professionals from over 800 academic institutions; it articulates common principles and aspirations among its members.[241] AUTM's "Nine Points to Consider in Licensing University Technology" recognizes the tension between academic and industry motivations.[242] It encourages universities to utilize "approaches that balance a licensee's legitimate commercial needs against the university's goal (based on its educational and charitable mission and the public interest) of ensuring broad practical application of the fruits of its research programs."[243] Many university technology transfer policies highlight their missions of promoting the public interest through the dissemination of technology. For example, the Office of Technology Licensing at Stanford states its goal is to "promote the transfer of Stanford technology for society's use and benefit while generating unrestricted income to support research and education."[244] In its Statement of Policy, Harvard recognizes its "long history of benefiting the public through its research programs."[245]

Academic institutions seek to advance the goals stated in their mission statements to bolster their reputations, which can advance philanthropic efforts as well as recruitment and retention.[246] If

240. MANAGING UNIVERSITY IP, *supra* note 9, at 2–4 (stating that the goal of university technology transfer should be "the expeditious and wide dissemination of university-generated technology for the public good").

241. *Who We Are*, ASS'N OF U. TECH. MANAGERS, https://autm.net/about-autm/who-we-are (last visited Sept. 25, 2020).

242. CAL. INST. OF TECH. ET AL., *supra* note 18, at 2.

243. *Id.*; *see also* Lemley, *supra* note 109, at 625 (explaining that a university is "a public-regarding institution that should be advancing the development and spread of knowledge and the beneficial use of that knowledge").

244. STANFORD U., RES. POL'Y HANDBOOK, 9.1 INVENTIONS, PATENTS, AND LICENSING (rev. ed. June 19, 2013), https://doresearch.stanford.edu/policies/research-policy-handbook/intellectual-property/inventions-patents-and-licensing [https://perma.cc/5HTP-28AJ].

245. HARVARD U., STATEMENT OF POLICY IN REGARD TO INTELLECTUAL PROPERTY, (last updated June 11, 2019) https://otd.harvard.edu/upload/files/IP_Policy_6-11-2019_(FINAL).pdf [https://perma.cc/T948-D6BB].

246. *See* Lisa Larrimore Ouellette, *How Many Patents Does It Take to Make a Drug? Follow-On Pharmaceutical Patents and University Licensing*, 17 MICH. TELECOMM. & TECH. L. REV. 299, 309 (2010) (describing successful efforts by students

universities inhibit mobility to block future development of technology, reputation costs could affect faculty and student recruitment.[247] Philanthropic contributions amount to over $4 billion annually for operations, buildings for conducting research, and endowment in the United States.[248] These donations depend on goodwill and relationships that seek to further universities' public purpose of "increasing the level of knowledge and the speed of technological progress."[249]

Annoying successful inventors-turned-entrepreneurs with overly burdensome limits could end up costing the university dearly in lost donations.[250] For example, compare the experiences of the founders of Netscape and the University of Illinois with those of the Google founders and Stanford University. While at the University of Illinois, Marc Andreessen worked on the Mosaic web browser.[251] Andreessen later became one of the co-founders of Netscape, a startup offering a competing web browser that ultimately surpassed Mosaic.[252] The contentious licensing negotiations and the "gimme gimme gadfly chorus" at the University of Illinois were so frustrating to the Netscape co-founders that they decided to write entirely new browser code in a "clean room," a time-consuming and laborious process.[253] Even though the university ultimately obtained $7 million from

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at Yale to ensure access to a patented HIV drug in South Africa that had been exclusively licensed to Bristol-Myers Squibb); Vertinsky, *supra* note 13, at 1961 ("The importance of philanthropy in supporting university activities has provided additional incentives to universities to protect their reputations as institutions engaged in public service.").

247. Vertinsky, *supra* note 13, at 1961.

248. Fiona Murray, *Evaluating the Role of Science Philanthropy in American Research Universities*, 13 INNOVATION POL'Y & ECON. 23, 23 (2012).

249. *Id.* at 35.

250. *See* Kenney & Patton, *supra* note 8, at 1413.

251. *See* ROBERT H. REID, ARCHITECTS OF THE WEB: 1,000 DAYS THAT BUILT THE FUTURE OF BUSINESS 36 (1997).

252. John Markoff, *The Co-Founder of Netscape Is an Entrepreneur Once Again*, N.Y. TIMES, (Oct. 27, 1999), https://www.nytimes.com/1999/10/27/business/the-co-founder-of-netscape-is-an-entrepreneur-once-again.html.

253. REID, *supra* note 251, at 36–37 (noting that there were allegations that Netscape's engineers were "inadequately insulated from their knowledge of the [existing] code when they wrote their new browser"); Pamela Samuelson et al., *A Manifesto Concerning the Legal Protection of Computer Programs*, 94 COLUM. L. REV. 2308, 2317–18 n.24 (1994) (explaining how a "clean room" approach can prevent copyright infringement).

Netscape, frustrating the Netscape founders likely cost the university much more in donations that never materialized.[254]

The relationship between Google's co-founders and Stanford was much more amiable than that of Netscape and the University of Illinois. Larry Page, one of Google's co-founders, was at Stanford when he invented the search technology PageRank.[255] Within six months of launching PageRank on Stanford's website, the search engine overburdened the university's bandwidth, resulting in Stanford's internet access being shut down several times.[256] Page recalled feeling "lucky" that Stanford did not "hassle" him too greatly about the resources PageRank was using.[257] By virtue of a prior agreement and policies at Stanford, Page was required to assign his rights in the PageRank technology to Stanford.[258] Even prior to selecting a domain name, Google was able to enter into a license agreement with Stanford.[259] Although another company approached Stanford about licensing PageRank in exchange for "a very attractive royalty payment," Stanford decided to license it to the inventors instead because "they were the ones most likely to make the technology a

254. *See* REID, *supra* note 251, at 36–37 (describing how the University of Illinois "burned every bridge" with Netscape and "squandered its chances of one day boasting an Andreessen Library"); Kenney & Patton, *supra* note 8, at 1413.

255. JOHN MACCORMICK, NINE ALGORITHMS THAT CHANGED THE FUTURE: THE INGENIOUS IDEAS THAT DRIVE TODAY'S COMPUTERS 24–25 (2012). Others state that Sergey Brin, Google's other co-founder, was the inventor of the PageRank search method. *See* Letter from Mark Fuchs, Chief Accountant, Google, Inc., to Sec. & Exch. Comm'n (Aug. 11, 2006) https://www.sec.gov/Archives/edgar/data/1288776/000119312506170952/filename1.htm ("Larry and Sergey helped create the PageRank patent."); *see also* Sergey Brin & Lawrence Page, *The Anatomy of a Large-Scale Hypertextual Web Search Engine*, 30 COMP. NETWORKS & ISDN SYS. 107, 107 (Apr. 1998). Page is the sole inventor specified on the initial PageRank patent. U.S. Patent No. 6,285,999 (filed Jan. 9, 1998) (issued Sept. 4, 2001).

256. *Taking a Chance on Google: Stanford University*, AUTM, [hereinafter *Taking a Chance on Google*], https://autm.net/about-tech-transfer/better-world-project/bwp-stories/google (last visited Sept. 25, 2020).

257. *Id.*

258. CORONA BREZINA, SERGEY BRIN, LARRY PAGE, ERIC SCHMIDT, AND GOOGLE 30 (2012); Katherine Ku, *Software Licensing in the University Environment*, COMPUTING RSCH. NEWS (1st ed., 2003), http://archive.cra.org/CRN/articles/ku.html.

259 *See* U.S. Patent No. 6,285,999 (filed Jan. 9, 1998) (disclosing the method for Google's "PageRank" search technology); David Pridham & Brad Sheafe, *Using IP to Benefit Startups and Large Companies Alike*, CORP. COUNSEL (Aug. 25, 2015), http://www.corpcounsel.com/id=1202735624108/Using-IP-to-Benefit-Startups-and-Large-Companies-Alike-?slreturn=20151012124727 (explaining that Google filed its patent before it "even had a business plan or a domain name" and "paid Stanford $336 million in shares for an exclusive license to it").

commercial success."[260] The original license comprised an up-front payment, annual royalties, an amount of the company's equity, and an option for exclusivity.[261] The patent license for the PageRank search technology helped smooth the technology transfer from Stanford to Google.[262]

In appreciation of the support that Stanford has given Google, Google has supported Stanford as well.[263] The company has provided funding for at least forty technology projects at Stanford.[264] In 2006, Google pledged $2 million to support a technology law and policy program in the Law School.[265] It donated $2.5 million to set up an endowment for a professorship in the School of Engineering in 2009.[266] And each year, Google provides $1 million to the Computer Science Department.[267] Working with departing inventors in a supportive way can pay off in philanthropic donations to the university.

Promoting translational research is also at the historical core of many public and private institutions.[268] In the late 1800s, legislation establishing land grant universities sought to further the translation of academic research in the agricultural sciences.[269] The legislation ensured that at least one land grant university would exist in every state.[270] The purpose of establishing land grant institutions was to develop inventions in agriculture and disseminate information about

260. *Taking a Chance on Google*, *supra* note 256.

