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Student Intellectual Property Issues on the Entrepreneurial Campus

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STUDENT INTELLECTUAL PROPERTY ISSUES ON THE ENTREPRENEURIAL CAMPUS

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A group of Harvard undergraduate students, led by nineteen-year-old Mark Zuckerberg, launched thefacebook.com in February 2004.[1] Within a month of its launch, over half of Harvard undergraduate students had registered on the thefacebook.com.[2] Within four months, Paypal co-founder, Peter Thiel, had invested $500,000 in Facebook.[3] Even before Facebook made its network available to the general public, Mark Zuckerberg had

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1. Alan J. Tabak, *Hundreds Register for New Facebook Website: Facemash Creator Seeks New Reputation with Latest Online Project*, THE HARVARD CRIMSON, Feb. 9, 2004, http://www.thecrimson.com/article/2004/2/9/hundreds-register-for-new-facebook-website/.

2. Sarah Phillips, *A Brief History of Facebook: Sarah Phillips reports on the development of Facebook, from a Harvard social-networking website to a global internet phenomenon,* THE GUARDIAN, Jul. 24, 2007, http://www.guardian.co.uk/technology/2007/jul/25/media.newmedia.

3. *Timeline: Facebook,* N.Y. TIMES, Feb. 1, 2012, http://www.nytimes.com/interactive/technology/facebook-timeline.html#/#time11_231.

already declined acquisition offers of $750 million (from Viacom) and $900 million (from Yahoo).[4] In May 2012, with over 845 million worldwide active users, Facebook went public. Based on this meteoric rise from a college dorm room concept to a publicly-traded company, Facebook is the epitome of university student entrepreneurship.

Facebook has also received attention for its underlying intellectual property and business disputes. The October 2010 movie, *The Social Network*, profiled these disputes between Zuckerberg and other Harvard students. While these disputes and ensuing lawsuits have garnered unprecedented media attention, in many ways, the launch of Facebook avoided the issues much more likely to cause trouble for universities concerning student intellectual property. As further described in Section II below, universities are increasingly offering courses, degree programs, startup incubators, mentorship programs, and other school-sponsored events to support student entrepreneurial endeavors. As a recent Boston Globe story explained, "Zuckerberg famously founded Facebook in his dorm room, with the help of his friends. Today's Harvard students are more likely to refine their projects through events and classes offered by the school to foster future Zuckerbergs."[5] Accordingly, it is worth considering: what if Zuckerberg had used "significant university resources" sufficient to trigger Harvard asserting ownership over the Facebook code and concept? What if a university employee had mentored the students and provided suggestions or otherwise assisted in creating the intellectual property underlying Facebook? What if the Facebook code and concept had been developed as part of a capstone design class project sponsored by Google?

These questions are increasingly common on campuses where the number of bright and motivated students seeking to become the next Mark Zuckerberg are rising. Further, the answers to the above questions no longer relate to a mere school project. Rather, these answers are the foundations of future for-profit ventures. For universities seeking the correct and most reasonable answers to the above questions, the stakes have never been higher.

I. Introduction

This article examines issues that are more frequently arising for universities concerning intellectual property in student inventions. It seeks to identify the issue, explain the underlying law, identify actual and proposed solutions to these issues, and explain the legal ramifications of these potential solutions.

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4. *Id.*

5. D.C. Denison, *Seeking the Next Big Online Thing: Undergrads Line up to Follow Zuckerberg's Facebook Footsteps*, Boston Globe, Nov. 7, 2011, at C7, *available at* http://www.boston.com/news/education/higher/articles/2011/11/07/harvard_undergrads_in_search_of_next_facebook_meet_with_mark_zuckerberg/.

In particular, Section II of this article addresses why universities should be paying attention to student intellectual property issues. This Section looks at the rise of student entrepreneurship on college campuses, the importance of clear intellectual property ownership for startup ventures, the challenging nature of student intellectual property issues, and why student intellectual property questions are important to universities even when universities have no rights in the students' inventions.

Section III provides an overview of the patent and copyright doctrines concerning ownership of intellectual property in student inventions.

Section IV addresses identifying the owner of intellectual property in student inventions. This Section looks at different approaches university policies may take to addressing student intellectual property and identifies considerations related to their treatment of student intellectual property. This Section also addresses issues related to identifying the inventors or authors of student inventions and discusses procedures for the university to confirm it makes no claim to any rights in a particular student invention.

Section V discusses managing joint ownership between students and the university.

Section VI analyzes how universities can appropriately manage student interactions with third parties concerning intellectual property rights. This Section provides a background of "capstone"[6] engineering design courses and identifies problems that can arise with interactions between students and third parties in capstone design classes. This Section concludes by laying out best practices for universities to avoid problems with student-sponsor interactions.

II. Why Universities Should Be Paying Attention to Student Intellectual Property Issues

This Section addresses why student intellectual property issues matter to universities. Section II.A. describes the rise of student entrepreneurship and the increasing support provided by universities. Section II.B. explains why student intellectual property issues are important to universities even if the university does not claim rights in student inventions. Section II.C. provides a background on why clear title to intellectual property is important in general. Lastly, Section II.D. focuses on why student intellectual property questions can be challenging to universities accustomed to addressing intellectual property issues related to faculty inventions.

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6. The term "capstone" refers to engineering design courses that offer students, typically in the last year of their engineering degree program, "a culminating design experience on an applied engineering project." Susannah Howe and Jessica Wilbarger, 2005 *National Survey of Engineering Capstone Design Courses*, 2006 ASEE Annual Conference and Exposition, Session 2525 at 1, http://www.science.smith.edu/departments/Engin/designclinic/ASEE06_CapstoneSurveyResults1_HoweWilbarger.pdf.

A. *Student Entrepreneurship is Burgeoning on College Campuses Across the Country*

Mark Zuckerberg was certainly not the first teenager or twenty-something to launch a successful venture from a college campus. Marc Andreeson created the Mosaic browser that would become Netscape,[7] Bill Gates initiated Microsoft,[8] and Fred Smith formulated the idea behind Federal Express,[9] all from college campuses. The collegiate roots of a high-profile startup, however, have never before been so visible to fellow college students, as has been the case with Facebook. Facebook was initially designed and marketed exclusively for college students. In its first seven months, Facebook attracted over 5 million college users.[10] In October 2010, The Social Network portrayed the origination of Facebook and its initial months in a Harvard dormitory room. That film debuted at number one in the box office[11] and received eight Academy Award nominations.[12] In Mark Zuckerberg, college students had a very tangible example of how an undergraduate student could create something that changes the world.[13] In the words of another Harvard undergraduate student who also created a startup during his first two years of college: "One big change that came after Zuckerberg is that now it's OK to start your own company as an undergraduate."[14] Some have coined this "the Zuckerberg effect."[15]

The success of Facebook coincided with other factors also incentivizing college students and graduates to launch entrepreneurial ventures in lieu of exploring traditional corporate careers. First, college graduates were facing a historically poor job market. Only 19.7 percent of 2009 college graduates who sought employment had secured a job upon graduation.[16]

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7. Chris Anderson, *The Man Who Makes the Future: Wired Icon Marc Andreessen,* WIRED, Apr. 24, 2012, http://www.wired.com/business/2012/04/ff_andreessen/.

8. Jonathon Byrnes, *How Microsoft Became MICROSOFT,* BUSINESS INSIDER, Sept. 21, 2010, http://articles.businessinsider.com/2010-09-21/strategy/29964094_1_microsoft-software-gates-and-allen-popular-electronics.

9. *Fred Smith: An Overnight Success,* ENTREPRENEUR (October 9, 2008), http://www.entrepreneur.com/article/197542.

10. Phillips, *supra* note 2.

11. Brandon Gray, *Weekend Report: 'Social Network' No Wallflower in Its Debut,* BOX OFFICE MOJO (Oct. 4, 2010), http://boxofficemojo.com/news/?id=2937&p=.htm.

12. Devindra Hardawar, *You Know What's Cool? 8 Oscar Nominations for the Social Network,* VENTUREBEAT (Jan. 25, 2011), http://venturebeat.com/2011/01/25/social-network-oscar-nominations/.

13. *See* Denison, *supra* note 5, at C7.

14. *Id.*

15. Beckie Supiano, *To Develop Student Entrepreneurs, Colleges Incubate Their Ideas*, CHRON. OF HIGHER EDUC. (May 13, 2012), http://chronicle.com/article/To-Develop-Student/131838/.

