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Intellectual Property Revenue Sharing as a Problem for University Technology Transfer

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INTELLECTUAL PROPERTY REVENUE SHARING AS A PROBLEM FOR UNIVERSITY TECHNOLOGY TRANSFER

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I. INTRODUCTION

The lone scientist, toiling away over a Bunsen burner at midnight or huddled in the corner of his garage with a few tools, has long held a place in the American psyche. As tempting as this noble image is, the truth is often much more mundane. Scientists typically work in groups, with ideas flowing among members of the group in an often

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unaccounted for manner, each idea building on the one before. Thus, inventions often have multiple inventors, each responsible for a minor aspect of the final invention.

This system of invention is the same model used in the laboratories of research universities, colleges, and non-profit research institutions[1] across the country. A faculty member, called a Principal Investigator (PI), leads a research team composed of a mix of research scientists, post-doctoral fellows, graduate students, and technicians. These research teams are responsible for thousands of new inventions across the country each year. In order to commercialize these inventions, universities often work with commercial entities to provide a means for the further development of the university inventions in a process called technology transfer.[2]

Technology transfer is a complicated dance involving numerous players and varied influences. Many universities have created technology-transfer offices (TTOs) tasked with choreographing and expediting this process. During the last three decades, technology transfer has become an economic powerhouse, and universities have become essential partners with industry, supplying innovative ideas and groundbreaking concepts—and often, patented inventions.[3] Technology transfer from 191 surveyed institutions produced 2.5 billion dollars in royalties from licensing academic research innovations in 2008, likely representing 50 to 70 billion dollars in sales of commercialized products.[4]

One of the most understudied aspects of the technology-transfer system is the interrelationship between the various inventors named on a patent application resulting from research conducted in these multi-player laboratories. In a previous paper, I discussed the negotiation power imbalance that exists between faculty and non-faculty inventors as a factor explaining why non-faculty inventors are not invested in the

1. For brevity, "university" as used in the remainder of this Article will include research colleges and non-profit research institutions.

2. For the purposes of this Article, "technology transfer" is the process by which innovations from university researchers are licensed or otherwise conveyed to entities that will eventually commercialize the innovation. The Association of University Technology Managers defines technology transfer as: "Technology transfer is the process of developing and commercializing scientific findings and fundamental discoveries into relevant applications." ASS'N OF UNIV. TECH. MANAGERS, AUTM U.S. LICENSING ACTIVITY SURVEY: FY2008 7 (Rich Kordal et al. eds., 2010) [hereinafter AUTM FY2008].

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

4. *See* AUTM FY2008, *supra* note 2, at 3, 8.

technology-transfer system.[5] That same negotiation power imbalance directly impacts agreements between faculty and non-faculty joint inventors as to how to divide patent royalties between them. One such royalty sharing agreement recently led to a lawsuit by a former Harvard graduate student based on accusations of fraud and coercion and well illustrates many of the problems.[6]

In June 2013, Dr. Mark Charest, a chemistry PhD student who graduated from Harvard in 2004, sued the university along with Andrew Myers, his PhD advisor.[7] The lawsuit arose due to the royalties associated with a patent covering a new synthetic method for producing 6-deoxytetracycline antibiotics.[8] This method became the basis for Charest's dissertation.[9] Additionally, in 2005 the Myers Lab published a paper in *Science* that described the method.[10] Charest was the first author listed on the paper.[11]

From those humble research lab inventions, the method became monetarily valuable.[12] As with all such research inventions, the method was assigned to the sponsoring university, in this case, Harvard.[13] From there, Harvard's Office of Technology Development (OTD) patented the method and sought to license it.[14] A company, Tetraphase Pharmaceuticals, was started to commercialize the work by licensing the tetracycline patent from the university.[15]

The distribution of royalties from the Tetraphase license led to the current dispute.[16] Harvard's policy requires the university to distribute royalties equally among all of the inventors on a patent unless the inventors agree to a different distribution.[17] Harvard's OTD asked Charest and his former labmates to voluntarily accept a distribution of 50% to Myers, 15% to Charest, 15% to Dionicio Siegel, 15% to Christian Lerner, and 5% to Jason Brubaker (the five co-authors of the

5. *See generally* Jennifer Carter-Johnson, *Beyond Einstein and Edison: Claiming Space for Non-Faculty Inventors in Technology Transfer*, 47 IND. L. REV. 645 (2014).

6. *See generally* Complaint, Charest v. President & Fellows of Harvard Coll. & Andrew G. Myers, 2016 WL 614368 (D. Mass. Feb. 16, 2016) (No. 1:13-cv-11556).

7. *Id.* at 1-4.

8. *Id.* at 4-5.

9. *Id.* at 5.

10. *Id.* at 4.

11. *Id.* at 5.

12. *Id.* at 7.

13. *Id.* at 5.

14. *Id.* at 5-7.

15. *Id.* at 7.

16. *Id.* at 8-9.

17. *Id.* at 8.

paper) rather than an equal split of 20% each.[18] The four non-faculty co-authors did not believe this to be an equitable split and agreed amongst themselves to a distribution of 18.75% to Charest, 11.25% to Siegel, 10% to Lerner, and 10% to Brubaker.[19] Myers refused to participate in the royalty negotiation and maintained that his 50% share was not open for discussion.[20]

Charest initially refused to accept the unequal distribution of the royalties.[21] When he began discussions with Harvard's OTD, Charest claimed that Harvard threatened to directly cut Charest's share of the royalties or to shift the distribution of licensing payments to a second patent on which Charest was not listed as an inventor.[22] In addition, Myers pressured Charest to accept the royalty distribution, using advice such as "tread lightly," "be careful," and "think about [your] career."[23]

In light of the pressure from Harvard and his PhD advisor, Charest signed an agreement to accept 18.75% of the royalties for the first patent.[24] The second patent never materialized, and Charest asserted in his complaint his belief that it was a ruse fabricated to force his hand to volunteer to let Myers get a 50% cut of the royalties.[25] Additionally, Myers refused to serve as a reference when Charest applied for a position after graduate school, going so far as to not return phone calls when a potential employer directly contacted Myers regarding Charest.[26]

The *Charest* case highlights important issues in royalty sharing agreements. First, faculty and students are likely to value their own individual contributions differently—and perhaps not based on inventorship definitions in patent law. Second, students are likely to capitulate to university and faculty demands (even if under protest) and wait until after graduation to bring any lawsuit. Such actions by students are highly indicative of the negotiation power imbalance between faculty and non-faculty inventors. This Article thoroughly discusses the issues that arise in technology transfer and invention disclosure. Even with these ever-present issues, universities should not ignore the revenue sharing requirements set forth in the Bayh-Dole Act and should implement a revenue sharing policy and an accompanying dispute

18. *Id.*
19. *Id.* at 9.
20. *Id.*
21. *Id.* at 10.
22. *Id.* at 10-11.
23. *Id.* at 10.
24. *Id.* at 12.
25. *Id.*
26. *Id.* at 10.

resolution policy in order to ensure that licensing revenues are shared equitably among the joint inventors.