261. The original 1998 license was nonexclusive. Google Inc., License Agreement (Ex. 10.10.1, to S-1/A Filing) (July 30, 2001); Google, Inc., Amended and Restated License Agreement, (Ex. 10.10.01) (Oct. 13, 2003).

262. *See* Colleen V. Chien, *Reforming Software Patents*, 50 HOUS. L. REV. 325, 351 (2012) ("[T]he PageRank patent, which covered a search algorithm, arguably facilitated the transfer of technology from Stanford University to Google.").

263. *See* Ku, *supra* note 258 (describing how Stanford has benefited from the "philanthropy of the successful entrepreneurs" who are alumni).

264. David Orenstein, *Google Grew From Stanford Engineering, and the Relationship Continues to Provide Answers to Tough Problems*, STAN. NEWS (Apr. 28, 2011), https://news.stanford.edu/news/2011/april/google-stanford-ties-042811.html [https://perma.cc/P8YU-PRFF].

265. *Google Pledges $2 Million to Support Law School Center*, STAN. NEWS (Dec. 6, 2006), https://news.stanford.edu/news/2006/december6/google-120606.html [https://perma.cc/7HUE-8P7Q].

266. Orenstein, *supra* note 264.

267. Taylor Grossman, *Tech Companies Wield Influence at Stanford*, STAN. DAILY (Nov. 7, 2011), https://www.stanforddaily.com/2011/11/07/bay-area-companies/ [https://perma.cc/N23Z-JN42].

268. *See* Vertinsky, *supra* note 13, at 1962.

269. *See Land Grant System*, *supra* note 233, at 1; Vertinsky, *supra* note 13, at 1956 n.19.

270. *Land Grant System*, *supra* note 233, at 1.

new technologies.[271] Land grant universities were also created to carry out agricultural research and to engage closely with industry, including licensing their inventions to private entities.[272]

The "historical commitment to public service" continues to ground the mission of land grant universities.[273] The Association of Public Land-Grant Universities (APLU) is an organization of 244 academic-related entities that seeks to advance the work of public universities.[274] A task force created by the APLU issued a statement in 2015 to reaffirm land-grant universities' missions of knowledge dissemination and furthering the public good.[275] They suggested steps to ensure that the universities' technology transfer policies were consistent with these missions.[276] To determine the extent of compliance with the recommended steps, the APLU and the American Association of Universities (AAU) conducted a survey in 2016.[277] They found that 87% of respondents claimed to have practices, policies, or to be in the process of developing written policies to ensure that their technology transfer practices further the public interest and are consistent with their universities' missions.[278] Many land-grant institutions are now research universities, and they continue to promote facilitating the translation of basic research to development of the technologies in furtherance of public benefit.[279] Providing reasonable means for departing inventors to practice the inventions

271. *See id.* at 14 (explaining that the legislation "endowed the colleges with a three-part mission of teaching, research, and.... extending education and technology transfer to the public"); NAT'L RES. COUNCIL, COLLEGES OF AGRICULTURE AT THE LAND GRANT UNIVERSITIES: A PROFILE 1 (1995), https://www.nap.edu/read/4980/chapter/2 [https://perma.cc/Q46C-2E6A] (explaining that the stated purpose of land grant colleges was "to provide instruction in agriculture and the mechanical arts, conduct agricultural research, and deliver knowledge and practical information to farmers and consumers").

272. *See Land Grant System*, *supra* note 233, at 14; Greenbaum, *supra* note 207, at 334.

273. *See Land Grant System*, *supra* note 233, at 12.

274. *About Us*, https://www.aplu.org/about-us/ (last visited Sept. 25, 2020).

275. *Statement to APLU Members of Recommendations on Managing University Intellectual Property*, ASS'N PUB. LAND-GRANT UNIVS. (Mar. 2015), https://www.aplu.org/projects-and-initiatives/research-science-and-technology/task-force-intellectual-property/March2015TaskForceManagingUniversityIntellectual Property.pdf [https://perma.cc/45TJ-WLV8].

276. *Id.*

277. *AAU-APLU Technology Transfer Management Survey Results*, ASS'N OF AM. UNIVS. & ASS'N PUB. LAND-GRANT UNIVS., https://www.aplu.org/members/councils/governmental-affairs/CGA-library/aplu-aau-technology-transfer-managagement-survey-results/file [https://perma.cc/34ED-PA7A] (last visited Jan. 3, 2022).

278. *Id.*

279. *See Land Grant System*, *supra* note 233, at 89.

they created would be consistent with the historical missions of these institutions.

III. CASE STUDY OF THE STRAWBERRY INDUSTRY

To provide context to the theoretical discussion of inventor mobility, this Part sets forth a case study examining the relationship between universities and departing inventors in the strawberry industry, an area that has been largely overlooked in the literature. Innovation is very important in the strawberry industry because it faces many impediments to production. With tougher restrictions on fumigants and pesticides, diseases and insects have to be managed.[280] Thirty percent fewer acres are being cultivated as compared with 2013, primarily due to difficulty finding agricultural laborers and increased labor costs, suggesting the need for berries that are less labor-intensive to harvest.[281] Recent fluctuations in weather—such as long-lasting droughts followed by intensive downpours—affect yield.[282] These issues highlight the need to develop more robust and improved strawberry varieties.

Strawberry plants can be protected using a combination of utility patents, plant patents, and Plant Variety Protection Act certificates.[283] Of particular importance to the development of the

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280. *See* CBC v. UC Complaint, *supra* note 22, at 4; Bomgardner, *supra* note 21, at 18; Goodyear, *supra* note 21.

281. Goodyear, *supra* note 21.

282. *See* LOIS WRIGHT MORTON ET AL., CLIMATE, WEATHER AND STRAWBERRIES 10 (2017), https://www.climatehubs.usda.gov/sites/default/files/Climate%2C%20Weather%20and%20Strawberries.pdf [https://perma.cc/QZ7C-SKLV]; CHARLIE WALTHALL ET AL., U.S. DEP'T AGRIC., CLIMATE CHANGE AND AGRICULTURE IN THE UNITED STATES: EFFECTS AND ADAPTATION, (2012), https://www.usda.gov/sites/default/files/documents/CC%20and%20Agriculture%20Report%20(02-04-2013)b.pdf; Tapan B. Pathak et al., *Climate Change Trends and Impacts on California Agriculture: A Detailed Review*, AGRONOMY, Feb. 26, 2018, https://www.mdpi.com/2073-4395/8/3/25/pdf; Dune Lawrence, *How Driscoll's Is Hacking the Strawberry of the Future*, BLOOMBERG (July 29, 2015), https://www.bloomberg.com/news/features/2015-07-29/how-driscoll-s-is-hacking-the-strawberry-of-the-future.

283. 35 U.S.C. § 101 (2018); 35 U.S.C. § 161 (2018); 7 U.S.C. § 2321 (2018); J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc., 534 U.S. 124, 143–45 (2001) (finding that the ability to obtain a utility patent will not be limited by the Plant Patent Act or the Plant Variety Protection Act because each Act has distinct requirements and coverage). A utility patent application may cover the same plant that is claimed under the Plant Patent Act, in addition to materials and processes, though a terminal disclaimer may be required to prevent improper patent term extension. *See* U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 2105 (rev. 10th ed., 2019), https://www.uspto.gov/web/offices/pac/mpep/s2105.html.

strawberry industry, the Plant Patent Act protects "cultivars," which are genetically distinct new varieties of plants that are created by breeding.[284] It also protects "germplasm," which is the genetic library of plants that breeders can use as "parents" when they create cultivars.[285]

The ability to obtain and license patents covering both cultivars and germplasm allows for flexibility in organizational structuring in the industry. Breeders develop new varieties of strawberry plants. Growers rely on breeders to be able to purchase strawberry plants each year, from well-liked breeds to new varieties that offer improvements, such as better flavor, color, and pest resistance.[286] Breeders can license growers to grow and harvest strawberry varieties, rather than having to vertically integrate, which would require breeders to not only develop new varieties but also to cultivate and harvest them.[287]

Two of the main breeders in the strawberry industry in the United States are Driscoll's and the University of California (UC). [288] Driscoll's is the leading proprietary breeder of private strawberry varieties, meaning that growers enter into restrictive agreements to use Driscoll's branding and pay its commissions and royalties.[289] The UC is the primary breeder of publicly-available strawberry varieties for growers.[290] The UC's germplasm has been described as "a living museum of 1,600 strawberry types" that has been maintained for

284. 35 U.S.C. § 161 (2018); CBC v. UC Cross-Complaint, *supra* note 25, at 1.

285. 35 U.S.C. § 161; (2018); John Doods et al., *Plants, Germplasm, Genebanks, and Intellectual Property: Principles, Options, and Management*, *in* INTELLECTUAL PROPERTY MANAGEMENT IN HEALTH AND AGRICULTURAL INNOVATION: A HANDBOOK OF BEST PRACTICES 389, 390 (Anatole Krattiger et al. eds., 2007).