16. Hannah Seligson, *No Jobs? Young Graduates Make Their Own,* N.Y. TIMES, Dec. 12, 2010, at BU1, *available at* http://www.nytimes.com/2010/12/12/business/12yec.html?pagewanted=all.

That figure rose to only 24.4 percent for 2010 graduates.[17] According to the managing director of the University of Maryland's Dingman Center for Entrepreneurship, "The down economy has made students realize that there may not be a cushy job at the end of this rainbow. So they're taking their destiny into their own hands."[18]

At the same time, launching a startup is becoming significantly less expensive. Advances such as open source software, cheap broadband, cloud computing, and Google applications allow companies to perform business functions today for a fraction of what they would have cost a decade ago.[19] Using social media for marketing has added to the drastic reduction in startup costs.[20] As compared to just a few years earlier, it is now possible for students to advance a startup company to a much further stage prior to seeking outside financing.[21]

In this perfect storm, student entrepreneurship is burgeoning on American campuses. As just one example, at the University of Michigan, between 2007-2012, students launched over 100 start-up companies, raised over $5 million in funding, and employed over 200 people.[22] During that same time, the number of students taking entrepreneurship-related classes rose from 100 to over 2,500[23] and the number of students taking part in entrepreneurial co-curricular activities rose from 200 to over 5,000.[24] The University of Michigan is not alone. Applications to the largest college student entrepreneurs competition, run by the Entrepreneurs Organization in Alexandria, Va., have doubled between 2007 and 2012.[25] The number of students participating in the University of Virginia's Galant Center for Entrepreneurship has doubled in the past four years.[26] At Arizona State University, in just one year, Venture Catalyst, an entrepreneurial as-

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17. *Id.*

18. Amy Reinink, *Student Entrepreneurship in College is on the Rise in Poor Economy,* WASH. POST, Nov. 3, 2011, http://www.washingtonpost.com/lifestyle/magazine/student-entrepreneurship-in-college-is-on-the-rise-in-poor-economy/2011/10/17/gIQAxEMuiM_story.html.

19. *Id.*

20. Abigail Tracy, *America's Coolest College Startups 2012: A New Movement Fueled by College-Aged Entrepreneurs and the Organizations that Support Them is Just Beginning to Take off,* INC.COM (March 4, 2012), http://www.inc.com/welcome.html?destination=http://www.inc.com/coolest-college-start-ups-2012/abigail-tracy/entrepreneurs-are-cool-kids-on-campus.html.

21. Carolyn Y. Johnson, *Ever-younger Entrepreneurs: Internet, Low Costs Lead to Early-in-Life Startups,* BOSTON GLOBE, Sept. 7, 2007, at 1A.

22. Thomas Zurbuchen, *Leadership and Entrepreneurship: The Entrepreneurial Wave at UM,* UNIVERSITY OF MICHIGAN CENTER FOR ENTREPRENEURSHIP (Apr. 6, 2012, 4:32 PM), http://cfe.engin.umich.edu/blog/2012/04/leadership-and-entrepreneurship-the-entrepreneurial-wave-at-u-m-by-thomas-zurbuchen/.

23. *Id.*

24. *Id.*

25. *Id.*

26. Reinink, *supra* note 18.

sistance initiative, received 44 business ideas from students enrolled in ASU entrepreneurship programs.[27] Entrepreneurship among college students is taking off across the country.[28]

American universities have long served as important drivers of economic development. The Bayh-Dole Act (1980) helped foster this role for universities, allowing universities to retain title to inventions created with federal funding.[29] The Bayh-Dole Act led to universities investing heavily in forming technology transfer offices to support the dissemination of faculty inventions.[30] This kick-started the translation of university innovation into products and services benefitting the public. These offices provide much-needed support to faculty in disseminating their inventions.[31] This support includes technology and commercialization evaluation, intellectual property strategy assessment, marketing, patenting, license negotiations, risk protection, start-up formation, and licensee partnership.[32]

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27. Ariz. State Univ., *Entrepreneurship at ASU Launches 55 Companies, Attracts $200M in Financing*, ASU NEWS (June 26, 2012), https://asunews.asu.edu/20120627_ASU startups.

28. Leslie Kwoh, *More Budding Entrepreneurs Popping up Across College Campuses,* NJ.COM (Jan. 17, 2010, 6:00 AM), http://www.nj.com/business/index.ssf/2010/01/post_53.html.

29. 35 U.S.C. §§ 200-11 (2006). *See also* Bd. of Trs. of Leland Stanford Junior Univ. v. Roche Molecular Sys., Inc., 131 S. Ct. 2188 (2011).

30. *Best Practices in Transforming Research into Innovation: Creative Approaches to the Bayh-Dole Act*, *Statement to the House Before the Subcomm. on Technology and Innovation of the H. Comm. on Science, Space, and Technology* (2012) [hereinafter *Best Practices*] (statement of Todd T. Sherer, President, Association of University Technology Managers), *available at* http://science.house.gov/sites/republicans.science.house.gov/files/documents/hearings/HHRG-112-%20SY-WState-TSherer-20120619.pdf ("Universities responded to the passage of the Bayh-Dole Act by creating technology transfer offices (TTOs) to manage the inventions of their faculty. Only 23 universities had TTOs before Bayh-Dole; today, all major research institutions have a technology transfer operation.").

31. Birch Bayh, Joseph P. Allen, & Howard W. Bremer, *Universities and the Bayh-Dole Act*, 3 LIFE SCIS. L. & INDUS. 1266, 2 (2009) ("[The Bayh-Dole Act] encouraged the establishment of hundreds of offices of technology transfer at universities. These offices relieve inventors from a need to develop expertise in the legal and business sides of invention commercialization. Second, since the offices typically cover expenses associated with marketing, patenting, and licensing, inventors avoid the risk associated with covering such costs. Not only are such activities expensive, but they are also time consuming.") (quoting Brent D. Goldfarb & Magnus Henrekson, *Bottom-Up vs. Top-Down Policies Towards the Commercialization of University Intellectual Property* 2 (Stockholm Sch. of Economics Working Paper Series in Economics & Finance, No. 463, 2002)).

32. *Best Practices*, *supra* note 30 ("We evaluate early stage technologies for commercial potential, determine the best intellectual property protection strategy, and market our technologies through a variety of channels in hopes of finding a corporate partner. We then negotiate often complicated agreements to ensure that our inventors, our universities and the taxpayer benefit from the ultimate products. Often we create or assist in the creation of entirely new companies to commercialize our technologies – many of them creating jobs in our own region and state. After licenses are signed, we maintain relationships throughout the life of the agreement, sometimes insisting upon the return of our technology should our partner decide to abandon our technology. Most importantly, we work as a team with our inventors to help make the world a better place by getting academic technologies out of the laboratory and into the economy.").

It is no surprise that given this level of resource investment, the dissemination of technology based on faculty inventions has been prolific. Since the passage of the Bayh-Dole Act, more than 5,000 new companies have launched based on university research.[33] More than fifty percent of existing biotech companies are based on a university intellectual property license.[34] Further, the former President of the NASDAQ Stock Market estimated that thirty percent of its value derived from university innovations supported by federal funding.[35] The Association of University Technology Managers, the nonprofit organization dedicated to supporting and enhancing the academic technology transfer profession, currently has over 3,200 members at over 300 universities, research institutions, teaching hospitals, or other business or government organizations.[36]

It is only recently, however, that universities have begun to provide institutional support focused on student entrepreneurs. Although recent in nature, universities are investing heavily in supporting student entrepreneurship. This support takes the form of new courses, majors and minors in entrepreneurship, new degrees in entrepreneurship,[37] startup incubators and accelerators, increased mentoring and access to faculty, and countless business concept competitions.[38] Gerald Hills, co-founder of the Collegiate Entrepreneurs' Organization, explained that "[o]n college campuses there's really been an explosion in interest in entrepreneurship . . . [M]ore than 1,500 universities in the U.S. have entrepreneurship courses now and most have some semblance of a program in entrepreneurship."[39]

The Chronicle of Higher Education,[40] the New York Times,[41] Crain's New York,[42] and Washington Post[43] have all recently covered the massive

33. Bayh et al., *supra* note 31, at 3.

34. *Id.*

35. *Id.*

36. *Id.*

37. *See* Kyle Feldscher, *University of Michigan to Offer Master's Degree in Entrepreneurship,* ANNARBOR.COM (July 22, 2011, 5:58 AM), http://www.annarbor.com/news/university-of-michigan-business-and-engineering-schools-combine-to-offer-entrepreneurship-masters-pr/; *see also* Master of Entrepreneurship, UNIV. OF MICH. http://www.entrepreneurship.umich.edu/.