This Article explores basic problems of the university technology-transfer process and its cumulative impact on revenue sharing and the technology-transfer process as a whole. Part II overviews university technology-transfer history and process, including a discussion of the history and purpose of the Bayh-Dole Act and the role of technology-transfer offices. Part III recounts the problems with incentivizing invention disclosure by university inventors as well as defining inventorship and ownership under patent law, along with the associated problems encountered by universities. Part IV discusses the Bayh-Dole revenue sharing requirements and explains that the problems encountered in Part III are similarly important in the revenue sharing context before discussing possible revenue sharing policies for universities.

II. UNIVERSITY TECHNOLOGY TRANSFER OVERVIEW

University scientific research spans the gamut from basic research[27] to applications of technology ready for commercialization. What ties much of this research together is a reliance on federal funding. The reliance on federal funding led Congress to be concerned that taxpayers were receiving fair returns on the research investments and to pass the Bayh-Dole Act, which governs the intellectual property rights of inventions created during the course of federally funded research. The history and purpose of the Bayh-Dole Act is discussed in more detail in Part II.A. The regulations and incentives of the Bayh-Dole Act in turn led universities to create technology-transfer offices to handle the intellectual property relating to those university inventions. Part II.B focuses on technology-transfer offices and their roles in technology transfer.

A. History of the Bayh-Dole Act

While patent rights generally exist to encourage invention and enable disclosure to the public,[28] before 1980, federally funded university research lacked the rewards for either inventors or universities. Many funding agencies assumed that ownership of such

27. As used in this Article, basic scientific research is that research designed to improve understanding of fundamental principles, relationships, and workings of the natural world. The main goal of basic scientific research is understanding, rather than the creation of a commercial product.

28. U.S. CONST. art. I, § 8, cl. 8.

innovations belonged with the funding agency itself,[29] due to a lack of uniform federal policy defining the ownership of innovations resulting from federally funded research.[30] Therefore, researchers using federal funds had no incentives to disclose created innovations other than in publications that resulted in the dedication of the inventions to the intellectual commons. Additionally, those inventions from basic research that were patented tended to be vastly under-utilized. Of the approximately 30,000 patents held by the United States Government, only five percent were licensed out to private industry.[31] One goal of the Bayh-Dole Act was to create incentives to drive the commercialization of academic innovations.[32]

The Bayh-Dole Act defines the uniform federal patent policy for agencies that fund university research. One stated policy of the Bayh-Dole Act is "to promote the utilization of inventions arising from federally supported research or development."[33] The Bayh-Dole Act accomplishes this policy, in part, by giving universities the option to take title to any invention created by federal funding[34] and to commercialize those inventions through licensing. This process incentivizes universities to commercialize inventions by allowing them to collect licensing revenues. Recognizing that inventors would need incentives to disclose their inventions to the universities, the Bayh-Dole Act also required universities to share a portion of that licensing revenue with the inventors.[35]

The passage of the Bayh-Dole Act in 1980 spurred acceleration of university technology transfer. In 1980, there were approximately two dozen technology-transfer offices (TTOs) at universities across the United States; today, technology transfer has grown such that almost

29. *See, e.g.*, Bhaven N. Sampat, *Patenting and US Academic Research in the 20th Century: The World Before and After Bayh-Dole*, 35 RES. POL'Y 772, 776-77 (2006).

30. John E. Tyler III, *Advancing University Innovation: More Must be Expected—More Must be Done*, 10 MINN. J.L. SCI. & TECH. 143, 146 (2009).

31. NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., MANAGING UNIVERSITY INTELLECTUAL PROPERTY IN THE PUBLIC INTEREST 16 (Stephen A. Merrill & Anne-Marie Mazza eds., 2011).

32. Bayh-Dole Act of 1980, Pub. L. No. 96-517, 94 Stat. 3015, 3019-29 (codified at 35 U.S.C. §§ 200-212). For a full description of the history leading up to the implementation of the Bayh-Dole Act, see Rebecca S. Eisenberg, *Public Research and Private Development: Patents and Technology Transfer in Government-Sponsored Research*, 82 VA. L. REV. 1663, 1671-95 (1996).

33. 35 U.S.C.A. § 200 (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

34. 35 U.S.C.A. § 202(a) (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

35. 35 U.S.C.A. § 202(c)(7)(B) (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

every major research institution has a TTO.[36] A 2009 Association of University Technology Managers survey of 179 technology-transfer offices reported 12,109 new patent applications were filed and over 5,300 licenses were granted.[37] Licensing revenues had grown to approximately 2.3 billion dollars in 2009, as compared to about 1 billion dollars of total licensing revenue in 2000.[38]

B. Role of the Technology-Transfer Office

The increased numbers of patent applications and licenses reported are due to the operation of the university technology-transfer process, which begins well before the TTO becomes involved. The technology-transfer process begins with invention in the university research laboratory. The large cast of the university research laboratory includes faculty researchers, termed "Principal Investigators" who lead the research group or laboratory, non-tenure track faculty research associates, post-doctoral fellows, graduate students, and technicians.[39] Project funding leads to inventions that the academic researchers, as the inventors, must disclose to the university's TTO. Generally, the inventor is required to fill out a disclosure form providing basic information about the invention, relevant funding, and inventor identification.[40]

Once the TTO receives the disclosure, it determines whether to patent and license the invention based on market analysis and patentability searches.[41] Upon determination that patent protection is appropriate, the TTO begins the patent prosecution process and attempts to license the invention. The TTO distributes revenues from the licenses back to the university to fund further research and support other university educational and administrative functions. Importantly, a

36. *See* Gideon D. Markman et al., *Entrepreneurship From the Ivory Tower: Do Incentive Systems Matter?*, 29 J. TECH. TRANSFER 353, 353 (2004).