286. *See* CBC v. UC Complaint, *supra* note 22, at 4; Hiltzik, *supra* note 24.

287. *See* Nathan M. Barnett, *Intellectual Property as a Law of Organization*, 84 S. CAL. L. REV. 785, 819 (2011) (describing how "strong patents are one of a set of legal and nonlegal conditions that must be satisfied in order to enable firms to accrue specialization gains through disintegrated structures"); Goodyear, *supra* note 21 (noting a senior vice-president and general counsel from Driscoll's described, "[w]e make the inventions, they assemble it, and then we market it, so it's not that dissimilar from Apple using someone else to do the manufacturing but they've made the invention and marketed the end product.").

288. *See* Susie Allen, *Strawberry Yields: The Fruitful Career of Herbert Baum*, U. CHI. MAG., Winter 2020, at 30, https://mag.uchicago.edu/sites/default/files/issues/UChicagoMagazine-Winter2020.pdf.

289. *See* Hiltzik, *supra* note 24.

290. *See* Goodyear, *supra* note 21.

decades with attentiveness in planting and reproduction.[291] Its cultivars represent approximately 75 percent of the production of the $1.3 billion strawberry industry in California, as well as approximately 50% of production globally.[292]

As will be discussed below in the case study, the departing university inventors had worked on developing improved strawberry plants for over three decades but were denied a nonexclusive license to practice their inventions from their parent university.[293] The university's refusal to allow the inventors to use the technology they had developed will likely inhibit transfer of their valuable tacit knowledge gained from over thirty years of experience.

A. The Budding Industry

In the early 1900s, strawberry breeders were on the quest for the holy grail of "a large, firm berry which could be picked one-fourth green and which could stand shipping to the east coast."[294] J.E. Reiter and R.F. Driscoll started growing strawberries at the beginning of the "California strawberry gold rush."[295] They planted a desirable berry called the "Banner," which was a consistently-shaped berry unlike the unusual, irregular berries available at the time.[296] Although Driscoll and Reiter were able to maintain exclusive access to the Banner for almost a decade, most of the farmers on the West Coast were able to access it eventually because there were no plant patent laws at the time.[297] Strawberry breeding was very competitive.[298] Adding to the challenge of developing new breeds without patent protection at that time, strawberries are self-cloning, which makes breeds especially vulnerable to theft.[299] When nurseries and breeders sought relief from

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291. Larry Gordon, *Strawberry Expert at Center of Battle over Fruit's Future*, L.A. TIMES, (May 27, 2014, 3:00 AM), https://www.latimes.com/local/great-reads/la-me-c1-strawberries-20140527-story.html.

292. Alan B. Bennett & Michael Carriere, *The University of California's Strawberry Licensing Program*, *in* INTELLECTUAL PROPERTY MANAGEMENT IN HEALTH AND AGRICULTURAL INNOVATION: A HANDBOOK OF BEST PRACTICES 1833 (Anatole Krattiger et al. eds., 2007) http://www.iphandbook.org/handbook/chPDFs/ch17/ipHandbook-Ch%2017%2026%20Bennett-Carriere%20Strawberry%20Licensing.pdf [https://perma.cc/FNT3-6GF5].

293. CBC v. UC Complaint, *supra* note 22, at 2.

294. Goodyear, *supra* note 21.

295. *Id.*

296. *Id.*

297. *Id.*

298. *Id.*

299. *Id.* (explaining that "mothers" send out runners, creating genetically identical "daughters").

Congress, Thomas Edison explained, "[n]othing that Congress could do to help farming would be of greater value and permanence than to give to the plant breeder the same status as the mechanical and chemical inventors now have through the law."[300]

Congress responded with the Plant Patent Act, which set forth a new class of inventions.[301] It allows protection for the invention or discovery of "any distinct and new variety of plant" that has been asexually reproduced.[302] Rather than viewing plants as ineligible products of nature, Congress explained that the work of the breeder "in aid of nature" should be considered patent eligible.[303]

B. Driscoll's Ascent

Driscoll's popular Banner strawberry breed eventually succumbed to a viral infection.[304] The UC started collecting germplasm in the hopes of finding plants that would be resistant to disease to cross-breed with the Banner line.[305] In the 1930s, the UC instituted a breeding program under the leadership of two early breeders, Harold Thomas and Earl Goldsmith, developing new strawberry varieties and releasing them to growers for a reasonable fee.[306]

By the 1940s, the strawberry business appeared to be faltering. In a tragic moment in the nation's history, Japanese immigrants, who worked as both laborers and growers, were sent to internment camps.[307] The UC appeared to be planning to abandon its breeding

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300. Imazio Nursery, Inc. v. Dania Greenhouses, 69 F.3d 1560, 1562 (Fed. Cir. 1995) (citing S. REP. NO. 71-315, at 3 (1930).

301. 35 U.S.C. § 161 (2018).

302. 35 U.S.C. § 101 (2018) (providing utility patent protection for asexually reproduced plants); 35 U.S.C. § 161 (2018); *In re* Beineke, 690 F.3d 1344, 1352 (Fed. Cir. 2012) (explaining protection is limited to plants "that were created as a result of plant breeding or other agricultural and horticultural efforts *and* that were created by the inventor").

303. Diamond v. Chakrabarty, 447 U.S. 303, 313 (1980) (citing S. REP. NO. 71-315, at 6–8 (1930)); H.R. REP. NO. 71-1129, at 7–9 (1930).

304. Goodyear, *supra* note 21.

305. *Id.*

306. *Id.*

307. *See* DAVID A. NEIWERT, STRAWBERRY DAYS: HOW INTERNMENT DESTROYED A JAPANESE AMERICAN COMMUNITY 52 (2005) ("The very image of the fruit became associated with the Japanese."); RICHARD REEVES, INFAMY: THE SHOCKING STORY OF THE JAPANESE AMERICAN INTERNMENT IN WORLD WAR II 64 (2015) ("The WCCA [Western Defense Command and Fourth Army Wartime Civil Control Administration] was given a mandate to find 'assembly centers' to temporarily hold the more than one hundred thousand Japanese on the West Coast and southern Arizona for months,

program, so the early UC breeders Thomas and Goldsmith left the university and joined the company that eventually became "Driscoll's."[308] Driscoll's apparently paid one thousand dollars for access to UC's germplasm, which other growers could have purchased as well.[309] No grower besides new-employer Driscoll's, however, would have had the benefit of Thomas and Goldsmith's valuable tacit knowledge from having worked with the plants for decades.

Drawing upon the expertise of these two early breeders who left the UC, the Driscoll family emerged as the dominant proprietary provider of the fruit.[310] Thomas and Goldsmith were able to use a variety of the UC strawberry plant that was not widely available.[311] In 1958, they released Driscoll's first proprietary cultivar, the "Z5A," which has become known as "perhaps the finest commercial strawberry ever developed."[312] Not only did the Z5A cultivar ship well, it grew fruit late in the strawberry season, enabling Driscoll's to sell strawberries at a time when the competition had nothing to offer.[313]

C. The UC's Revival

Contrary to Thomas and Goldsmith's understanding, the UC did not terminate its strawberry breeding program in 1945.[314] Instead, UC retained copies of its germplasm and eventually hired two new breeders: Douglas Shaw and Kirk Larson.[315] During the approximately thirty years they led the program at UC, the patents on the plants Shaw and Larson invented while developing the UC's germplasm became some of the most valuable assets in UC's patent portfolio, bringing in over $100 million.[316] Shaw and Larson became the most "celebrated" breeders in the strawberry business.[317] They were able to improve production by enhancing the ability to grow during shorter daylight hours, durability for travel, and disease and

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while the WRA [War Relocation Authority] was to build permanent concentration camps.").

308. *See* Goodyear, *supra* note 21.

309. *Id.*

310. *Id.*

311. *Id.*

312. *Id.*

313. *Id.*

314. *Id.*

315. *Id.*; Pat Bailey, *Strawberry Breeding Program Backgrounder: A Historical Timeline*, UNIV. CAL. DAVIS (May 9, 2016), https://www.ucdavis.edu/news/strawberry-breeding-program-backgrounder-historical-timeline/.