38. *See* Supiano, *supra* note 15.

39. Julia Aubuchon, *From Books to Business: Student Entrepreneurs,* ABC NEWS (Nov. 14, 2009), http://abcnews.go.com/Business/SmallBiz/successful-student-entrepreneurs/story?id=9075154#.UH1ivbSj-Qo.

40. *Id.*

41. Laura Pappano, *Got the Next Great Idea?*, N.Y. TIMES, July 22, 2012, at ED10, *available at* http://www.nytimes.com/2012/07/20/education/edlife/campus-incubators-are-on-the-rise-as-colleges-encourage-student-start-ups.html.

42. Steve Garmhausen, *Colleges Become Startup Factories*, CRAIN'S N.Y. (April 23, 2012, 5:59 AM), http://www.crainsnewyork.com/article/20120422/SMALLBIZ/304229998.

43. Reinink, *supra* note 18.

expansion of university incubators[44] focused on launching student-led startup ventures. The National Business Incubation Association shows that about one-third of the 1,250 business incubators in the United States are at universities.[45] At least thirty-six universities have startup incubators focused solely on mobile application startups.[46] The University of Miami transformed an office block in the middle of campus into "The Launch Pad," which supports start-ups launched by juniors and seniors.[47] By July 2012, The Launch Pad had launched 65 new companies and had created 200 new jobs in Miami.[48] The University of Michigan formed its TechArb student startup incubator in 2009 through its Center for Entrepreneurship, the Zell-Lurie Institute for Entrepreneurship, and the Office of the Vice President for Research. Through July 2012, TechArb had created over ninety new companies, which had received over $5 million in funding and of which, three had been acquired.[49] For its past six-month session, TechArb received sixty-five applications for its twenty spots.[50] Harvard[51] and Syracuse[52] have recently launched similar high-profile incubators. In the words of the Director of Entrepreneurship at George Mason University's Center for Social Entrepreneurship "[t]he campus is the new frontier for entrepreneurship."[53]

B. *Why Student Intellectual Property is a University Issue Whether or Not the University Claims Rights?*

Some may ask why student intellectual property is a university issue in situations where students own the intellectual property in their inventions. The reasons are numerous.

First, universities are making unprecedented investment in incubators, degree programs, and courses to supported student entrepreneurship.

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44. An incubator has been described as "a company or facility designed to host startup companies. Incubators help startups grow while controlling costs by offering networks of contacts and shared backoffice resources." Ctr. for Private Equity & Entrepreneurship, *Nat'l Venture Capital Ass'n Yearbook, Appendix A: Glossary*, 2009 NAT'L VENTURE CAPITAL ASS'N YEARBOOK, *reprinted in* VENTURE CAPITAL 2010: NUTS & BOLTS, CORPORATE LAW AND PRACTICE HANDBOOK B-1799 55, 61 (Practising Law Institute ed., 2010).

45. Pappano, *supra* note 41.

46. Kathleen Chaykowski, *College Kids Aim to Make 52 Apps a Year in South Carolina*, BUS. WK., July 9, 2012 *available at* http://www.businessweek.com/news/2012-07-09/college-kids-aim-to-make-52-apps-a-year-in-south-carolina.

47. Carl Schramm, *Expanding the Entrepreneur Class*, HARV. BUS. REV., July 1, 2012, available at http://hbr.org/2012/07/expanding-the-entrepreneur-class/ar/1.

48. *Id.*

49. Pappano, *supra* note 41.

50. *Id.*

51. *See* HARVARD INNOVATION LAB, http://i-lab.harvard.edu/ (last visited Oct. 1, 2012).

52. *See* SYRACUSE STUDENT SANDBOX, http://www.syracusestudentsandbox.com/ (last visited Oct. 1, 2012).

53. Supiano, *supra* note 15.

Given the importance of clear title to intellectual property,[54] it only makes sense for universities also to invest in clarifying their policies and practices to avoid unnecessary intellectual property problems for student entrepreneurs. Why educate, inspire, mentor, and incubate the next great technology startup only to see avoidable intellectual property ownership questions render the startup unfundable. Along these lines, student entrepreneurs are now increasingly savvy and may understand the importance of intellectual property to their venture.[55] These students are likely to ask new questions of university attorneys, administrators, and other personnel. The university, in answering these questions, must understand the issues and its positions concerning intellectual property in student inventions.

Second, disputes over intellectual property ownership are costly and time-consuming. Even a dispute between students can trigger the resource-intensive involvement of senior university administrators. As just one example, consider that the intellectual property dispute between Harvard students concerning rights in Facebook involved at least one meeting with Harvard's president and has triggered subsequent negative media attention concerning comments made by Harvard's president about students involved in that dispute.[56]

Third, universities generally have a number of interests in helping their students become successful. As explained by the Director of George Washington University's Office of Entrepreneurship, "successful alumni breed successful schools."[57] As described in a recent New York Times story, while Stanford claimed no ownership in the intellectual property behind Yahoo! (created on Stanford servers), the founders have endowed a $2 million chair at Stanford and the founders have given over $75 million to the school.[58]

Fourth, it is worth noting that in past intellectual property disputes with universities, graduate students have asserted the university or a university employee breached a fiduciary duty owed to the student.[59]

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54. For a discussion of the importance of clear title, *see infra,* Section II.C.

55. Denny Carter, *Tech-savvy Students Prompt Colleges to Revamp Rules*, eCampus News (January 27, 2011), http://www.ecampusnews.com/technologies/tech-savvy-students-prompt-colleges-to-revamp-rules/.

56. *See* Geoffrey Fowler, *Winklevosses to Summers: You Are "Tactfully Challenged"*, Wall St. J. Blogs: Digits (July 21, 2011, 8:16 PM), http://blogs.wsj.com/digits/2011/07/21/winklevosses-to-summers-you-are-tactfully-challenged/.

57. Pappano, *supra* note 41.

58. *Id*.

59. *See* Chou v. Univ. of Chi., 254 F.3d 1347, 1362 (Fed. Cir. 2001) (holding that district court erred in dismissing plaintiff's claim for breach of fiduciary duty because under Illinois law a fiduciary duty may arise from the circumstances of the parties' relationship, "such as when one party justifiably places trust in another so that the latter gains superiority and influence over the former."); *see also* Univ. of W. Virginia Bd. of Trustees v. VanVoorhies, 278 F.3d 1288, 1300 (Fed. Cir. 2002) (holding that the relationship between the university and the graduate student set forth in the intellectual property assignment and policy in question did not create a fiduciary duty under West Virginia law).

Whether a fiduciary duty exists will depend on state law and is highly fact specific. For example, the plaintiff in *Chou v. University of Chicago* claimed the plaintiff's advisor and the university breached a fiduciary duty by allegedly mishandling a patent inventorship determination. The plaintiff, Dr. Joany Chou, was a former graduate student and post-doctoral research assistant at the University of Chicago. Dr. Chou sued the University of Chicago, her advisor Dr. Roizman, and other related defendants seeking to correct inventorship of certain patents and for other state law claims.[60] One of Dr. Chou's state claims was that Dr. Roizman had breached a fiduciary duty owed to Dr. Chou. Specifically, Dr. Chou alleged that Dr. Roizman's held a position of superiority over Dr. Chou as her departmental chairman and that Dr. Roizman represented to Dr. Chou that he would "protect and give her proper credit for her research and inventions."[61]

The Federal Circuit reversed the district court's dismissal of Dr. Chou's fiduciary duty claim.[62] Applying Illinois law, the Federal Circuit ruled that a fiduciary duty may arise either (i) from a particular relationship, such as an attorney-client and principal-agent relationship, or (ii) from special circumstances of the parties' relationship, such as when one party's superiority and influence over another results from a relationship of trust.[63] According to the Federal Circuit, the disparity of experience and roles and Roizman's responsibility for making patenting decisions regarding Dr. Chou's inventions was sufficient to state a claim for the existence of a fiduciary duty as between Dr. Roizman, as advisor and department chair, and Dr. Chou as graduate student and fellow. Furthermore, Dr. Chou stated a claim for breach of that fiduciary duty by pleading that Dr. Roizman named himself as the inventor of her discoveries.[64] The Federal Circuit also held that Dr. Chou stated a claim for breach of fiduciary duty against the university under the theory of respondeat superior.[65] Accordingly, universities, when addressing intellectual property questions, should be mindful of the potential legal risks associated with their relationships with any involved students.