37. *See* ASS'N OF UNIV. TECH. MANAGERS, AUTM U.S. LICENSING ACTIVITY SURVEY: FY2009 25, 34 (Rich Kordal et al. eds., 2010).

38. *Id*. at 37.

39. For a fuller description of the research laboratory, see 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).

40. There are two types of disclosure often mentioned in relation to university research: (1) disclosure by the inventor to the university and (2) disclosure by the university to the relevant governmental funding agency. For the purposes of this paper, "disclosure" will refer to disclosure by the inventor of an invention to the university TTO.

41. *See* AUTM FY2008, *supra* note 2, at 21 ("Once the technology transfer office receives the innovations in the form of disclosures, it assesses each disclosure for commercial potential, novelty, potential for startup opportunity, and pre-existing obligations.").

portion of the licensing revenue is distributed to the inventors as incentives to encourage invention and invention disclosure to the university.[42]

III. TECHNOLOGY TRANSFER PROBLEMS GENERALLY

At least three related problem points should be highlighted in the technology-transfer process. Invention disclosure is an important requirement in order to begin the process, but without university researcher support, no such disclosures occur. Once disclosed, university researchers must identify the inventors for patent procurement. Unfortunately, inventor identification is an area that is more difficult than it first appears. Finally, in order to distribute licensing revenue, the relative proportion of inventorship, a mutual agreement among the inventors, or some other method must be employed to determine revenue allocation among inventors. This allocation mechanism is a little researched area of technology-transfer, but is fraught with many of the same difficulties as the first two areas.

Therefore, in order to understand the issues raised by revenue allocation, it is also helpful to review the literature associated with the first two problems. Part III.A fully discusses the issues with incentivizing invention disclosure and outlines the incentives and disincentives of invention disclosure in Parts III.A.1 and III.A.2, respectively. Part III.B discusses the issues involved in defining inventorship, including a discussion of patent ownership and who an inventor actually is in Part III.B.1 and a discussion of inventorship issues specifically in the university setting in Part III.B.2.

A. Problem One: Incentivizing Invention Disclosure

Much has been written about inventor disclosure in the university technology-transfer process. The underlying basis of the university technology-transfer system relies on inventor researchers to disclose patentable and licensable innovations—otherwise the innovations are generally published in scientific journals and thus dedicated to the public domain. However, faculty support of the technology-transfer process has lagged behind university investment for myriad reasons.

42. The Bayh-Dole Act requires non-profit organizations such as universities to share with the inventors some portion of the royalties obtained by the licensing of federally funded inventions. 35 U.S.C. § 202 (c)(7)(B) requires that funding agreements include as provisions "a requirement that the contractor share royalties with the inventor." 35 U.S.C.A. § 202(c)(7)(B) (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

In support of the technology-transfer system, most university policies include a duty to disclose and to assign title to inventions, and universities require researchers to agree to these policies as a term of employment—including employment as student research assistants.[43] Non-employee researchers, such as graduate students and sometimes even undergraduate students, are generally subject to similar policies in which the university claims title to any inventions developed using university resources.[44]

Despite a contractual duty to disclose and the possibility of monetary revenue, as many as 50% of patentable innovations are not disclosed by researchers to their university's TTO.[45] Such disregard for the duty to disclose suggests an imbalance between incentives to disclose and other influences on researchers. The disclosure incentive is generally monetary—a slice of the licensing revenues, as is required by the Bayh-Dole Act for federally funded inventions.[46] On the other hand, incentives to ignore disclosure requirements are varied and include social norms, time-management issues, and a lack of education about the duty and the monetary incentives.

1. Disclosure Incentives

University intellectual property policies generally provide for

43. *See, e.g.*, *The University of Michigan Technology Transfer Policy*, THE UNIVERSITY OF MICHIGAN (June 1, 2009), http://www.techtransfer.umich.edu/resources/policies.php; James D. Clements, *Improving Bayh-Dole: A Case for Inventor Ownership of Federally Sponsored Research Patents*, 49 IDEA 469, 500-01 (2009).

44. There is debate as to the ability of the university to claim ownership of student-created inventions in certain contexts, such as inventions created during a class. This Article is limited to inventorship in the context of a university research laboratory, which typically means that the student is also acting, in many ways, as an employee of the university and using substantial university resources. For more information on the debate, see Sean B. Seymore, *My Patent, Your Patent, or Our Patent? Inventorship Disputes Within Academic Research Groups*, 16 ALB. L.J. SCI. & TECH. 125, 137 (2006); and Anthony J. Luppino, *Fixing a Hole: Eliminating Ownership Uncertainties to Facilitate University-Generated Innovation*, 78 UMKC L. REV. 367, 377-78, 383-84 (2009).

45. *See* Richard A. Jensen, Jerry G. Thursby & Marie C. Thursby, *Disclosure and Licensing of University Inventions: 'The Best We Can Do with the S**t We Get to Work With'*, 21 INT'L J. INDUS. ORG. 1271, 1272 (2003); 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 (ADVANCES IN THE STUDY OF ENTREPRENEURSHIP, INNOVATION, AND ECONOMIC GROWTH) 187, 189 (Gary D. Libecap ed., 2005) [hereinafter Thursby, *Pros and Cons*]; Albert N. Link, Donald S. Siegel & Barry Bozeman, *An Empirical Analysis of the Propensity of Academics to Engage in Informal University Technology Transfer*, 16 INDUS. & CORP. CHANGE 641, 642-43 (2007).

46. *See generally* 35 U.S.C.A. §§ 200-204 (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

inventors, both faculty and non-faculty, to receive a share of the licensing revenue derived from their invention as an incentive for disclosure. The average distribution of revenue to the inventors is a 40% share of the net licensing revenue.[47] However, the policies differ greatly on the percentage awarded to each party and whether those percentages are stable or variable according to the amount of licensing revenue generated by the invention.[48]

Some scholars have suggested that monetary incentives are less effective than other types of incentives in the academic research world. These scholars suggest that academic researchers are more interested in the secure employment of tenure, intellectual freedom, and recognition of their peers.[49] While these non-monetary goals and interests are dependent on grant funding for research and a stream of publications, they are not inconsistent with monetary incentives. Indeed, many scholars have used empirical methods to model the effect of incentivization of faculty researchers through share of licensing revenue. In general, these studies conclude that monetary incentives have at least some positive impact on disclosures.[50] However, some studies have shown little or no positive impact of revenue sharing with researchers. It is likely that faculty response to monetary incentives varies across institutions based on the strength of the competing disincentives to disclose.