316. Hiltzik, *supra* note 24.

317. *Id.*

pest resistance.[318] The breeding program at UC became the exact opposite of Driscoll's: nonexclusive and accessible.[319] Unlike Driscoll's, UC shares its research data and supplies strawberry plants to growers for a minimal royalty.[320] Almost half of the strawberries in the United States are raised through cross-breeding and transplanting at UC's laboratories.[321] UC eventually became the main competitor to Driscoll's for new strawberry varieties.[322]

After decades passed, it appeared that UC was allowing its strawberry breeding program to wither, apparently moving away from the hand-breeding that creates new cultivars.[323] In 2011, Shaw became concerned that UC was moving toward the more lucrative area of genomics and decided to leave.[324] Like the early breeders Thomas and Goldsmith had requested decades before, Shaw and Larson asked UC to be able to continue using their plants after departure.[325] This time, however, the departing breeders sought to compete with Driscoll's, instead of joining it. Shaw and Larson proposed a startup "based in U.C. germplasm" to ensure that the cultivars that they had developed but not yet patented would be used.[326] They started up their own company, California Berry Cultivars (CBC), to continue developing strawberry plants in conjunction with growers.[327] UC later denied that it was going to discontinue its breeding program, contending that Shaw and Larson had spread the rumor to benefit their own startup company.[328]

Initially, UC seemed willing to allow Shaw and Larson to continue practicing their inventions.[329] By virtue of agreements entered into with UC, Shaw and Larson had already assigned ownership of many of the materials at issue to UC, including their notebooks and research records.[330] The UC's position appeared to change when the California Strawberry Commission (CSC), of which Driscoll's was a

318. *Strawberry Suit: UC Davis and Former Professors Clash over Who Owns the Fruits of Research*, L.A. TIMES: ASSOCIATED PRESS, (May 5, 2017, 1:10 PM) [hereinafter *Strawberry Suit*], https://www.latimes.com/business/la-fi-strawberries-uc-davis-20170505-story.html.

319. *See* Goodyear, *supra* note 21.

320. *Id.*

321. Gordon, *supra* note 291.

322. *See* Allen, *supra* note 288.

323. CBC v. UC Trial Brief, *supra* note 24, at 2–3; Gordon, *supra* note 291.

324. Goodyear, *supra* note 21.

325. CBC v. UC Complaint, *supra* note 22, at 10.

326. Goodyear, *supra* note 21.

327. CBC v. UC Complaint, *supra* note 22, at 1.

328. Gordon, *supra* note 291.

329. Goodyear, *supra* note 21.

330. Transcript of Record, *supra* note 26, at 1328–29.

member, sued UC in 2013.[331] The CSC expressed concerns that UC's germplasm would be abandoned or privatized.[332] As part of the 2015 settlement with the CSC, UC agreed to maintain its breeding program for at least five years.[333] The UC also agreed to hire a new breeder to continue its strawberry program and allow wide licensing of its varieties.[334] The UC hired Steven Knapp, an expert in genomics from Monsanto, who sequenced the strawberry genome.[335] The UC also allegedly entered into a secret agreement, which provided that UC would not grant a license to Shaw.[336]

The impact of litigation in the strawberry industry is acutely felt by growers; some have suggested that the existence of UC and CBC is critical to ensuring that they will not become "captive growers" to the "big breeders."[337] Shaw and Larson sued UC in 2016, seeking a license to use the cultivars they had developed.[338] UC countersued for patent infringement and for Shaw and Larson's continued use of the unreleased plants they developed at UC without permission.[339] A jury found that CBC infringed the UC's patents. [340] Prior to the determination of remedies, the judge urged the parties to resolve their "custody dispute," stating that both parties were at fault.[341] The parties settled, with Shaw and Larson agreeing to return to the UC

331. *See* Cal. Strawberry Comm'n Settlement, Cal. Strawberry Comm'n v. Regents of Univ. of Cal., No. 14-cv-04801-JST (N.D. Cal. Feb. 17, 2015) [hereinafter CSC Settlement], https://docs.justia.com/cases/federal/district-courts/california/candce/3:2014cv04801/281817/35 [https://perma.cc/3HTS-K974]; Larry Gordon, *UC, Strawberry Growers Settle Legal Fight Over Research*, L.A. TIMES (Feb. 10, 2015, 8:27 PM), https://www.latimes.com/local/education/la-me-uc-strawberries-20150211-story.html.

332. Gordon, *supra* note 331.

333. *Id.*

334. *Id.*

335. Goodyear, *supra* note 21.

336. CBC v. UC Trial Brief, *supra* note 24, at 3; Transcript of Record, *supra* note 26, at 1329.

337. Hiltzik, *supra* note 24, at 7 (explaining that in March 2019, Driscoll's sued Shaw and CBC, claiming they used Driscoll's proprietary varieties without permission in their breeding).

338. Goodyear, *supra* note 21.

339. CBC v. UC Cross-Complaint, *supra* note 25, at 6.

340. Hiltzik, *supra* note 24, at 6.

341. Transcript of Record, *supra* note 26, at 1333–34 (finding that the district court had also previously found evidence that UC decided to pursue patent protection for the core strawberry germplasm in bad faith); Order Granting in Part and Denying in Part Cross-Motions for Summary Judgment, Regents of Univ. of Cal. v. Cal. Berry Cultivars, LLC, No. 16-CV-02477-VC, at 18 (N.D. Cal. Apr. 27, 2017).

any plants bred from any unpatented or unreleased materials.[342] Based on the terms of the settlement, it appears that much of the inventors' tacit knowledge related to the unpatented materials will be lost. The outcome seems to contradict the mission statement of the UC: "We provide public service—which dates back to UC's origins as a land grant institution in the 1860s. . . . UC disseminates research results and translates scientific discoveries into practical knowledge and technological innovations that benefit California and the nation." [343] Rather than disseminating research results and translating discoveries, it appears that the development of the strawberry cultivars will be hampered.[344]

Of course, university discretion in licensing can benefit the public interest in many circumstances. For example, universities should justifiably deny licenses to inventors that act in a way that impedes social welfare. In the case study, perhaps departing breeders Shaw and Larson were not acting in the public interest of furthering the development of the inventions, but were instead motivated by private financial gain. In addition, allowing flexibility in licensing can support advances in commercialization and development of an industry, ultimately benefiting the public. For instance, with regard to licensing growers, the UC has a unique licensing system for its strawberry cultivars that is "driven in part by UC's presence as a public institution in the state of California."[345] The UC uses a three-tier pricing system in which California growers pay the lowest prices, growers outside of California in North America pay slightly more, while all other growers pay the highest rates. [346] This type of specialization, as well as exclusivity in certain circumstances, can benefit the public. However, the viability of such an approach depends on continued investment in innovation and the ability of knowledge to be transferred efficiently and effectively. On balance, universities

342. Plaintiff's Complaint, Driscoll's, Inc. v. California Berry Cultivars, LLC, at 2 (E.D. Cal. Mar. 20, 2019) (No. 2:19-CV-00793-TLN-CKD) [https://perma.cc/HBU6-BQ9T] (stating that Driscoll's brought suit against CBC and Shaw in March 2019, alleging patent infringement and other claims); Helen Christophi, *Settlement Reached in the Great Strawberry Fight*, COURTHOUSE NEWS SERV. (Sept. 18, 2017), https://www.courthousenews.com/settlement-reached-great-strawberry-fight.

343. *UC's Mission*, U. OF CAL., https://www.ucop.edu/uc-mission/ [https://perma.cc/RGP4-78MN] (last visited July 18, 2020).

344. CBC v. UC Complaint, *supra* note 22, at 3–5, 18.

345. Bennett & Carriere, *supra* note 292, at 1835 (describing how in North America, UC licenses the strawberry cultivars nonexclusively to nurseries, while in other regions, it relies on master licensees that receive exclusive rights within a given territory).

346. *Id.* at 1834–35.

should strive to allow inventors to use the technology they have invented, though there may be circumstances in which granting a license is ill-advised, such as if doing so would harm the public interest.

IV. MITIGATING POTENTIAL HARMS

This Part examines how to address possible harms when academic inventors seek to depart from their universities. In particular, it raises and assesses various proposals to address potential detrimental effects on the dissemination of knowledge and innovation arising from limitations on university inventor mobility.[347] Due to the significant risk of deleterious effects on innovation incentives for many of the proposals, the best alternatives would be to modify the Bayh-Dole Act to allow inventors a presumptive right to practice on payment of a reasonable royalty or to place conditions on government incentive structures to encourage university inventor involvement in development.

A. Legislative Approaches

Several legislative alternatives might be feasible. The discussion below examines the advantages of modifying the Bayh-Dole Act to allow a presumptive right the practice for academic inventors, issues that may arise with broad compulsory licensing, and why proposals to vest ownership in university inventors are likely to be problematic.

1. Amend the Bayh-Dole Act to Allow a Presumptive Right to Practice for University Inventors

One potential solution to address some of the issues related to university inventor mobility described previously would be to modify the Bayh-Dole Act. The proposed amendment would require universities to allow a presumptive right to practice for university inventors on payment of a reasonable royalty, or as otherwise agreed between the inventors and the parent university.