In sum, given the above considerations, avoiding intellectual property ownership disputes, such as the one in *Chou v. University of Chicago*, is in everyone's interest.

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60. Dr. Chou also sued the exclusive licensee of the patent rights at issue, Aviron Company, and the university's patent licensing subsidiary, ARCH Development Corporation. *See* Chou 254 F.3d at 1347.

61. Chou, 254 F.3d at 1362.

62. *Id.*

63. *Id.*

64. *Id.* at 1363.

65. *Id.*

C. *Intellectual Property is an Important Component of Technology-Based Startup Ventures and Warrants University Attention*

It is essential for a technology-based startup venture to have clean title to intellectual property used in its fundamental products or services. As explained in Venture Deals: Be Smarter than your Lawyer and Venture Capitalist by Brad Feld and Jason Mendelson, "[i]ntellectual property (IP) issues can kill a start-up before you even really begin."[66] Entrepreneurs are routinely cautioned to make sure that anyone contributing to the startup's technology has assigned their rights to the startup.[67] Mistakes that cloud title to intellectual property are frequently cited as some of the top mistakes for startups to avoid.[68] Investors will almost certainly investigate the origins of a start-up's technology to ensure the start-up actually holds the rights to the intellectual property it uses.[69] Intellectual property ownership questions will dissuade investors or, at the very least, add cost and complexity to securing investment.[70]

Recent cases demonstrate how unclear policies or contracts can create ambiguity over the ownership of intellectual property.[71] The Supreme Court's decision in *Stanford v. Roche* particularly illustrates how interactions with industry partners can cloud title to intellectual property in inventions created at a university.[72] In that case, a Stanford researcher, Dr. Holodniy, performed research at both Cetus (later acquired by Roche) and Stanford. In performing research at Cetus, Dr. Holodniy signed a

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66. BRAD FELD & JASON MENDELSON, VENTURE DEALS: BE SMARTER THAN YOUR LAWYER AND VENTURE CAPITALIST 167 (2011).

67. John V. Bautista, *Key Considerations in Forming a New Company*, *in* VENTURE CAPITAL 2012: NUTS AND BOLTS, CORPORATE LAW AND PRACTICE HANDBOOK B-1941 87, 129 (Practising Law Institute ed., 2012) (advising that a "company should . . . ensure that it puts into place agreements with third parties whenever it engages in any relationship with a third party that may result in work product related to the company's business.").

68. Jill Hubbard Bowman, *Does Your Startup Own the IP Created by its Founders?,* IP LAW FOR STARTUPS BLOG (September 28, 2011), http://www.iplawforstartups.com/does-your-startup-own-the-ip-created-by-its-founders/.

69. Jill Hubbard Bowman, *Is Your Startup Ready for IP Due Dilligence?,* IP LAW FOR STARTUP BLOG (October 20, 2011), http://www.iplawforstartups.com/is-your-startup-ready-for-ip-due-diligence/.

70. *See* Bevery A. Berneman, *Venture Capital Financing for Development of Intellectual Property Assets: A Marriage of Convenience, in* HANDLING INTELLECTUAL PROPERTY ISSUES IN BUSINESS TRANSACTIONS 2005 223, 232 (Practising Law Institute, 2005) (explaining the due diligence process behind an institutional investment as follows: "The entrepreneur should provide the venture capital group with a list of Intellectual Property assets that are integral to the function of the enterprise. . . . The venture capital group will want to search the title of each Intellectual Property asset. If the entrepreneur did his homework before the matchmaking phase, title searches should be unproblematic because the entrepreneur will be able to give the venture capital group documents of title and agreements.").

71. *See, e.g.*, DDB Techs., LLC v. MLB Advanced Media, LP*,* 517 F.3d 1284, 1286–87 (Fed. Cir. 2008) (addressing whether a start-up founder's prior employment agreements covered patents obtained by start-up thus giving ownership to prior employer).

72. *See* Bd. of Trs. of Leland Stanford Junior Univ. v. Roche Molecular Sys., Inc., 131 S. Ct. 2188 (2011).

"Visitor Confidentiality Agreement" (assigning to Cetus all rights in inventions created "as a consequence" of the researcher's access to Cetus). Dr. Holodniy returned to Stanford and created an invention with other Stanford researchers using NIH funding.[73] Stanford applied for and received patents on that invention, rights in which Dr. Holodniy assigned to Stanford.[74] When licensing discussions between Roche and Stanford broke down, Stanford sued for patent infringement. Roche asserted it was a joint-owner of the patents-in-suit by way of Dr. Holodniy's assignment to Cetus and Roche's acquisition of Cetus. The courts agreed, ruling that the assignment language in the Cetus Visitor Confidentiality Agreement covered Dr. Holodniy's subsequent invention at Stanford and trumped his assignment obligations to Stanford, included in his employment contract.[75] Accordingly, Dr. Holodniy's rights belonged to Roche while the co-inventors' rights belonged to Stanford. The patents-in-question were jointly-owned and neither party held exclusive rights, as will be discussed further in Section III.A.3 below.

Stanford v. Roche demonstrates how imperfect university policies and interactions between entrepreneurs and third parties can lead to unintended consequences concerning intellectual property ownership. While the ownership dispute in that case involved a Stanford employee, it just as easily could have involved a non-employee student. To the extent that student launched a start-up venture, that venture would be significantly harmed, if not destroyed, by the unintended assignment to the industry partner, denying the startup exclusive rights in its underlying technology.

D. *Student Ownership Issues Present Unique Challenges*

Questions concerning intellectual property in student inventions present unique challenges for universities, even where they are accustomed to addressing intellectual property in faculty inventions. After the passage of the Bayh-Dole Act in 1980,[76] universities built up their technology transfer offices. As one commentator has explained, "[t]hese offices are typically staffed with experienced licensing professionals, often with a combination of legal, industrial, marketing, and technical backgrounds."[77] Large universities have experienced in-house attorneys who advise the university and its faculty on intellectual property matters. After the pas-

73. *Id.* at 2192-93.

74. Dr. Holodniy's Stanford employment contract required him to assign to Stanford rights in his inventions. *See id.*

75. Bd. of Trs. of Leland Stanford Junior Univ. v. Roche Molecular Sys., Inc., 583 F.3d 832, 841-42 (Fed. Cir. 2009) (holding that Holodniy's contract with Stanford stating he "agreed . . . to assign" was merely a promise to assign and not an actual assignment; the Cetus agreement contained language of present assignment, "hereby assigns," and therefore was the first actual assignment of Holodniy's rights).

76. *See* 35 U.S.C. §§ 200-11 (2006).

77. F. Kinsey Haffner et al., *University Technology Transfer Rights*, *in* INTELLECTUAL PROPERTY TECHNOLOGY TRANSFER 221, 221 (Aline C. Flower ed., 2006).

sage of Bayh-Dole, most universities clarified their intellectual property policies to address university ownership of employee inventions.[78] Because Bayh-Dole addressed rights in inventions conceived or reduced to practice through federally funded research,[79] universities drafted these policies with employees in mind. Universities created technology transfer offices designed to manage university-held intellectual property.[80] These offices have become relatively proficient at determining ownership, procuring intellectual property protection for an invention, licensing intellectual property rights to a commercialization partner, and identifying any rights a sponsor may have in an invention created under industry sponsored research.[81]

Further, universities have established a framework for addressing inventions in which multiple sophisticated entities jointly hold the rights. When faculty collaborate with faculty at other institutions, universities will enter into an "inter-institutional agreement" laying out which institution will manage the patent prosecution and lead in any licensing efforts, and how to divide costs and royalties.[82] Faculty collaboration with industry is typically addressed in advance through an industry sponsored research agreement that grants the sponsor certain rights[83] in any inventions created during the course of the sponsored research.[84] Simply, most universities have significant experience in managing intellectual property issues in faculty inventions.

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78. *See* Kevin LaRoche et al., *Appropriating Innovation: The Enforceability of University Intellectual Property Policies*, 20 INTELL. PROP. J. 135, 138 n.11 (2007) ("One practical effect of the Bayh-Dole Act was to require universities to enact intellectual property policies to establish means of complying with the Act.").

79. *See* 35 U.S.C. § 201 (2006) (defining a "subject invention" as "any invention of the contractor conceived or first actually reduced to practice in the performance of work under a funding agreement.").