47. Thursby, *Objectives*, *supra* note 3, at 61.

48. For a detailed description of two major university revenue sharing policies, see generally Carter-Johnson, *supra* note 5.

49. DANIEL S. GREENBERG, SCIENCE FOR SALE: THE PERILS, REWARDS AND DELUSIONS OF CAMPUS CAPITALISM 22-23 (2007). *See generally* Katherine J. Strandburg, *Curiosity-Driven Research and University Technology Transfer*, *in* 16 UNIVERSITY ENTREPRENEURSHIP AND TECHNOLOGY TRANSFER: PROCESS, DESIGN, AND INTELLECTUAL PROPERTY (ADVANCES IN THE STUDY OF ENTREPRENEURSHIP, INNOVATION, AND ECONOMIC GROWTH) 93, 99-104 (Gary D. Libecap ed., 2005).

50. *See, e.g.*, Donald S. Siegel, David Waldman & Albert Link, *Assessing the Impact of Organizational Practices on the Relative Productivity of University Technology Transfer Offices: An Exploratory Study*, 32 RES. POL'Y 27, 44-45 (2003); Joseph Friedman & Jonathan Silberman, *University Technology Transfer: Do Incentives, Management and Location Matter?*, 28 J. TECH. TRANSFER 17, 29 (2003) (showing a positive but weak correlation of license revenue share incentives to faculty researchers with the number of licenses executed, and a strong correlation with license income. This discrepancy may be due to a skewing of the data by one or more "blockbuster" inventions or could also be due to limits on TTO resources to execute more licenses.); Albert N. Link & Donald S. Siegel, *Generating Science-Based Growth: An Economic Analysis of the Impact of Organizational Incentives on University-Industry Technology Transfer*, 11 EUR. J. FIN. 169, 179 (2005); Thursby, *Pros and Cons*, *supra* note 45, at 192; Saul Lach & Mark Schankerman, *Incentives and Invention in Universities*, 39 RAND J. ECON. 403, 404 (2008) (showing that license revenue sharing with scientists strongly affects licensing outcomes).

2. Disincentives to Disclosure

Arrayed against these monetary incentives to disclose are a number of pressures inherent in the academic research environment. Social norms, lack of education, and a perception that time is better spent elsewhere all work together to offset the potential monetary incentive to disclose.[51]

University scientists work in a community that was built on the free sharing of ideas through publications, conferences, and open discussion. The social norms surrounding this community have made it difficult to convince university scientists that participating in the technology-transfer process is valuable as many of these norms conflict with technology transfer.[52] For example, patents result in exclusivity rights which restrict use of an invention. Publication may also be delayed to file a patent. While current U.S. patent law allows a one year grace period after research publication but before patent application,[53] the patent laws of many other countries have an absolute publication bar upon any publication of the innovation before the patent application.[54] Therefore, academic researchers may fear that disclosure of innovations to the university TTO will result in requirements to delay publication or conference presentations so that patent applications can be timely filed.[55]

Additionally, scientists often lack education about patent law and

51. For a full discussion of the disincentives to disclose, see generally Carter-Johnson, *supra* note 5.

52. *See, e.g.*, Thursby, *Pros and Cons*, *supra* note 45, at 189 ("[S]ome faculty may refuse to disclose for 'philosophical' reasons related to their notions of the proper role of academic scientists and engineers."); Arti Kaur Rai, *Regulating Scientific Research: Rights and the Norms of Science in Biotechnology Research*, 94 NW. U. L. REV. 77 (1999) (discussing changes in scientific norms within the biotechnology research community); Arti K. Rai & Rebecca S. Eisenberg, *Bayh-Dole Reform and the Progress of Biomedicine*, 66 LAW & CONTEMP. PROBS. 289, 289-90 (2003) (discussing the erosion of 'open science' norms resulting at least in part from the encouragement of university patenting of basic biomedical research). For a comprehensive discussion of the debate over the existence and effects on scientific norms on technology transfer, see generally Charles R. McManis & Sucheol Noh, *The Impact of the Bayh-Dole Act on Genetic Research and Development: Evaluating the Arguments and Empirical Research to Date*, *in* PERSPECTIVES ON COMMERCIALIZING INNOVATION (F. Scott Kieff & Troy A. Paredes eds., 2012).

53. 35 U.S.C.A. § 102(b)(1) (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

54. *See generally Certain Aspects of National/Regional Patent Laws: Grace Period*, WIPO (Nov. 2015), http://www.wipo.int/export/sites/www/scp/en/national_laws/grace_period.pdf (describing grace periods for publication, or the lack of the same, in Europe and other countries).

55. *See, e.g.*, *Intellectual Property Policy*, WASHINGTON UNIVERSITY IN ST. LOUIS, (Oct. 1, 2014), https://wustl.edu/about/compliance-policies/intellectual-property-research-policies/intellectual-property/ ("The publication of research results must not be hampered by agreements made to commercialize intellectual property. However, a minimal and defined delay to protect intellectual property through patent applications may be included.").

technology transfer generally. Scientists may lack knowledge about the legal definition of an invention or inventorship as well the steps required to disclose an invention to the TTO. Academic researchers do not instinctively understand when a patentable invention has been created or even recognize the existence of the duty to disclose an invention. To the extent that the time pressures discussed below exist, academic researchers are unlikely to find time to educate themselves if they lack an underlying understanding of the importance of technology transfer.

Finally, aside from social norms and technology-transfer education, the simple balancing of the time investment necessary for disclosure and the expectations of recoupment may weigh against disclosure. For many academic researchers, this balancing of time commitments may weigh strongly in favor of failing to disclose. Once a faculty researcher creates a new technology, she must determine the best use of the technology and her time in order to continue to receive more funding and job stability such as tenure. Monetary gain in the distant future may not outweigh a publication or further grant writing.[56] Similarly, post-doctoral researchers and graduate students must make a trade-off between publication and its concomitant career advancement and the time needed for disclosure.[57]

B. Problem Two: Determining Inventorship

Once the university researchers have made the decision to disclose, the next hurdle in the technology-transfer process is to determine who should be a named inventor on the patent. As noted above, lack of education in this process may indeed be a disincentive for disclosure in the first place. Perhaps more importantly, lack of education combined with inherent biases in the research community may result in the omission of inventors from a patent application.