If an inventor is moving to another academic institution and the invention will be used for solely academic purposes, then an

347. This Part discusses ways to mitigate issues arising from lawful inhibitions on inventor mobility. Antitrust law should be used to address the illegal mechanisms discussed previously, such as anticompetitive no-poach agreements. *See supra* Part I.B.

appropriate royalty for the presumptive right to practice could be set at zero. Imposing any royalty could discourage moves for academic purposes only. Alternatively, Congress or the courts could provide for a limited academic "reverse shop right" for inventors seeking to transfer between academic institutions.[348] A limited reverse shop right would enable inventors to continue using their prior creations for purely academic use.[349] The traditional shop right doctrine holds that an employer retains a royalty-free, nontransferable license to practice an employee's invention when the employer's resources have been used.[350] Similar to the equitable principles justifying the standard shop right doctrine, a limited academic reverse shop right would recognize the importance of departing inventors' contributions, supporting the ability of university inventors to continue using their creations for solely academic purposes.[351]

Determining whether an invention will be used for academic purposes only can be difficult. For example, in the case of *Madey v. Duke University*, the departing inventor owned patents covering the invention at issue and sued his former university for patent infringement.[352] Duke attempted to rely on the experimental use defense.[353] The Federal Circuit explained that Duke's use of the invention in furtherance of its "legitimate business" of "educating and enlightening students and faculty" would not allow it to qualify for the experimental use defense, regardless of its non-profit status.[354]

To allow for greater discretion, universities could rebut the presumptive right to practice by demonstrating that allowing inventors to practice their inventions would undermine the public interest or that exclusivity is essential to commercialization. An inventor might not be acting in the best interest of the public, but may

348. Steven Cherensky, *A Penny for Their Thoughts: Employee-Inventors, Pre-Invention Assignment Agreements, Property, and Personhood*, 81 CAL. L. REV. 597, 662 (1993) (proposing a reverse shop right for employees).

349. *See id.*; William P. Hovell, *Patent Ownership: An Employer's Rights to His Employee's Invention*, 58 NOTRE DAME L. REV. 863, 889 (1983) (proposing a reverse shop right that would be "singly-transferable"). *But see* Mainland Indus., Inc. v. Timberland Mach. & Eng'g Corp., 649 P.2d 613, 618 (Or. Ct. App. 1982) (declining to apply a reverse shop right to a departing employee).

350. 8 DONALD S. CHISUM, CHISUM ON PATENTS § 22.03 [3] (2021).

351. *Id.* at 67.

352. *See* Madey v. Duke Univ., 307 F.3d 1351, 1353 (Fed. Cir. 2002).

353. *Id.*

354. *Id.* at 1362.

instead be motivated by vindictiveness or have conflicts of interest.[355] In those circumstances, a university justifiably might not want to share data with or license intellectual property. Similarly, sometimes an exclusive patent license is a necessary incentive for a firm to take on the costs of commercializing an invention, particularly in the pharmaceutical or biotechnology space.[356] In other technological areas, such as computer-implemented inventions, exclusivity may not be as essential for commercialization. For example, universities reported that they granted over 60% of patent licenses in a nonexclusive manner from 2009 to 2013.[357] In circumstances where a university is already licensing an invention nonexclusively, allowing departing inventor use on payment of a reasonable royalty would be unlikely to adversely affect innovation incentives.

Returning to the example from the strawberry industry, if this proposal were in force, the departing inventors would have had a presumptive right to continue using the strawberry plants they had developed on payment of a reasonable royalty. Their parent university, the UC, would be able to rebut the presumptive right to practice if it could make a sufficient evidentiary showing. For instance, perhaps the UC could provide evidence that the departing inventors were acting contrary to the public interest or in bad faith. Alternatively, the university might argue that exclusivity was necessary for commercialization, though that argument would not likely succeed if the UC were already licensing the plants on a nonexclusive basis.

Some commentators have noted that amendments to Bayh-Dole have been rather difficult to obtain in practice.[358] Lobbying by universities and industry would be expected, as they have strong interests in retaining the status quo with regard to patent protection.[359] For example, over three dozen universities spent millions of dollars in their attempts to influence recent patent reform

355. *See* Geertrui Van Overwalle, *Reconciling Patent Policies with the University Mission*, 13 ETHICAL PERSPS. 231, 236 (2006) (describing mechanisms to ensure appropriate oversight, such as appointing an ombudsperson, creating a whistle-blowing system, and instituting a code of conduct and conflict of interest guidelines).

356. *See* Roin, *supra* note 148, at 515.

357. Ayres & Ouellette, *supra* note 214, at 275 n.16.

358. *See* Boettiger & Bennett, *supra* note 208, at 323 (stating that attempts to amend Bayh-Dole typically have not been successful).

359. *Id.*; Ouellette & Weires, *supra* note 116, at 1376–77; Joe Mullin, *How the Patent Trolls Won in Congress*, ARS TECHNICA (May 23, 2014, 2:08 PM), https://arstechnica.com/tech-policy/2014/05/how-the-patent-trolls-won-in-congress.

legislation.[360] As a result, the America Invents Act (AIA) includes provisions that provide special treatment for academic institutions, such as reduced fees and immunity from a prior use defense.[361] Nonetheless, a narrow amendment such as the one proposed might not raise as many concerns.

In fact, Congress has amended the Bayh-Dole Act many times.[362] Although most of the amendments were relatively minor, a few substantive amendments stand out. First, Congress removed some of the limitations on the terms of exclusive licenses in 1984.[363] In addition, it modified a prior policy that had allowed agencies to waive provisions of the Act to advance commercialization.[364] The amendments instead required that agencies include government license and march-in rights in funding agreements.[365] In 2000, Congress made significant changes to provisions dealing with federally-funded inventions.[366] It also added the important underlined phrase to the previous statutory language in 35 U.S.C. § 200 ("Policy and Objective") as follows: "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 . . . to ensure that inventions . . . are used in a manner to promote free competition and enterprise without unduly encumbering future research and discovery."[367] The above examples suggest that

360. Andrew Ramonas, *University Lobby Push: Higher Ed. Asserts Voice in Patent Reform Effort*, NAT'L L.J. (Apr. 7, 2014, 12:00 AM), https://www.law.com/nationallawjournal/almID/1202649803262/University-Lobby-Push/?slreturn=20200822001133 (stating that dozens of universities spent "at least $11.4 million [in] lobbying" in their attempts to influence the legislation); Ayres & Ouellette, *supra* note 214, at 324.

361. *See* 35 U.S.C. § 123(d) (2018) (classifying universities as micro-entities, which are eligible for reduced fees); 35 U.S.C. § 273(e)(5) (2018) (indicating that universities are immune from the prior commercial use defense).

362. *See* Sean M. O'Connor, *The Real Issue Behind Stanford v. Roche: Faulty Conceptions of University Assignment Policies Stemming from the 1947 Biddle Report*, 19 MICH. TELECOMM. & TECH. L. REV. 379, 411 (2013) ("Between 1984 and 2000, only minor conforming and typographical correction amendments were made to Bayh-Dole.").

363. *See* Pub. L. No. 98-620, 98 Stat. 3335, 3366–67 (1984) (eliminating § 202(c)(7)(B), which prohibited exclusive licenses to persons other than small firms in excess of certain time periods).

364. S. REP. NO. 98-662, at 10 (1984).

365. *Id.*

366. Pub. L. No. 106-404, § 2, 114 Stat. 1742 (2000).

367. *Id.* at 1745 (emphasis added).

substantively amending the Bayh-Dole Act, while not a trivial endeavor, is certainly possible.[368]

The amendment proposed in this Article is narrowly crafted to address the specific effects of unduly limiting university inventor mobility. Although amending the Bayh-Dole Act to provide a presumptive right to practice for university inventors would address situations involving federally-funded patented technology, it would not require universities to allow access to all innovation-essential components, such as data or materials. As such, the proposed amendment would still require universities to act in accordance with their mission statements, which typically state that universities will act to further public benefit.[369] By restricting the amendment to address university inventors, the proposal recognizes the importance of tacit knowledge in developing nascent inventions, and any injurious effects on innovation incentives will be minimized. The ability to rebut the presumptive right to practice recognizes that exclusivity may be necessary to support not only commercialization of the invention in question, but also for the research and development of inventions that do not succeed but are necessary for innovation. As will be discussed in the next section, other proposals to amend Bayh-Dole that have not been adopted have been far more extensive.[370]

2. Broad Compulsory Licensing Should Not be Adopted

Although rarely used in the United States, a broad compulsory licensing requirement might allow for access to innovation-essential components of mobility, but it would raise serious concerns as to its effects on innovation incentives.[371] The Bayh-Dole Act allows the government to require a university "to grant a nonexclusive, partially exclusive, or exclusive license" on reasonable terms.[372] The government can exercise its march-in rights if necessary, for example, to ensure that an invention is "available to the public on reasonable

368. *Id.*

369. *See supra* Part II.D.3.

370. *See* Vertinsky, *supra* note 13, at 1998 (proposing "changes in the legal and regulatory framework . . . to support a new guardian-like role for universities").

371. *See* Andrew W. Torrance, *Patents to the Rescue - Disasters and Patent Law*, 10 DEPAUL J. HEALTH CARE L. 309, 336–40 (2007).