80. *Best Practices*, *supra* note 30 ("Universities responded to the passage of the Bayh-Dole Act by creating technology transfer offices (TTOs) to manage the inventions of their faculty. Only 23 universities had TTOs before Bayh-Dole; today, all major research institutions have a technology transfer operation.").

81. *Id.*

82. *See, e.g.*, Anthony P. Green et al., *Accelerating Innovation: The Nanotechnology Institute*, 8 NANOTECHNOLOGY L. & BUS. 176, 180 (2011); *see also Licensing Process*, WIS. ALUMNI RESEARCH FOUND., http://www.warf.org/industry/index.jsp?cid=1 (describing Inter-Institutional Agreements as follows: "These are special agreements between WARF and other universities, federal labs, nonprofit foundations and industry. These agreements permit WARF to offer clean license agreements when individuals from other organizations are co-inventors on a technology.").

83. Symposium, *Patent Rights and Licensing*, 6 B.U. J. SCI. & TECH. L. 48, 68-69 (2000) ("If a company funds research, a standard component of a sponsored research agreement is an exclusive option to an exclusive license."); *see also Sponsored Research Agreement Review Procedures Research Administration and Finance*, RENSSELEAR POLYTECHNIC INST., 6-7, *available at* http://rpi.edu/research/office/policy/ResearchAdministrationAndFinance Procedures.pdf.

84. This is not to say that disputes do not arise, as evidenced by the *Stanford v. Roche* case. *See supra* section II.A.

Historically, however, most universities have not supported the commercialization of student inventions in the same way. Most universities do not claim ownership of inventions created solely by unpaid students the same way they do for those created by their employees.[85] Therefore, most schools will not support the commercialization of these inventions through their office of technology transfer. Further, university counsel typically cannot provide legal advice to a student because the student is not a client.[86] While many large universities provide free or discounted legal services to students,[87] these legal service providers are unlikely to be experienced in the specialized field of intellectual property. Perhaps most obviously, students are not typically capable of paying for even basic legal counsel to address intellectual property issues.

Compounding the problem, as further discussed in Section VI., the established curriculum in the science and engineering fields, with its emphasis on industry interaction and a team-based design process, places students in situations giving rise to precarious intellectual property issues. For example, universities often require engineering students to interact with a corporate sponsor of a class project.[88] This corporate sponsor often will have the students sign an agreement governing intellectual property ownership and confidentiality.[89]

In sum, the traditional university support structure of faculty innovators is not designed to address the unique intellectual property questions raised by student entrepreneurs.

III. Background of Legal Principles Governing Intellectual Property Ownership

In order to address further issues concerning student intellectual property, it is necessary to provide an overview of the legal principles governing student intellectual property rights. Concerning recently-invented technology, the relevant types of intellectual property are typically patents or copyrights (in the case of software). Accordingly, in order to determine the rights holder one must understand the legal principles concerning ownership and transfer of patents and copyrights.

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85. *See infra* section IV.A.

86. *See* Model Rules of Prof'l Conduct R. 1.13 (2002). It might also be the case that the university counsel's client has interests adverse to those of the student. For example, if a university employee is a potential inventor, the university may have rights in the invention.

87. *See, e.g., Student Legal Services*, U. Mich., http://studentlegalservices.umich.edu (last visited Sept. 29, 2012); *Student Legal Services,* U. Colo., http://www.colorado.edu/studentaffairs/legal/ (last visited Oct. 15, 2012); *Student Legal Services,* UCLA, http://www.studentlegal.ucla.edu (last visited Oct. 15, 2012); *Student Legal Services,* U. Wash., http://depts.washington.edu/slsuw/ (last visited Oct. 15, 2012).

88. Susannah Howe, *Where are We Now? Statistics on Capstone Courses Nationwide,* Advances in Engineering Educ., Spring 2010, at A1, A8-9.

89. *Id.* at A22-23, fig. 24.

A. *Patents*

1. General Overview of Patents

The U.S. patent system seeks to promote the progress of the "useful arts" by rewarding investment in advancing technology and disclosing those advances to eventually become part of the public domain.[90] The Patent Act makes eligible for patent protection any "new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."[91] In order to receive an issued U.S. patent, an invention must be new, nonobvious, useful, and the applicant must describe the technology such that those in the field can understand the invention.[92] The novelty[93] and nonobviousness[94] hurdles typically receive the most attention.

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90. U.S. CONST. art. I, § 8, cl. 8; 35 U.S.C. § 154(c)(1).

91. 35 U.S.C. § 101 (2006). The Supreme Court has interpreted this to mean that "[everything] under the sun that is made by man" is patent eligible. Diamond v. Chakrabarty, 447 U.S. 303, 309 (1980) (quoting S. REP. NO. 82-1979, at 5 (1952) & H.R. REP. NO. 82-1923, at 6 (1952)). Indeed, the United States Patent & Trademark Office ("USPTO") has granted patents in a wide array of fields, including: electronic trading systems, e.g., U.S. Patent No. 4,903,201 (filed Nov. 3, 1983); genetically modified living organisms (such as the "oncomouse"), *e.g.*, U.S. Patent No. 4,736,866 (filed June 22, 1984); methods of buying and selling things on the World Wide Web, *e.g.*, U.S. Patent No. 5,897,620 (filed July 8, 1997), U.S. Patent No. 5,960,411 (filed Sept. 12, 1997); isolated DNA sequences, *e.g.*, U.S. Patent No. 5,747,282 (filed June 7, 1995), U.S. Patent No. 5,837,492 (filed Apr. 29,1996), U.S. Patent No. 5,693,473 (filed June 7,1995), U.S. Patent No. 5,709,999 (filed Jan. 5, 1996), U.S. Patent No. 5,710,001 (filed June 7, 1995), U.S. Patent No. 5,753,441 (filed Jan. 5, 1996), U.S. Patent No. 6,033,857 (filed Mar. 20, 1998); smartphones, *e.g.*, U.S. Patent No. 8,223,134 (filed Mar. 5, 2012); and medical devices, *e.g.*, U.S. Patent No. 6,080,155 (filed Feb. 27, 1995), U.S. Patent No. 6,270,498 (filed Jun. 7, 1995), U.S. Patent No. 5,797,909 (filed Jun. 7, 1995), U.S. Patent No. 6,210,412 (filed Jun. 7, 1995), U.S. Patent No. 6,159,214 (filed July 31, 1996), and U.S. Patent No. 6,440,139 (filed Dec. 12, 2000), just to name a few. In fact, the only subject matter not eligible for patent protection is "laws of nature, natural phenomena, and abstract ideas." Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1293 (2012) (quoting Diamond v. Diehr, 450 U.S. 175, 185 (1981)). The patent eligibility of certain new technologies, such as genetic testing and software, is the subject of much controversy. These technologies have raised questions of whether they involve "laws of nature, natural phenomena, [or] abstract ideas" and should therefore be ineligible for patent protection. *See* Bilski v. Kappos, 130 S. Ct. 3218 (2010), Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 132 S. Ct. 1794 (2012).

92. 35 U.S.C. §§ 101-03, 112 (2006).

93. 35 U.S.C. § 102 (2006); *See* Krippelz v. Ford Motor Co., 667 F.3d 1261, 1265 (Fed. Cir. 2012) (a patent claim is invalid as anticipated if a single prior art reference discloses each and every element of a claimed invention).

94. *See* 35 U.S.C. § 103; *see also* Sciele Pharma Inc. v. Lupin Ltd., 684 F.3d 1253, 1259 (Fed. Cir. 2012) ("A patent is obvious if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.") (internal quotation marks omitted).

A patent provides the right to exclude others from using, making, selling, offering for sale, or importing the patented invention.[95] This right to exclude is extremely powerful. Independent invention is no defense to a charge of patent infringement.[96] In other words, a patent precludes another from practicing the patented invention even if that person independently conceived of the invention, never copying or even being aware of the patent.[97]

While the patent monopoly is extremely powerful, it is also short and costly to obtain, relative to other forms of intellectual property, such as copyright. The term of a patent is, generally, twenty years from the date of the patent application.[98] After a patent expires, the invention goes into the public domain and may be used freely. Additionally, the process to obtain a patent is rigorous. An applicant files a patent application with the USPTO. Because of the specialized nature of patent law, applicants typically use certified patent attorneys to prepare, file, and prosecute patent applications. Based on 2011 data, on average it takes 28 months to receive a first response from the USTPO after submitting an application.[99] On average it takes 33.7 months to receive an issued patent or to abandon one's application.[100] While costs differ based on the particular patent attorney and the nature of the patent examination, it is common for a patent application to cost between $10,000-$30,000 for its preparation, filing, and prosecution through issuance.[101] The expense and time required to obtain patent rights is relevant because it demonstrates the difficulty students might have in pursing such rights.