1. Defining Inventorship

To understand the problems with invention determination in the university technology-transfer process, it is important to understand inventorship and the underlying patent laws. Under U.S. patent law,

56. Daniel W. Elfenbein, *Publications, Patents, and the Market for University Inventions*, 63 J. ECON. BEHAV. & ORG. 688, 689 (2007); Jensen, Thursby & Thursby, *supra* note 45, at 1272.

57. For a full discussion of why non-faculty researchers are unlikely to be incentivized by the technology-transfer system and suggestions to include them in the process, see generally Carter-Johnson, *supra* note 5 and Luppino, *supra* note 44.

ownership of a patent initially vests in the inventor.[58] The Federal Circuit has used strong language to make that point, holding that by default, "an invention presumptively belongs to its creator"[59] and that inventor ownership is a "bedrock tenet of patent law."[60] Therefore, the naming of the inventor on a patent defines ownership of the patent as well as who needs to transfer the rights of the patented technologies to the university for licensing.[61]

In *Ethicon, Inc. v. U.S. Surgical Corp.*, the Federal Circuit explained that conception of the invention is what determines inventorship.[62] The Federal Circuit held that "[c]onception is the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice."[63]

Conception does not need to be one person, but rather, multiple people can qualify as inventor. Joint inventorship has been defined as "the product of a collaboration between two or more persons working together to solve the problem addressed."[64] However, it is not always easy to determine if two researchers are joint inventors. Multiple researchers can be joint inventors on a patent even if "(1) they did not physically work together or at the same time, (2) each did not make the same type or amount of contribution, or (3) each did not make a contribution to the subject matter of every claim of the patent."[65] Each person only has to perform "part of the task which produces the invention,"[66] but one cannot be considered a joint inventor if they

58. 35 U.S.C.A. § 101 (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016). *See generally* DONALD S. CHISUM, CHISUM ON PATENTS § 2.01 (1978).

59. Teets v. Chromalloy Gas Turbine Corp., 83 F.3d 403, 407 (Fed. Cir. 1996).

60. Isr. Bio-Eng'g Project v. Amgen, Inc., 475 F.3d 1256, 1263 (Fed. Cir. 2007).

61. Previously only the inventor could file a patent application. However, section 4 of the America Invents Act provides that applications filed after September 16, 2012 may be filed by the inventor, the inventor's assignee, or anyone to whom the inventor is obliged to assign the patent, even if the assignment has not yet been executed. Donald S. Chisum, *America Invents Act of 2011: Analysis and Cross-References*, CHISUM PATENT ACADEMY 41-42 (Dec. 5, 2011), *available at* www.chisum.com/wp-content/uploads/AIAOverview.pdf. For an overview of problems in conception and inventorship, see Aaron X. Fellmeth, Conception and Misconception in Joint Inventorship, 2 N.Y.U. J. INTELL. PROP. & ENT. L. 73 (2012).

62. 135 F.3d 1456, 1548 (Fed. Cir. 1998).

63. Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986) (internal quotation marks omitted); Burroughs Wellcome Co. v. Barr Labs., Inc., 40 F.3d. 1223, 1227-28 (Fed. Cir. 1994) ("Conception is the touchstone of inventorship . . . .").

64. *Burroughs Wellcome*, 40 F.3d. at 1227.

65. 35 U.S.C.A. § 116(a) (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

66. *Ethicon*, 135 F.3d at 1460.

merely assisted the inventor after conception or provided the inventor with basic principles and explanations of the art.[67]

A patent usually contains multiple claims, each relating to a different aspect of the invention. Therefore, a patented invention can be, and often is, attributed to several inventors, each of which must have contributed conceptually to at least one of the claims in the patent.[68] Additionally, since the conceived invention changes over time, initial conception is often not an indication of all of the inventors.[69]

Failure to denote an inventor can be quite serious, though recent changes have made omissions less problematic. Before the passing of § 256 of the Patent Act in 1952, all errors regarding the addition or removal of an inventor caused the patent to be invalid.[70] Passage of § 256 allowed for changes to the listed inventors.[71] Under § 256, removing an inventor from an issued patent could be accomplished with no regard as to how that person became named in the first place.[72] However, to add an inventor to an issued patent, no deceptive intent on the part of the non-named inventor was allowed.[73] Most recently, the passage of the America Invents Act (AIA) significantly altered the language of § 256.[74] The requirement that the error arise without deceptive intent was removed.[75] This strongly increases the rights of patentees because they

67. Sewall v. Walters, 21 F.3d 411, 415-16 (Fed. Cir. 1994); Hess v. Advanced Cardiovascular Sys. Inc., 106 F.3d 976, 981 (Fed. Cir. 1997).

68. *See* 35 U.S.C.A. § 116(a) (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016); *Ethicon*, 135 F.3d at 1548 ("[E]ach joint inventor must generally contribute to the conception of the invention.").

69. For a full discussion of how to determine patent inventorship, see generally Christopher McDavid, *I Want a Piece of That! How the Current Joint Inventorship Laws Deal with Minor Contributions to Inventions*, 115 PENN ST. L. REV. 449 (2010).

70. Iowa State Univ. Research Found., Inc., v. Sperry Rand Corp., 444 F.2d 406, 408 (4th Cir. 1971).

71. Patent Act of 1952, Pub. L. No. 593, § 256, 66 Stat. 792, 810 (1952) (codified at 35 U.S.C. § 256).

72. Patent Act of 1952 § 256.

73. The actual language of § 256 makes this clear:

> Whenever through error a person is named in an issued patent as the inventor, or through error an inventor is not named in an issued patent and such error arose *without any deceptive intention* on his part, the Director may, on application of all the parties and assignees, with proof of the facts and such other requirements as may be imposed, issued a certificate correcting such error.

Patent Act of 1952 of § 256 (emphasis added).

74. Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 20, 125 Stat. 284, 334 (2011) (codified at 35 U.S.C. § 256); *Manual of Patent Examining Procedure § 1481.02: Correction of Named Inventor*, THE UNITED STATES PATENT AND TRADEMARK OFFICE, *available at* http://www.uspto.gov/web/offices/pac/mpep/s1481.html.