372. 35 U.S.C. § 203(a) (2018). Historically, the NIH had sometimes required universities to grant nonexclusive licenses. *See* Alessandra Colaianni & Robert Cook-Deegan, *Columbia University's Axel Patents: Technology Transfer and Implications for the Bayh-Dole Act*, 87 MILBANK Q. 683, 694 (2009) (describing how the NIH denied Columbia University's request to exclusively license foundational patents for methods of introducing genes for foreign proteins into cells).

terms" or "to alleviate health or safety needs."[373] An agency could determine that granting licenses to departing inventors would "better promote the policy and objectives" of the Act.[374] The government has not yet exercised march-in rights, however.[375] Since Bayh-Dole's enactment, only a few petitions asking that the government exercise its march-in rights have been filed.[376] All of the petitions were dismissed.[377] In light of the numerous administrative obstacles to government intervention, several scholars have proposed amending the Act to permit greater discretion in intervening.[378]

Numerous variations on standard compulsory licenses have been proposed. They range from "public" patents with zero royalties[379] to requiring universities to offer only nonexclusive licenses.[380] Recently,

373. 35 U.S.C. §§ 201(f), 203(a)(1)–(2) (2018).

374. 35 U.S.C. § 202(a)(ii), (c)(4) (2018) (noting that the government holds a nonexclusive license to practice inventions that are subject to the Act).

375. *See* Ayres & Ouellette, *supra* note 214, at 321; Michael S. Mireles, Jr., *States As Innovation System Laboratories: California, Patents, and Stem Cell Technology*, 28 CARDOZO L. REV. 1133, 1155 (2006); Rai & Eisenberg, *supra* note 198, at 294; Torrance, *supra* note 371, at 341; Ryan Whalen, *The Bayh--Dole Act & Public Rights in Federally Funded Inventions: Will the Agencies Ever Go Marching in?*, 109 NW. U. L. REV. 1083, 1099–1106 (2015).

376. *See* Ayres & Ouellette, *supra* note 214, at 321; Whalen, *supra* note 375, at 1099–1106.

377. *See* Mireles, *supra* note 375, at 1158–59.

378. *See, e.g.*, John H. Barton, *Emerging Patent Issues in Genomic Diagnostics*, 24 NATURE BIOTECH. 939, 941 (2006) (proposing that the NIH "impose on genetic research a self-denying injunction about patents that would effectively require licenses"); Rai & Eisenberg, *supra* note 198, at 310–13 (proposing an amendment to allow the government more discretion to ascertain whether federally-funded discoveries should become part of the public domain).

379. *See* Jorge L. Contreras, *Data Sharing, Latency Variables, and Science Commons*, 25 BERKELEY TECH. L.J. 1601, 1640–41 (2010) (proposing that university inventions should be considered part of the public domain); Kenney & Patton, *supra* note 8, at 1414 (proposing that university inventions should be within the public domain); Richard R. Nelson, *The Market Economy, and the Scientific Commons*, 33 RES. POL'Y 455, 469 (2004) (proposing an amendment to allow for the "widest possible use" of university inventions, that requires an "explicit rationale" for why an exclusive license is necessary for commercialization); Van Overwalle, *supra* note 355, at 237–38 (describing a system in which universities obtain "public" patents that "guarantee the unencumbered and free use of the knowledge patented," by ensuring the grant of licenses with zero royalty).

380. *See* Eisenberg, *supra* note 15, at 1690, 1724 (requiring universities to provide only nonexclusive licenses); Van Overwalle, *supra* note 355, at 237–38 (explaining that universities could "guarantee unlimited and free use of the patented technology," provided that improvements are shared and that licensees agree not to exclusively claim the essence of the invention or improvements); Kenney & Patton, *supra* note 8, at 1414 (proposing that universities be limited to offering nonexclusive licensing).

Ian Ayres and Lisa Larrimore Ouellette proposed a market-based test that would require universities to offer a nonexclusive patent license for "no more than the cost of patenting" before being permitted to offer an exclusive license.[381] If the university can find a company that agrees to commercialize the technology with a nonexclusive license, they propose that the university would be required to provide a nonexclusive license at no cost to any other interested firms.[382]

Although the market-based test might be useful in addressing some of the issues mentioned previously by providing departing inventors with access to their inventions, it raises several concerns. The proposal requires finding a firm willing to develop the invention on a nonexclusive basis.[383] The market-based test may also adversely impact innovation incentives because the proposed nominal fee would only cover the costs of patent acquisition by the university,[384] not the costs of research and development for that invention or countless others that were not successful. The Bayh-Dole Act itself recognizes the possibility of using patent income to support such "unsuccessful" inventions, stating that "the balance of any royalties or income earned by the contractor with respect to subject inventions . . . [will] be utilized for the support of scientific research or education."[385] Some scholars maintain, however, that the use of technology transfer as a way of funding research is "highly inefficient."[386]

There are additional challenges to implementing broad compulsory licensing proposals. Requiring a compulsory license might not always be advisable, such as if the inventors are acting contrary to the public interest. Moreover, a compulsory license that mandated the disclosure of proprietary data might rise to the level of a taking, which would require the payment of just compensation.[387] Perhaps the greatest concern, exclusivity may be necessary for firms to be willing to undertake the costs of commercializing certain types of technology, such as for pharmaceutical inventions. Imposing a mandatory requirement of nonexclusive licensing might frustrate the

381. Ayres & Ouellette, *supra* note 214, at 279–80, 323.

382. *Id.* at 279–80.

383. *Id.*

384. *Id.* at 279.

385. 35 U.S.C. § 202(c)(7)(C) (2018).

386. *See* Ayres & Ouellette, *supra* note 214, at 293; Lemley, *supra* note 109, at 620.

387. *See* Ruckelshaus v. Monsanto Co., 467 U.S. 986, 1003, 1005 (1984) (reasoning that Monsanto's "interest in its health, safety, and environmental data [is] cognizable as a trade secret property right" and discussing "several factors that should be taken into account when determining whether a governmental action" would constitute a taking).

settled expectations of prior licensees of the technology and the likelihood of commercialization.[388]

3. Problematic Proposals to Vest Ownership in Inventors

Some authors have suggested that academic inventors should have greater control over their inventions.[389] Unlike employees in industry, academic inventors typically direct their own research programs with little involvement from their university, so they tend to have a better understanding of the technology than their parent institutions.[390] University inventors may be well-situated to direct development of an invention, given their familiarity with the field and work with early-stage technology.[391] Providing inventors with greater influence over the licensing process could also decrease transaction costs by allowing inventors to retain control of development activity.[392] Inventors might be able to choose more efficient agents

388. *See* Ayres & Ouellette, *supra* note 214, at 322; Rai & Eisenberg, *supra* note 198, at 311 ("[A] subsequent exercise of march-in rights disturbs settled expectations of grantees and licensees that may underlie investments.").

389. *See generally* Kenney & Patton, *supra* note 8.

390. Jennifer Carter-Johnson, *Unveiling the Distinction Between the University and its Academic Researchers: Lessons for Patent Infringement and University Technology Transfer*, 12 VAND. J. ENT. & TECH. L. 473, 478–80 (2010) (describing how academic inventors typically have control over how to direct their research); Kenney & Patton, *supra* note 8, at 1413 (questioning the "assumption that university inventors are employees in the same way as corporate researchers are employees"); *see IP Policies FAQs*, WIPO, https://www.wipo.int/about-ip/en/universities_research/ip_policies/faqs/ (last visited Jan. 4, 2022) (describing international approaches for ownership of inventions that result from publicly-funded research, including the professor's privilege).

391. *See* Jennifer Carter-Johnson, *Beyond Einstein and Edison: Claiming Space for Non-Faculty Inventors in Technology Transfer*, 47 IND. L. REV. 645, 683–85 (2014) (describing the costs and benefits of "vesting full control and ownership . . . with the inventor"); James D. Clements, *Improving Bayh-Dole: A Case for Inventor Ownership of Federally Sponsored Research Patents*, 49 IDEA 469, 496–500 (2009) (proposing inventor ownership of patents resulting from federally-funded research); Kenney & Patton, *supra* note 8, at 1414–18 (comparing different university invention ownership regimes, and providing examples of inventor ownership); Sunil R. Kulkarni, *All Professors Create Equally: Why Faculty Should Have Complete Control Over the Intellectual Property Rights in Their Creations*, 47 HASTINGS L.J. 221, 232–33 (1995) (arguing that faculty should own intellectual property rights in their inventions).

392. *See* Carter-Johnson, *supra* note 391, at 683–84; Kenney & Patton, *supra* note 8, at 1414–18.

than university technology transfer offices, which are sometimes disorganized or ineffective.[393]

The American Association of University Professors (AAUP) has set forth guidelines that propose providing university inventors with greater control of inventions derived from university research.[394] The AAUP is a nonprofit association of academic professionals that seeks to "define fundamental professional values and standards for higher education." [395] The AAUP principles recognize the inventor's "fundamental rights to direct and control" issues related to "invention management, licensing, commercialization, dissemination and public use."[396] For disputes involving inventor rights, the principles instruct that any resolution should strive to provide the best outcome for the research, the inventors, the institution, and the public interest. [397]

Providing inventors with ownership over their inventions, as opposed to merely increased control, would likely create more problems than it would solve. The potential for conflicts of interest is vast. Overinvolvement in commercialization can distract university inventors from their responsibilities to their parent institutions, such as teaching, publishing, programmatic activities, service, and mentoring students. [398] If university inventors were granted sole ownership over their inventions, they might exploit university resources for commercial purposes unrelated to their academic position. For example, they alone could reap the financial rewards of inventions that benefit from the efforts of graduate students and other academic personnel. [399] Strong financial interests might sway

393. *See* Carter-Johnson, *supra* note 391, at 684; Kenney & Patton, *supra* note 8, at 1414–18; *see also* Robert E. Litan et al., *Commercializing University Innovations: Alternative Approaches*, 8 INNOVATION POL'Y & ECON. 31, 32 (2007) (arguing that technology transfer offices may be overlooking inventions that are less lucrative but still socially beneficial).