While commentators refer to patents, generally, it is the claims of a patent that define the legal boundaries of one's patent rights.[102] A patent typically has multiple claims, taking the form of sentences specifying various combinations of elements that define the invention. During the course of a patent application being examined by the USPTO, patent claims can be amended or abandoned altogether.

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95. 35 U.S.C. § 154(a)(1) (2006); *see also* eBay Inc. v. MercExchange, LLC, 547 U.S. 388, 392 (2006).

96. Samson Vermont, *Independent Invention as a Defense to Patent Infringement,* 105 MICH. L. REV. 475, 475 (2006) ("Under current law, independent invention is no defense to patent infringement.").

97. *Id.*

98. 35 U.S.C. § 154 (2006).

99. 2011 U.S. PTO, PERFORMANCE AND ACCOUNTABILITY REP., 2 (2011), *available at* http://www.uspto.gov/about/stratplan/ar/2011/USPTOFY2011PAR.pdf.

100. *Id.*

101. J. Jonas Anderson, *Secret Inventions,* 26 BERKELEY TECH. L.J. 917, 952 (2011).

102. *See* Thorner v. Sony Computer Entm't Am. LLC, 669 F.3d 1362, 1367 (Fed. Cir. 2012) ("It is the claims that define the metes and bounds of the patentee's invention.").

2. Ownership and Inventorship Principles for Patents

With rare exception,[103] patent rights in an invention initially vest with the inventor.[104] An inventor is then free to transfer these rights to third parties via written agreements.[105] While employers typically own the patent rights in employee inventions, employers obtain this ownership via contractual assignments.[106] Under existing Federal Circuit law, pre-invention assignments are enforceable.[107] In other words, it is permissible to assign rights in inventions prior to their creation. Employers commonly include in employment agreements language of present assignment (i.e., "hereby assigns") transferring to the employer rights in inventions an employee makes on the job. These agreements will automatically transfer rights in a subsequent employee invention to the assignee employer.

Accordingly, in order to discern which entity holds patent rights to an invention, one must first identify the inventor(s). Inventorship is a legal standard, and consequences exist for incorrect inventorship determinations.[108] An often misunderstood concept is that not everyone who contributes to an invention is an inventor. Rather, "[c]onception is the touchstone of inventorship."[109] The law defines "conception" as "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."[110] It is somewhat counterintuitive that building a prototype or otherwise reducing an invention to practice is not required for one to constitute an "inventor." Rather, at the time of inventorship, the follow-

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103. *See* Alzheimer's Inst. of Am., Inc. v. Avid Radiopharmaceuticals, No. 10-6908, 2011 WL 3875341, at *10 (E.D. Pa. Aug. 31, 2011) (finding that unlike the Bayh-Dole Act, Florida state law, R. 6C4-10.012(3)(c) unequivocally vests title to state university employee inventions with the employer university).).

104. *Stanford*, 131 S. Ct. at 2195 ("Our precedents confirm the general rule that rights in an invention belong to the inventor.").

105. *Id.* (citing United States v. Dubilier Condenser Corp., 289 U.S. 178, 188 (1933) ("A patent is property and title to it can pass only by assignment")); 8 CHISUM ON PATENTS, §22.01, at 22-2 ("the inventor . . . [may] transfer ownership interests by written assignment to anyone").

106. *Stanford*, 131 S. Ct. at 2195 ("In most circumstances, an inventor must expressly grant his rights in an invention to his employer if the employer is to obtain those rights.") (citing Dubilier Condenser Corp., 289 U.S., at 189) ("The respective rights and obligations of employer and employee, touching an invention conceived by the latter, spring from the contract of employment.").

107. FilmTec Corp. v. Hydranautics, 982 F.2d 1546 (Fed. Cir. 1992); *see also* Shukh v. Seagate Tech, LLC, 2011 WL 4947608, at *2-3 (D. Minn. Oct. 18, 2011) (declining to certify an interlocutory appeal on issue of enforceability of pre-invention assignment, finding that *FilmTec* remains controlling law). *But see Stanford*, 131 S. Ct. at 2199 (Breyer, J., dissenting) (casting doubt on *FilmTec*).

108. Sherry L. Murphy, *Determining Patent Inventorship: A Practical Approach*, 13 N.C. J.L. & TECH. 215, 216 (2012) (explaining consequences of incorrect inventorship determinations).

109. Univ. of Pittsburgh v. Hedrick, 573 F.3d 1290, 1297 (Fed. Cir. 2009).

110. Burroughs Wellcome Co. v. Barr Labs., Inc., 40 F.3d 1223, 1228 (Fed. Cir. 1994).

ing must be true of the inventor's conceived idea: (i) "only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation."[111] (ii) the inventor must have a "specific, settled idea, a particular solution to the problem at hand, not just a general goal or research plan he hopes to pursue."[112] (iii) the inventor should be able to describe his or her invention with particularity.[113] (iv) the inventor has corroborating evidence, preferably by showing a contemporaneous disclosure to a witness.[114]

While an inventor need not know whether the invention will work for conception to be complete,[115] subsequent experimental failures may reveal uncertainty that "so undermines the specificity of the inventor's idea that it is not yet a definite and permanent reflection of the complete invention as it will be used in practice."[116]

In seeking to understand what constitutes inventorship, it is often helpful to identify what is *not* inventorship. Courts have established that the following contributions do not constitute inventorship: (i) identifying the problem to be solved; (ii) offering up general suggestions for solutions; and (iii) building a prototype of an invention.

A majority of patents list more than one inventor,[117] and this trend toward joint inventorship is continuing.[118] Joint inventorship presents a host of issues and has been famously labeled "one of the muddiest concepts in the muddy metaphysics of patent law."[119] This is partly because inventors may be joint inventors even if the following are true: (i) one of the inventors performed only a small part of the task producing the invention; (ii) any inventor did not contribute to every claim of a patent; (iii) inventors did not physically work on the invention together or at the same time.[120] Additionally, at least one university has noted a common miscon-

111. Ethicon, Inc. v. U.S. Surgical Corp., 135 F.3d 1456, 1460 (Fed. Cir. 1998).

112. *Burroughs Wellcome*, 40 F.3d at 1228.

113. *Id.*

114. *Id.*

115. *Id.*

116. *Id.* at 1229 (citing Amgen, Inc. v. Chugai Pharmaceutical Co., Ltd., 927 F.2d 1200, 1206 (Fed. Cir. 1991); Rey-Bellet v. Engelhardt, 4923 F.2d 1380, 1387 (C.C.P.A. 1974)).

117. John Allison & Mark Lemley, *Who's Patenting What? An Empirical Explanation of Patent Prosecution,* 53 VAND. L. REV. 2009, 2117 (2000) (finding that "on average each patent in the authors' random study of 1,000 utility patents listed 2.26 inventors and the median patent listed two inventors, with one patent listing eleven inventors.").

118. *See The Changing Nature of Inventing: Collaborative Inventing*, PATENTLYO BLOG (Jul. 9, 2009, 9:28 AM), http://www.patentlyo.com/patent/2009/07/the-changing-nature-inventing-collaborative-inventing.html (stating that the average number of inventors per patent has increased from 1.6 per patent for patents issued in the 1970's to 2.5 per patent for patents issued in from 2000-2009).

119. Jamesbury Corp. v. U.S., 518 F.2d 1384, 1396 (Ct. Cl. 1975).

120. 35 U.S.C. § 116 (2006).

ception among university researchers that one can sign away inventorship.[121]

Another complicating factor is that determining inventorship requires identifying the "invention." The claims of a patent identify the invention.[122] Because the claims of a patent are not finalized until the patent issues, and the average patent takes over three years to issue,[123] inventorship determinations, especially those concerning inventors with contributions to only a few claims, can often change during patent prosecution.[124] Therefore, the party controlling the patent application process, can often control the identity of the proper inventors through selecting whether or not to cover certain aspects of an invention in the patent claims.