75. 35 U.S.C.A § 256 (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

no longer have to defend accusations of deceptive behavior when attempting to cure the inventorship defects in a patent.

2. Importance of Inventorship to Universities

While ownership of a patent initially vests with an inventor or joint inventors, the Bayh-Dole Act gives universities the right to "elect to retain title to any subject invention."[76] Until recently, many assumed that this provision implied automatic vesting of ownership of federally funded inventions to the university rather than through assignment by the inventor.[77] This assumption was rejected recently in *Stanford v. Roche*.[78]

In *Roche*, Mark Holodniy, hired as a research fellow at Stanford University, had signed Stanford's "Copyright and Patent Agreement" obligating him to assign any inventions and related intellectual property to Stanford University.[79] He later signed a "Visitor's Confidentiality Agreement" with Cetus [Roche] that provided that Holodniy "do[es] hereby assign to Cetus" the "right, title and interest in each of the ideas, inventions and improvements" that he developed during his work at Cetus—including the PCR-based HIV detection assay he later developed.[80]

Years later, Stanford sued Roche for patent infringement based on the Holodniy patents.[81] Roche countered that Stanford did not own the patents because Holodniy's Visitor's Confidentiality Agreement contained an assignment of the PCR-based invention because the assay was based on technology that Holodniy learned while at Cetus.[82] The Federal Circuit agreed with Roche, noting that Stanford's prior Copyright and Patent Agreement merely held a contractual obligation to assign rather than an actual assignment.[83] Holodniy may have breached

76. 35 U.S.C.A. § 202(a) (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

77. *See, e.g.*, Friedman & Silberman, *supra* note 50, at 18 ("The Bayh-Dole act requires university's faculty members, students or staff members who recognize or discover a new technology or invention that has commercialization potential to disclose the invention to their institution's Technology Transfer Office (TTO).").

78. Bd. of Tr. of the Leland Stanford Junior Univ. v. Roche Molecular Sys., Inc., 131 S. Ct. 2188, 2199 (2011).

79. *Id*. at 2192.

80. *Id*. (internal quotation marks omitted).

81. *Id*. at 2193.

82. *Id*.

83. *See* Bd. of Tr. of the Leland Stanford Junior Univ. v. Roche Molecular Sys., Inc., 583 F.3d 832, 841-42 (Fed. Cir. 2009). This issue was not reviewed by the Supreme Court. *See Leland Stanford*, 131 S. Ct. at 2194.

his contractual obligation to Stanford, but the first assignment of the technology went to Cetus. The Supreme Court held that the source of funding did not affect ownership of the resulting patent and that even though the PCR assay was developed with federal funding under the Bayh-Dole Act, ownership rights continued to vest initially with the inventor.[84] Therefore, because Holodniy first assigned his patent rights to Cetus, he had no rights left to assign to Stanford. As a result of this holding, universities must acquire a valid patent assignment agreement in order to have the authority to transfer ownership rights.

In light of the *Roche* decision, patent rights initially vest in inventors—even those using federal funds to invent. Therefore, universities must rely on inventors to assign patent applications and assignments. Without inventor cooperation, the university cannot procure the needed patents or oversee the licensing of technologies created within its walls.[85]

It can be difficult for a scientific researcher to determine who should be included as an inventor. Problems in the technology-transfer process may arise due to ambiguities in inventorship. Due to the definition of inventorship and the complexities of the modern university research environment, inventions often include conceptual and creative contributions by many people building on an initial idea. Unfortunately, universities often leave the determination of inventorship, especially during the disclosure stage, to the researchers themselves. Because these researchers lack patent law training, their designation of joint inventors may be legally incorrect, resulting in improper patent prosecution and assignments. If the TTO fails to list a joint inventor on a patent and get an assignment, that joint inventor may later sue to claim her patent rights and potentially license those rights in competition with the university.

Problems associated with the failure to list an inventor can be exacerbated because it is not uncommon for faculty researchers to deny that non-faculty members, particularly graduate and undergraduate students, are inventors. Some faculty researchers have blatantly made declarations to the United States Patent and Trademark Office declaring themselves the sole inventor despite several graduate student and post-doctoral researcher co-authors on the very papers at the base of the innovation[86] or declaring that all innovative work in the lab came from

84. *Leland Stanford*, 131 S. Ct. at 2195-99.

85. 35 U.S.C.A. §§ 202(a), 202(c) (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

86. *See* Chou v. Univ. of Chi., 254 F.3d 1347, 1353 (Fed. Cir. 2001); Seymore, *supra* note 44, at 147.

faculty.[87] Even legal scholars look to faculty inventors suggesting that the requirement that graduate students have faculty advisors for research topics implies a lack of conceptual creativity on the part of those students.[88]

This attitude of many faculty inventors causes real problems. For example in *Chou v. University of Chicago*, Joany Chou's faculty advisor failed to name her as an inventor on a patent and fired her when she pressed her claim for inventorship.[89] After leaving the laboratory, Dr. Chou sued her faculty advisor, the University of Chicago, and ARCH Development Corporation, the University of Chicago's licensing arm, for correction of inventorship in order to have her name added to the patent as a joint inventor so that she could receive a portion of the licensing revenue.[90] On appeal, the Federal Circuit held that Dr. Roizman had a fiduciary duty to his student with regards to giving her credit as joint inventor on the patent application.[91]

These sorts of problems between faculty and non-faculty inventors can be viewed as power imbalances that affect the ability of the non-faculty inventor to negotiate inventorship credit and a share of the licensing revenue.[92] In negotiations between faculty researchers and those non-faculty researchers working in their laboratories, this power imbalance is often exacerbated. More so than in many employment situations, the faculty researcher holds a great deal of power over the future career prospects of post-doctoral fellows and students in their laboratories. Due to the apprentice-like structure of graduate science programs, the faculty member controls degree prospects of students and publishing abilities of both students and post-doctoral fellows. For the non-faculty researcher, this relationship makes bargaining for inventorship credit and splits of revenue problematic as the faulty member has a great amount of perceived power over the non-faculty researcher. This extreme perceived power imbalance may result in the

87. CORYNNE MCSHERRY, WHO OWNS ACADEMIC WORK? BATTLING FOR CONTROL OF INTELLECTUAL PROPERTY 183 (2001) (quoting a faculty researcher describing inventorship in his laboratory: "I think there's rarely more than one inventor . . . if you wake up and you have an idea, that's the invention . . . . The postdoctoral researchers contributed to the work [around the idea], but they didn't do any really innovative work such as contributing new concepts, [or] coming up with something that, in my lab, I haven't thought about.").