394. AM. ASS'N OF UNIV. PROFESSORS, RECOMMENDED PRINCIPLES TO GUIDE ACADEMY-INDUSTRY RELATIONSHIPS 8–9 (2014) [hereinafter AM. ASS'N OF UNIV. PROFESSORS, RECOMMENDED PRINCIPLES], https://www.aaup.org/sites/default/files/Academy-Industry%20Relationships_0.pdf [https://perma.cc/D9W9-47UH].

395. *About Us*, AM. ASS'N OF UNIV. PROFESSORS, https://www.aaup.org/about-aaup (last visited Oct. 8, 2021).

396. AM. ASS'N OF UNIV. PROFESSORS, RECOMMENDED PRINCIPLES, *supra* note 394, at 8.

397. *Id.* at 9.

398. *See* MARTIN KENNEY, BIOTECHNOLOGY: THE UNIVERSITY-INDUSTRIAL COMPLEX 120, 131 (1986); Lee, *supra* note 10, at 1564.

399. *See* KENNEY, *supra* note 398, at 120, 131; Estreicher & Yost, *supra* note 36, at 1082.

university inventors to report less than completely accurate results in describing their research.[400]

Vesting ownership in university inventors may impede commercialization. Academic inventors might exclusively license technology to a private company with which they have a prior relationship, even if other companies would be better at commercializing the invention or creating a larger social benefit.[401] University inventors might lack the experience or financial means to commercialize their inventions.[402] The skill set of a university inventor may not translate well into licensing the technology or becoming an entrepreneur.[403] Moreover, many inventions are jointly owned by multiple university inventors.[404] Commercializing inventions that are jointly owned usually entails higher transaction costs compared with having the university as the sole owner.[405] Universities should also be more likely than inventors to consider the

400. *See, e.g.*, Sara Reardon, *US Vaccine Researcher Sentenced to Prison for Fraud*, 523 NATURE 138 (2015), https://www.nature.com/news/us-vaccine-researcher-sentenced-to-prison-for-fraud-1.17660 (describing how university scientist falsified research results to obtain NIH grants); Eugenie Samuel Reich, *Biologist Spared Jail for Grant Fraud*, 474 NATURE 552 (2011), https://www.nature.com/articles/474552a (MIT professor "found to be solely responsible for more than 11 incidents of data fabrication in grant applications" worth over $2 million); Jeneen Interlandi, *An Unwelcome Discovery*, N.Y TIMES (Oct. 22, 2006), https://www.nytimes.com/2006/10/22/magazine/22sciencefraud.html (university researcher sentenced to prison for providing "fraudulent data in lectures and in published papers . . . to obtain millions of dollars in federal grants"); Gina Kolata, *Harvard Calls for Retraction of Dozens of Studies by Noted Cardiac Researcher*, N.Y. TIMES (Oct. 15, 2018) https://www.nytimes.com/2018/10/15/health/piero-anversa-fraud-retractions.html ("Brigham and Women's Hospital agreed to pay $10 million . . . to settle accusations that Dr. Anversa submitted fraudulent data to get research funding."); Keith J. Winstein & David Armstrong, *Top Pain Scientist Fabricated Data in Studies, Hospital Says*, WALL ST. J. (Mar. 11, 2009, 12:01 AM), https://www.wsj.com/articles/SB123672510903888207?mod=googlenews_wsj (stating that an academic researcher, who was a paid speaker for a pharmaceutical company, fabricated data on numerous painkillers).

401. *See* Estreicher & Yost, *supra* note 35, at 1100.

402. *Id.* at 1093.

403. *See id.* ("Individual faculty members . . . spend most of their time teaching, researching, and performing the creative work behind inventions, none of which would suggest any particular business acumen for negotiating a favorable deal."); Kenney & Patton, *supra* note 8, at 1419.

404. *See* Estreicher & Yost, *supra* note 35, at 1100 (explaining that "a patent having multiple inventors is becoming the norm"); Lemley, *supra* note 46, at 711.

405. *See* Estreicher & Yost, *supra* note 35, at 1100.

public interest in developing a technology, given their legislative, financial, and reputational foundations described previously.[406]

B. Conditions on Governmental Incentives are a Promising Alternative

Another promising option would be placing conditions on government incentive structures to encourage universities to support departing inventor involvement in development. Examples of government incentive structures include grants, tax credits, or deductions. Grants provide financial support for research and development in academic institutions.[407] The two main research and development disbursements in the Tax Code include a "credit for increasing research activities" as well as a deduction for research and experimental expenditures.[408]

Requiring compliance with conditions on incentives could encourage universities to allow inventors to use innovation-essential components even after they depart. For instance, government agencies could require universities to agree to adhere to reasonable licensing policies that allow for continued inventor use in project proposals or as a condition of obtaining funding or tax incentives, absent a showing of extraordinary circumstances.[409] Government agencies have evaluated project proposals in light of similar considerations, requesting applicants describe how a "transfer of knowledge" will occur and whether a project has "the potential to benefit society."[410] They have also placed similar conditions on obtaining funding, such as requiring conflict of interest policies.[411] Alternatively, agencies could allocate funding to encourage continuing

406. *See supra* Part II.D; Madey v. Duke Univ., 307 F.3d 1351, 1361–62 (Fed. Cir. 2002) (patentee-inventor Madey challenged Duke's reliance on the experimental use defense).

407. *See* Daniel J. Hemel & Lisa Larrimore Ouellette, *Beyond the Patent-Prizes Debate*, 92 TEX. L. REV. 303, 320–21 (2013).

408. Economic Recovery Tax Act of 1981, Pub. L. No. 97-34, §221(d), 95 Stat. 172, 247 (current version at I.R.C. § 41 (2018); Internal Revenue Code of 1954, ch. 736, 68A Stat. 66 (codified as amended at I.R.C. §174 (2018)); Hemel & Ouellette, *supra* note 407, at 322–23.

409. *See generally* Ayres & Ouellette, *supra* note 214, at 322 (proposing that agencies "could require universities to have socially responsible licensing policies" as a condition of obtaining funding).

410. *See* NAT'L SCI. FOUND., PROPOSAL AND AWARD POLICIES AND PROCEDURES GUIDE II-49, III-2 (June 1, 2020), https://www.nsf.gov/pubs/policydocs/pappg20_1/nsf20_1.pdf [https://perma.cc/6NXZ-DFNX].

411. *See id.* at IX-1.

involvement by academic inventors, regardless of whether they have left the grant recipient.[412]

To incentivize academic institutions to allow departing inventors access to innovation-essential components, a government grant or tax incentive would have to be sufficient to overcome market-based incentives and required conditions would need to be complied with and enforced. Compliance could be problematic. As an example, consider the NIH's issuance of non-binding best practices stating that recipients of grants related to certain types of technology should only be exclusively licensed if necessary to commercialize an invention.[413] Although a laudable goal, these discretionary guidelines tend not to be complied with by grant recipients.[414] Governmental actors may be subject to political pressures and inefficient management in allocating funding, requiring compliance, and enforcing conditions, although some of these risks could be minimized with clear guidelines and effective oversight.[415] Further, instituting and enforcing governmental incentives can be costly.[416] If the social benefits of ensuring tacit knowledge transfer are sufficiently important government objectives, however, providing incentives may be a worthwhile mechanism for encouraging universities to work with departing inventors. In addition, placing conditions on grants and tax incentives for university inventor involvement may be unnecessary, as not all inventions require the transfer of tacit knowledge for successful development and not all tacit knowledge transfer requires formal mechanisms.[417] However, the importance of tacit knowledge transfer is much more likely to be relevant for technology that draws upon the nascent research typical of university-based inventions, as

412. *See* Lee, *supra* note 10, at 1561 (describing how "these funds would support ongoing research and interactions between the academic inventor and the licensing entity").

413. Best Practices for the Licensing of Genomic Inventions: Final Notice, 70 Fed. Reg. 18,413, 18,413–15 (Apr. 11, 2005); Principles and Guidelines for Recipients of NIH Research Grants and Contracts on Obtaining and Disseminating Biomedical Research Resources: Final Notice, 64 Fed. Reg. 72,090, 72,095 (Dec. 23, 1999).

414. *See* Ayres & Ouellette, *supra* note 214, at 300; *see also* Rai & Eisenberg, *supra* note 198, at 306–10.