3. Joint Ownership of Patents

Absent any contractual assignment, for a patent with multiple inventors, those inventors will jointly own the patent. Joint owners of a patent may each use and license the patented technology without regard to the other.[125] Joint owners do not need to share with other joint owners any proceeds they receive from the jointly-owned patent.[126] Because either joint owner can license the invention, however, no single joint owner can grant an exclusive license under the jointly owned patent without the participation of each joint owner.[127] Additionally, each joint owner must be joined as a plaintiff when suing for patent infringement.[128]

Accordingly, where exclusivity is important to commercializing a patented invention, it is common for joint owners to either assign their rights

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121. JUDY CURRY & KULTARAN CHOHAN, INVENTORSHIP: WHY IT MATTERS, *available at* http://www.google.com/url?sa=t&rct=j&q=joint+innventorship+more+common&source=web&cd=10&ved=0CFkQFjAJ&url=http%3A%2F%2Fwww.ncsu.edu%2Fgeneral_counsel%2Flegal_topics%2Fdocuments%2FInventorship.docx&ei=MYU4UO6HL4Ku8QTJzoDgBw&usg=AFQjCNFTK4gtQ3Nl5FJ5IwmX poY0x9Utbw&sig2=0QdiKfjLJPV5EGKy4Bb4CA (noting the confusion between "inventorship" and "ownership" and that many university researchers believe inventorship can be assigned away).

122. *See* Retractable Techs., Inc. v. Becton, Dickinson and Co., 659 F.3d 1369, 1370-71 (Fed. Cir. 2011).

123. *See Stanford*, 131 S. Ct. at 2195.

124. Murphy, *supra* note 108, at 236 (suggesting revisiting inventorship determinations at the time of patent issuance).

125. 35 U.S.C. § 262 (2006); *See* Wisconsin Alumni Research Found. v. Xenon Pharm., Inc., 591 F.3d 876, 883 (7th Cir. 2010).

126. 35 U.S.C. § 262 (2006) ("In the absence of any agreement to the contrary, each of the joint owners of a patent may make, use, offer to sell, or sell the patented invention within the United States, or import the patented invention into the United States, without the consent of and without accounting to the other owners.").

127. Gregory N. Mandel, *Left-Brain versus Right-Brain: Competing Conceptions of Creativity in Intellectual Property Law,* 44 U.C. DAVIS L. REV., Nov. 2010, at 283, 296-97 ("[A] joint owner cannot grant an exclusive license without the agreement of all co-owners.").

128. *See, e.g.*, EBS Auto. Serv. v. Ill. Tool Works, Inc., No. 09-CV-996, 2011 WL 13623, at *1–2 (S.D. Cal. Jan. 4, 2011) (dismissing case for lack of standing for failure to join all joint-owners as plaintiffs).

to a single entity or to enter into a contractual arrangement governing commercialization.[129] Note, however, that even if joint owners are comfortable with not having exclusive rights in an invention, the parties should take care before agreeing to joint ownership merely because it is "fair."[130] Joint ownership can be troublesome due to the differing foreign laws concerning joint ownership.[131]

B. *Copyright*

1. Copyright Basics

In the context of entrepreneurs launching technology-based startups, copyright issues typically first emerge in the context of assessing intellectual property protection for the underlying technology. As a general matter, copyright protects the original expression in the source code.[132] As compared to patents, copyrights are easy and cheap to obtain. Copyright protection exists from the moment a work is created.[133] An author may register a copyright with the United States Copyright Office.[134] This registration provides certain procedural benefits, such as the right to sue in federal court for infringement, eligibility for statutory damages and attorneys' fees in successful litigation, and a presumption that the registrant owns a valid copyright for registrations within five years of publication.[135]

While copyright protection is easier to obtain than patent protection, it also offers a much narrower form of protection. A copyright protects only against others who actually copy the protected expression. As explained by the Second Circuit, "the plaintiff must show that the defendant appropriated the plaintiff's particular means of expressing an idea, not merely

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129. Joseph Yang, *What Corporate Counsel Should Know About IP Planning for Technology-Driven Alliances (Part 1)*, THE PRACTICAL LAWYER, Feb. 2005, at 35; *see* Joseph Yang, *What Corporate Counsel Should Know About IP Planning for Technology-Driven Alliances (Part 2)*, THE PRACTICAL LAWYER, Apr. 2005, at 31.

130. Joseph Yang, *Recent Case Law Relevant to Patent Monetization*, in IP MONETIZATION 2012: MAXIMIZE THE VALUE OF YOUR IP ASSETS, at 219, 225 (PLI Patents, Copyrights, Trademarks, and Literary Prop., Course Handbook Ser. No. 34258, 2012) ("Joint ownership almost always causes problems.").

131. Joseph Yang, *Patent and Technology Licensing,* in ADVANCED LICENSING AGREEMENTS 2012, at 83, 111 (PLI Patents, Copyrights, Trademarks, and Literary Prop., Course Handbook Ser. No. 34179, 2012) (noting complexities arising from differing foreign laws concerning rights of joint owners of intellectual property asset).

132. Tegg Corp. v. Beckstrom Elec. Co., 650 F. Supp. 2d 413, 422 (W.D. Pa. 2008) ("It is well-settled that computer source codes may be protected by copyright.") (citing Long v. Quality Comp., 860 F. Supp. 191, 196 (M.D. Pa. 1994) (citing Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983) ("a computer program . . . is a 'literary work' and is protected from unauthorized copying.")).

133. 17 U.S.C. § 102 (2006) ("Copyright protection subsists . . . [when work is] fixed in any tangible medium of expression.").

134. 17 U.S.C. § 408 (2006) ("[R]egistration is not a condition of copyright protection.").

135. 17 U.S.C. §§ 410-12 (2006).

that he expressed the same idea."[136] As an example, Party X may develop a new web application. Copyright will likely protect the source code and other protectable expression such as the on-screen content for that application. Party Y may independently create a similar web application that performs the same function as Party X's application. However, Party X's copyright in its source code and other particular expression will not prevent Party Y from selling its application. Compare this with patent protection, where if Party X had a patent on the functionality performed by its application, it would have the right to exclude Party Y from making and selling a device that performed that same functionality even absent actual copying.

2. Copyright Ownership

For purposes of software, the person that writes the code, is generally considered the author of the code.[137] One very large exception exists, however, for copyrights. Unlike patent law, copyright law will automatically vest title to copyrights with the employer of the creator. While the initial owner of a copyright is always the author, the copyright's work-for-hire doctrine will consider a creator's employer to be the author when a work is created during the scope of employment.[138] Title to copyrights can also be transferred through written agreements, just like patents.[139] Therefore, in terms of ownership of copyrights in software, the work-for-hire doctrine typically has little impact because copyrights in software are covered by the same pre-invention assignment agreements covering patent rights.

If two or more authors prepare a work with the intention that their contributions be "merged into inseparable or interdependent parts of a unitary whole" then they have created a "joint work" under copyright law.[140] The authors of a "joint work" are co-owners of copyright in the work.[141] Joint owners of a copyright are similar to joint owners of a patent in that they can both exploit all of the rights of a copyright owner.[142]

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136. Fisher-Price Inc. v. Well-Made Toy Mfg. Corp., 25 F.3d 119, 123 (2d Cir. 1994).

137. 17 U.S.C. § 201(a) (2006) ("Copyright in a work protected under this title vests initially in the author or authors of the work.").

138. *Id.* §§ 101, 201(b) ("In the case of a work made for hire, the employer or other person for whom the work was prepared is considered the author for purposes of this title, and, unless the parties have expressly agreed otherwise in a written instrument signed by them, owns all of the rights comprised in the copyright.").

139. *Id.* § 201(d).

140. *Id.* § 101.

141. *Id.* § 201(a).

142. Cmty. for Creative Non-Violence v. Reid, 846 F.2d 1485, 1498 (D.C. Cir. 1988) ("Joint authors co-owning copyright in a work 'are deemed to be tenants in common,' with 'each having an independent right to use or license the copyright, subject only to a duty to account to the other co-owner for any profits owned thereby.'") (quoting WILLIAM F. PATRY, LATMAN'S THE COPYRIGHT LAW 116 (6th Ed. 1986)).

Unlike patent joint owners, however, joint owners of a copyright must account to the other joint owner for any profits.[143]

With this background in the legal doctrines governing intellectual property ownership and transfer, we next look at issues related to determining ownership in intellectual property in student inventions.