88. *See, e.g.*, Clements, *supra* note 43, at 497 (suggesting that graduate students need receive no incentives to invent beyond their yearly stipend, perhaps due to the idea that faculty members are the true inventors within the laboratory).

89. 254 F.3d at 1353-54.

90. *Id.* at 1354.

91. *Id.* at 1362-63.

92. Carter-Johnson, *supra* note 5, at 676.

avoidance of conflict and lack of disclosure by non-faculty researchers.[93]

IV. REVENUE SHARING ALLOCATIONS IN UNIVERSITIES

Once an invention is disclosed to a university, the inventorship issues are resolved, and a patent is issued to the university, the invention may be licensed for commercialization. Revenue from licensing the patent must be shared with the inventors in order to comply with the Bayh-Dole Act. In order to distribute licensing revenue, the relative proportion of inventorship, a mutual agreement among the inventors, or some other method must be employed to determine revenue allocation among inventors. This allocation mechanism is a little-researched area of technology transfer. Part IV.A reviews the revenue sharing requirements of the Bayh-Dole Act and how the competing interests of inventors can affect the revenue sharing. Finally, Part IV.B suggests revenue sharing policies that universities can implement in an attempt to curb revenue sharing issues among inventors.

A. Problem Three: Determining Revenue Sharing Allocations

After disclosure and licensing, fortunate universities and inventors will receive revenue based on the patented inventions. These revenues are shared amongst all named inventors on the patent due to Bayh-Dole Act requirements. However, the Bayh-Dole Act does not specify how to allocate the revenues between joint inventors. Technology-transfer policies and negotiations between joint inventors determine the allocation but raise many of the same issues seen with disclosure and inventorship determinations discussed above.

1. Revenue Sharing Requirements

As described above, the Bayh-Dole Act requires universities to share proceeds from the licensing of patents with the inventor.[94] However, neither the Bayh-Dole Act nor its implementing regulations define how such revenue must be shared with any given inventor even though the Code of Federal Regulations specifically recognizes that co-inventors exist by including reference to federal employee co-inventors in the revenue sharing requirements.[95] Since many university patents

93. *Id.*

94. 35 U.S.C.A. § 202(c)(7)(B) (West, Westlaw through P.L. 114-114 (excluding P.L. 114-92, 114-94, and 114-113) 2016).

95. 37 C.F.R. § 401.14(k)(2) (2016) states that "[t]he contractor will share royalties collected

have multiple named joint inventors, this revenue sharing requirement necessitates that the university and/or inventors determine an allocation mechanism for revenue amongst multiple competing interests.

University technology-transfer policies typically set out the portion of the revenue for the inventors as a group.[96] These policies may also set out the mechanism for revenue allocation amongst the inventors. For example, from our *Charest* example in the Introduction,[97] Harvard's policy required all joint inventors to agree to a revenue sharing agreement or default to an equal division of the royalties.[98]

As in *Charest*, problems may arise when universities ignore the stated policy. For instance, both Harvard and the Principal Investigator (PI) believed that the PI should have 50% of the royalties leaving the other four non-faculty joint inventors to share the remaining 50%.[99] When Charest disagreed, preferring the default 20% division, Harvard stepped in and pushed for the agreement in spite of its policy to the contrary.[100]

Thus, university technology-transfer policies, while almost completely discretionary, need to be a statement of the true university policy. These policies should address the competing interests of the various parties to the technology-transfer process, recognizing that all inventors are not a monolithic group.[101]

2. Competing Interests and Attitudes

To understand the best way to allocate revenue among joint inventors, it is important to understand the attitudes and interests of the various parties. Joint inventors may be any combination of laboratory members described above—faculty members, graduate students, post-doctoral fellows, to name a few. Many of the issues described in the technology-transfer problem points above also permeate the discussion of revenue allocation.

The monetary incentives geared toward disclosure are more immediate when discussing revenue allocation. An individual inventor

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on a subject invention with the inventor, including Federal employee co-inventors" (emphasis added) but does not specify how those royalties should be divided.

96. Thursby, *Objectives*, *supra* note 3, at 61.

97. *See supra* notes 6-26 and accompanying text.

98. Complaint at 8, Charest v. President & Fellows of Harvard Coll. & Andrew G. Myers, 2016 WL 614368 (D. Mass. Feb. 16, 2016) (No. 1:13-cv-11556).

99. *Id.* at 8-9.

100. *Id.*

101. Carter-Johnson, *supra* note 5, at 670.

trying to determine her fair revenue allocation based upon her contribution would likely have immediate monetary incentive to assess her contribution. However, as in the disclosure context, the monetary incentives may not offset other pressures on an individual to minimize her contribution.

For example, a graduate student who is a joint inventor with her PI is likely to face several pressures to minimize her revenue allocation similar to the battles fought for recognition of inventor status. Unlike inventorship, there are no legal rules requiring any particular revenue allocation for a named inventor. Fairness and equity are the best arguments for sharing revenue above a minimum amount.

Unfortunately, equitable distribution may be a difficult argument if the faculty inventor has trouble believing the graduate student is a joint inventor. As discussed above, university researchers are not educated as to the rules concerning inventorship. This lack of education may result in overestimation of some contributions to the invention with concomitant underestimation of other contributions. Due to a lack of education, these mis-estimations are likely exacerbated by claim amendments during prosecution that narrow the scope of the disclosed invention. Additionally, many faculty members may have a hard time believing that graduate students contribute inventive ideas. This attitude further diminishes any estimated allocation due to the graduate student.

Negotiating a revenue allocation under those circumstances can be quite difficult when views of contribution are not matched. Making the revenue allocation agreement more difficult is the negotiation power imbalance that exists between the faculty and non-faculty inventors.[102] Even an immediate monetary incentive is unlikely to overcome a graduate student's reluctance to anger her PI when project assignments and future recommendations are more valuable in the long term.

With these competing interests and power imbalances in mind, universities must determine how to equitably define a distribution of revenue amongst the joint inventors. However, due to the lack of guidance from the Bayh-Dole Act, the definition of equitable could have different meanings to each university.