415. *See* Hemel & Ouellette, *supra* note 407, at 327 (suggesting that these possibilities "may explain why the social rate of return on R&D funded through government grants has been estimated to be lower than on private R&D").

416. *See id.* at 310–13, 349–50; Benjamin N. Roin, *Intellectual Property Versus Prizes: Reframing the Debate*, 81 U. CHI. L. REV. 999, 1001 (2014).

417. *See* Lee, *supra* note 10, at 1513; Ouellette & Weires, *supra* note 116, at 1359 ("Tacit knowledge transfer can also occur without any formal incentives or agreements.").

opposed to inventions in general.[418] Overall, even though placing conditions on governmental incentives is a worthwhile alternative to consider, compliance and enforcement may be difficult to achieve.

C. University-Based Approaches are Unlikely to Succeed

Although legislative and governmental approaches allow for greater consistency, they can be cumbersome to implement. Universities could simply decide to adopt nonbinding guidelines to address some of the concerns raised, although these measures are unlikely to be effective. Some have suggested that universities can "police each other" when one is straying from community norms of acting in the public's best interest.[419] AUTM could consider adopting guidelines stating that universities should ordinarily grant departing inventors a right to practice their inventions, or at least to be able to continue their research. Universities would retain the right to refuse the right to practice when doing so would undermine the public interest. Discretionary guidelines allow for the flexibility necessary to adapt to the underlying factual circumstances. Moreover, given the importance of increased collaboration across institutions in many fields, inter-institutional agreements might also be used to address some of the issues identified previously.

Many academic institutions have already adopted recommendations related to patent licensing and data sharing. AUTM has set forth guidelines that describe the importance of careful structuring of exclusive licensing.[420] These nonbinding recommendations with regard to exclusive licensing allow flexibility for different situations, as it may be unclear whether a particular licensing structure is most beneficial *ex ante*.[421] The National Research Council has also articulated guidelines to address disputes "between inventors and the technology transfer office with respect to the protection and commercialization of inventions."[422] These

418. *See* Jensen & Thursby, *supra* note 9, at 243; Ouellette & Weires, *supra* note 116, at 1355–56.

419. Vertinsky, *supra* note 13, at 1995.

420. CAL. INST. OF TECH: ET AL., *supra* note 18, at 2–4.

421. *See, e.g.*, Ayres & Ouellette, *supra* note 214, at 279–80, 323; Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 276 (1977).

422. MANAGING UNIVERSITY IP, *supra* note 9, at 5.

guidelines note the importance of including university inventors in the "development of technology transfer policies and procedures."[423]

In applying similar types of guidelines, universities have taken markedly different approaches. Some universities lean toward working with established companies to minimize risk and obtain a more immediate return.[424] Others have given preferential treatment in licensing to their inventors or have attempted to simplify licensing when university inventors want to startup a company to commercialize their inventions.[425] For example, Stanford often finds startups by inventors to be the "most appropriate licensee" and awards an exclusive license if requested.[426] MIT states that it may license inventors "consistent with the public interest" where they "demonstrate technical and financial capability to commercialize."[427] The University of Illinois notes that it has the discretion, "consistent with the public interest," to grant licenses exclusively or nonexclusively.[428] Similar to MIT, it requires that licensees show that they have both the "technical and business capacity to commercialize."[429] The University of Wisconsin is "eager" to provide assistance to faculty who wish to startup companies with technology

423. AUTM, TECHNOLOGY TRANSFER EVOLUTION: DRIVING ECONOMIC PROSPERITY 20 (Nov. 2017), https://autm.net/AUTM/media/About-Tech-Transfer/Documents/Technology_Transfer_Evolution_Driving_Economic_Prosperity_APLU_NOV2017.pdf [https://perma.cc/H8JN-S5Y3].

424. Scott Shane, *Executive Forum: University Technology Transfer to Entrepreneurial Companies*, 17 J. BUS. VENTURING 537, 542–43 (2002); Vertinsky, *supra* note 13, at 1995.

425. *See* Rosa Grimaldi et al., *30 Years After Bayh-Dole, Reassessing Academic Entrepreneurship*, 40 RES. POL'Y 1045, 1049 (2011) ("[S]ome universities have decided to provide preferential treatment to university-affiliated entrepreneurs wishing to license technologies they developed."); Ouellette & Weires, *supra* note 116, at 1343, 1360 ("Inventors may also receive preference in using the patent to create a start-up.").

426. STAN. UNIV. OFFICE OF TECH. LICENSING, START-UP GUIDE 17 (2016), https://otl.sites.stanford.edu/sites/g/files/sbiybj10286/f/otlstartupguide.pdf [https://perma.cc/EN3H-9PFS].

427. MASS. INST. OF TECH., MASSACHUSETTS INSTITUTE OF TECHNOLOGY POLICIES AND PROCEDURES § 13.1.2 (May 23, 2018), https://policies.mit.edu/policies-procedures/130-information-policies/131-intellectual-property [https://perma.cc/DML8-CR4N].

428. U. OF ILL., THE GENERAL RULES CONCERNING UNIVERSITY ORGANIZATION AND PROCEDURE 17 (rev. ed. Jan. 19, 2017), https://www.bot.uillinois.edu/UserFiles/Servers/Server_694865/File/General-Rules-1-19-2017.pdf [https://perma.cc/23P6-2SA6].

429. *Id.*

licensed from its TTO.[430] The University of North Carolina offers an express license agreement, which simplifies the licensing process when at "least one UNC faculty, student or staff is a company founder."[431]

A main drawback of non-binding recommendations is that they face compliance issues in practice. As previously discussed in the disputes over the Alzheimer's research program and the strawberry breeding program, universities may be less willing to work with departing inventors when their new venture will be in competition with the university or its other licensees, when the departing inventors are not acting in good faith, or when a large amount of grant money, contracts, data, or prestige is involved.[432] For example, even though 115 academic institutions have endorsed the AUTM's Nine Points to Consider, their compliance is far from certain.[433] Point Two, for example, encourages academic institutions to balance "a licensee's legitimate commercial needs against the university's goal (based on its educational and charitable mission and the public interest) of ensuring broad practical application of the fruits of its research programs," but it is not clear how closely universities follow these loosely-articulated principles.[434] Although the guideline proposed in this subsection specifically directs universities to consider the importance of inventor involvement in commercialization, specificity does not guarantee adherence. Ultimately, discretionary guidelines are unlikely to be sufficiently persuasive to overcome the financial incentives that have become so compelling for universities in recent years.[435]

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430. *See Patenting FAQs*, WIS. ALUMNI RSCH. FOUND., https://www.warf.org/for-uw-inventors/patenting-faqs/patenting-faqs.cmsx#startup [https://perma.cc/X5XE-43XC] (last visited Oct. 24, 2021).

431. UNIV. OF N.C., CAROLINA EXPRESS USER GUIDE 12 (2019), https://otc.unc.edu/files/2018/12/Carolina-Express-License-USER-GUIDE-2019-v3.pdf [https://perma.cc/V76J-QN6X].

432. *See supra* Part I.B.2.

433. CAL. INST. OF TECH. ET AL., *supra* note 18 (listing signatories).

434. *Id.*; *see* Vertinsky, *supra* note 13, at 2008 ("Despite the stated support for these guidelines, however, there is little evidence that informal measures such as these have been adequate to curtail universities' self-interested actions in the face of increasing competition for scarce resources.").

435. *See, e.g.*, Jay P. Kesan, *Transferring Innovation*, 77 FORDHAM L. REV. 2169, 2169 (2009) (concluding that "university technology transfer activities continue to be predominantly patent-centric and revenue-driven").

CONCLUSION

This Article has described the many challenges university inventors face when attempting to leave their parent institutions. It has set forth how innovation-essential components that are vital to the innovative process create strong ties that effectively inhibit university inventor mobility. Augmenting these obstacles to inventor mobility, universities have forged questionable arrangements with and brought suits against other academic institutions to prevent movement of university inventors.[436]

Restrictions on university inventor mobility are concerning. Academic inventors often gain specialized insights into their nascent inventions that are critical to commercialization, and excessive limitations on mobility may hamper the transfer of their tacit knowledge.[437] In addition, discrepancies between community norms, philosophical principles, and legal doctrine may appear to justify inventors' attempts to continue using their inventions, though that use is proscribed.[438] Even when supported by legal doctrine, far-reaching restrictions on inventor mobility may be at odds with the foundational objectives of universities. Examples from poaching among academic institutions to innovation in the strawberry industry underscore the implications of overbroad limits on inventor mobility.[439] Although no proposal for addressing these potential harms is ideal, the best options are amending the Bayh-Dole Act to provide a presumptive right to practice for university inventors on payment of a reasonable royalty or placing conditions on governmental incentive structures to encourage university inventor involvement in development.

436. *See generally* Seaman v. Duke Complaint, *supra* note 48.
437. *See* Jensen & Thursby, *supra* note 9.
438. *See supra* Part II.D.
439. *See supra* Part III.