B. Defining an "Equitable" Revenue Distribution

To be clear, neither the Bayh-Dole Act nor the CFR requires an "equitable" sharing among joint inventors, merely that the revenue be

102. *Id.* at 676.

shared with them. It might be argued that a token amount of money could be given to a joint inventor, but this would seem to call into question the spirit of the statutory requirement, if not the specific language. More problematically, there could well be different views as to what constitutes an equitable revenue distribution among joint inventors. University policies could differ widely and still be considered equitable based on a number of factors.

The first potential revenue distribution policy would be to share the inventor portion of the revenue equally amongst all named joint inventors on a patent. Such a policy mirrors aligning the revenue sharing with the initial patent ownership since all joint inventors are considered to be equal owners of the patent. However, an equal revenue sharing policy does not reflect the underlying work that goes into inventorship. To be a joint inventor, and thus joint owner of a patent, one must contribute to at least one claim of a patent. Under an equal sharing policy, a joint inventor might then contribute a minor component of the invention but receive as much money from the patent licensing as the main invention developer. Additionally, the revenue sharing policy of the Bayh-Dole Act has been theorized to be about invention disclosure rather than pure compensation for assignment of the patent ownership.[103] University employees are required to assign patent rights as part of their terms of employment; therefore, the necessity of paying each joint inventor equally to compensate for ownership rights is abrogated.

A second distribution sharing policy for revenue distribution would be based on inventive input. Under an inventive input policy, university TTOs or joint inventors would determine how much each inventor contributed to the final invention and distribute revenue based on that contribution. This policy reflects the work that each inventor contributes and ignores the equal ownership issues described above. Difficulties may arise under this policy due to a lack of understanding regarding what an inventive step actually entails as described above. Additionally, conception does not equate to the amount of hands on work that an individual may have contributed to the project resulting in the invention—making understanding of the revenue distribution harder for the joint inventors to understand. Furthermore, due to the nature of the patent prosecution process, patent application amendments may change the relative inventive input over the course of the application process. A

103. *See, e.g.*, Martin Kenney & Donald Patton, *Reconsidering the Bayh-Dole Act and the Current University Invention Ownership Model*, 38 RES. POL'Y 1407, 1413 (2009) ("The literature suggests that the best way to encourage disclosure on the part of university employees is to increase their share of the invention's income.").

joint inventor at disclosure may no longer be a named inventor once the patent issues if her contribution is deemed unpatentable. These difficulties can be alleviated with an increased emphasis on education by the TTO.

A third revenue distribution policy would be for the joint inventors to decide the split amongst themselves. The advantage of this policy is that it allows the inventors the autonomy to determine what they believe to be an equitable distribution. However, this autonomy is also the failing of this policy. As noted above, the lack of education as to what is an inventive contribution will be exacerbated by the negotiation power imbalance inherent in the laboratory structure. Additionally, the problems associated with the second policy will also exist but without an incentive for the TTO to lead an educational effort.

A final major revenue distribution policy option would be to give a set minimum percentage to the PI of the laboratory when she is an inventor in recognition of the underlying contribution that the PI makes to all work that occurs in the laboratory. A university could well decide that the PI should receive a minimum of a fifty percent revenue share because the PI leads the funding efforts of the laboratory as well as the mentorship of members of the laboratory. This approach recognizes that one of the underlying motivations for the revenue sharing provision is disclosure. Having a PI who is invested in the technology-transfer system increases the odds of disclosure over the long term because the other members of the laboratory are likely to leave the university after a few years. However, if the invention is developed primarily by other members of the laboratory, those members are likely to feel the revenue sharing is not entirely equitable.

Therefore, this approach would require extensive initial amounts of education by the TTO to explain why the PI received a large automatic share. The policy would also need to be supplemented by a secondary policy as described above in order to determine how the remaining revenue should be distributed. However, allocating a large share directly to the PI may result in less pressure by the PI on the other joint inventors during negotiations as the PI will have received her (perceived earned) large share. This policy may reflect ownership or inventorship in the secondary policy depending on the university's decisions.

There are numerous variations on these basic revenue distribution policies. The timing of the joint inventor determination may be made at various points in the process from disclosure to licensing to patent issuance. The entity making the determination of inventorship percentage could be joint inventors, the TTO, an independent patent

attorney or a separate standing committee. The university might also give weight to license agreement in determining the revenue distribution amongst joint inventors. If a relatively minor portion of the invention is the driving force behind a license negotiation, that inventor could receive a relatively larger portion of the proceeds than the base policy might allow. Each of these variations will have benefits and drawbacks that each university will have to weigh in light of its own process. These policies do generally require significant input from the TTO.

Additionally, each of these policies may result in the joint inventors disagreeing with the revenue allocation outcome. Some policies may result from disagreement amongst inventors while others may result from an inventor doubting the determination of a non-inventor arbiter. In any case, the university should have a dispute resolution policy in place for such disagreement. The method of the process will vary based on the type of the initial policy and is beyond the scope of this Article.

One revenue distribution policy that no university should ever adopt is to ignore the contributions of non-faculty inventors. The Bayh-Dole Act does not distinguish different types of joint inventors[104] and requires that all inventors receive a portion of the revenues from licensing the patent. Therefore, universities should carefully consider both revenue distribution policies that include all joint inventors as well as educational programs that allow those policies the greatest chance of working.

V. CONCLUSION

The issues that arise early in the technology-transfer process that impact disclosure and inventor determination become important again later in the process. After licensing, revenue allocation requires university technology-transfer offices to confront many of the same issues that caused problems throughout the process.

University policies may not be aligned with the goals and interests of all parties. Harvard's policy required all joint inventors to agree to a revenue sharing agreement or default to an equal division of the royalties. It is unlikely that all inventors contribute equally to an invention or that faculty inventors perceive the non-faculty contributions as being substantial. These attitudes combined with a negotiation power imbalance in favor of the favor inventors leaves many graduate students with little to do other than agree with the PI.

104. Except the CFR does distinguish federal employee joint inventors. *See, e.g.*, 37 C.F.R. § 401.14(k)(2) (2016).

There are many options for revenue distribution policies amongst joint inventors. More research into university technology-transfer policies with regards to revenue sharing allocations and dispute resolutions is required in order for universities to mindfully execute this stage of the technology-transfer process.