IV. Determining Ownership in Intellectual Property in Student Inventions

This Section addresses identifying the owner of intellectual property in student inventions. Section IV.A. looks at different approaches to addressing student intellectual property in university policies. Section IV.B. focuses on considerations for universities in assessing or implementing policies concerning student inventions. Section IV.C. addresses issues related to identifying the inventors or authors of student inventions. Section IV.D. discusses procedures for the university confirming it makes no claim to any rights in a particular student invention.

A. *Different University Policy Approaches to Ownership of Student Intellectual Property*

University policies differ greatly in how they treat intellectual property rights in inventions created by unpaid students. A large number of universities have policies providing the university some ability to claim intellectual property rights in student inventions. There are examples, however, of universities moving away from this model in order to remove any ambiguity concerning students' rights in intellectual property in their campus inventions.

1. Examples of University Policies Focusing on the Extent of University Resources Used by Student Innovators

Traditionally, many university policies provide for university ownership of intellectual property in student inventions under certain circumstances. These university policies typically focus on the extent to which a student inventor used university resources, and the nature of those resources, in creating the invention. For example Stanford's intellectual property policies states,

> In the case of non-employees, all potentially patentable inventions conceived or first reduced to practice in whole or in part in the course of their participation in research projects at Stanford, or with more than incidental use of University resources, shall be disclosed on a timely basis to the University, and title shall be assigned to the University, unless a waiver has been approved.[144]

Specifically addressing non-employee students, Stanford provides a guide titled, "Best practices for student entrepreneurial courses," providing

143. *Id.*

144. *Research Policy Handbook*, Stanford Univ., ch.5.1 (July 15, 1999), http://rph.stanford.edu/5-1.html.

"[s]tudent inventions that are developed with more than incidental use of Stanford resources fall under the Stanford policy (http://rph.stanford.edu/5-1.html)."[145] That guide provides the following examples of "more than incidental use": (i) use of the Stanford funds to file a provisional patent, to create physical prototypes, to acquire data for an invention or to develop an invention; (ii) use of Stanford facilities such as the Machine Labs.[146] The guide provides that "incidental use" would include "use of the library, use of computer resources available to all students, email, the dorm room, or the use of classrooms to discuss projects."[147]

The Massachusetts Institute of Technology's policy is similar.[148] MIT's intellectual property policy generally provides, "[w]hen Intellectual Property is developed by MIT faculty, students, staff, visitors, or others participating in MIT programs using significant MIT funds or facilities, MIT will own the Intellectual Property."[149] MIT's "Guide to Ownership" clarifies that "[u]se of office, library, machine shop facilities, and of traditional desktop personal computers and Project Athena are examples of facilities and equipment that are not considered significant."[150]

Stanford and MIT have long histories of fostering entrepreneurial activity on campus. Because of that long history, administrators on campus are extremely experienced and sophisticated at managing intellectual property questions. Additionally, those schools have developed mechanisms for addressing such questions. For example, MIT has a form document available online allowing students to request MIT to waive any rights it might have in a student's invention based on that student's use of university resources.[151] Similar policy language, where ownership hinges on the extent of university resources used by the student, may be more troublesome at schools with less experience in managing intellectual property ownership questions. These schools may lack personnel experienced at making these ownership determinations or mechanisms for quickly confirming student ownership.

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145. *Best Practices for Student Entrepreneurial Courses*, STANFORD UNIV., (Oct. 7, 2011), http://otl.stanford.edu/documents/studentbestpractices.pdf.

146. *Id.*

147. *Id.*

148. *See* MASS. INST. OF TECH., *13.0 Information Policies*, MIT POL'Y & PROCS., http://web.mit.edu/policies/13/13.1.html (last visited Sept. 29, 2012).

149. *Id.*

150. *Guide to Ownership, Distribution and Commercial Development of M.I.T. Technology*, MASS. INST. OF TECH. OFFICE OF TECH. LICENSING, (June 2010), http://web.mit.edu/tlo/www/community/policies.html.

151. *See Mass. Inst. of Tech. Request for Statement of No Significant Use of M.I.T. Facilities or Funds and Waiver of M.I.T. Ownership Rights*, MASS. INST. OF TECH. http://web.mit.edu/tlo/www/downloads/pdf/no_significant.pdf (last visited Oct. 23, 2012).

2. Examples of University Policies Attempting to Clarify Student Intellectual Property Ownership

Some schools have moved away from policy language where intellectual property ownership hinges on the extent of university resources used by the student innovator. In 2009, the University of Michigan amended its intellectual property policy, attempting to remove any ambiguity regarding student inventions. The current policy provides that the university "does not claim ownership of Intellectual Property created by students."[152] If a student is paid, then the university treats him or her as an employee under the intellectual property policy and the university would claim title to any intellectual property created with the support of university funds.[153] As explained by the Executive Director of Michigan's Office of Technology Transfer, Ken Nisbet, the university was receiving questions about rights in student inventions based on the university's bylaw covering intellectual property.[154] That bylaw provided that the university held the rights to inventions created with "direct or indirect support of funds administered by the University."[155] The university intended the change to both confirm its existing practice concerning intellectual property in student inventions and to encourage students to use university resources to support their entrepreneurial endeavors. As explained by Mr. Nisbet, "This change both clarifies our intent and sends a strong message. The message is that students are encouraged to bring their ideas to campus and that we're eager to help them pursue those ideas."[156]

The University of Illinois has also adopted a clear policy concerning student intellectual property. Illinois has a "General Rule" providing that the "University owns all intellectual property developed by any University employee or by anyone, including students, using any University facilities, equipment or funds."[157] Illinois, however, provides certain relatively broad exceptions to this General Rule for student entrepreneurial activities:

> **Student Entrepreneurship Activities:** A variety of campus initiatives support student created start up activities by providing limited amounts of funding, space and other resources. For these student initiated and directed start-ups, the University will allow the students to retain ownership of their intellectual

152. *The University of Michigan Technology Transfer Policy*, UNIV. OF MICH. OFFICE OF TECH. TRANSFER, II.C (June 1, 2009), http://temp.techtransfer.umich.edu/resources/policies.php; *see also Student Ownership Policy,* UNIV. OF MICH. OFFICE OF TECH. TRANSFER (2012), http://www.techtransfer.umich.edu/resources/ownership.php.

153. *Id.*

154. *U-M Tech Transfer Clarifies Policy to Encourage Student Entrepreneurs,* U. OF MICH. NEWS SERVICE (June 18, 2009), http://ns.umich.edu/new/releases/7206.

155. *Id.*

156. *Id.*

157. *Ownership of Intellectual Property Created by Students at the University of Illinois*, U. OF ILL. AT URBANA-CHAMPAIGN OFF. OF TECH. MGMT (Sept. 21, 2012), http://otm.illinois.edu/studentownership.

property resulting from these efforts, even though they utilize limited University facilities and resources, through an exception to the General Rules granted by the Vice President for Research. For details on recently approved activities contact OTM.

Student Class Projects: A similar exception is granted by the Vice President for Research for certain courses (such as industrial arts design or engineering senior design, masters of science in technology management) that allow students to own their inventions made as part of the course. The exception applies when the only University facilities used were those routinely made available by the College/Department to all students enrolled in the course. This exception is applied on a course-by-course basis and will be memorialized in supporting documentation prepared by the course instructor in conjunction with OTM in advance of the course commencing. In addition, such project oriented courses often engage sponsors to provide funding and/or specific projects. In those cases, the sponsor may claim ownership of resulting inventions. If so, students must be informed of the requirement to transfer ownership of inventions to the sponsor at the beginning of the semester. Students must agree to such ownership in writing as a condition for working on the project. If the course is a degree requirement, participating students must be presented with a choice of projects, some of which must allow students to retain rights to their inventions. In the event that neither the University nor the sponsor claims ownership, students are free to own their inventions and enter into agreements involving their inventions directly with third parties. Students are required to disclose such inventions to the OTM to receive confirmation of ownership. [158]

3. More Attention is Being Paid to University Intellectual Property Policies Concerning Student Inventions

University policies concerning student intellectual property are receiving more attention. New York Times recently covered how different university intellectual property policies handle student inventions.[159] Also, a Boston Globe article raised the issue of Harvard's potential claim to ownership of Facebook's intellectual property based on the creators' use of Harvard resources.[160]

Media coverage of university intellectual property policies as well as actual and potential disputes concerning rights in student inventions may prompt universities to revisit their policies and practices. Indeed, the University of Missouri recently revised its intellectual property policies con-

158. *Id.*

159. Pappano, *supra* note 41 (citing student inventors benefiting from providing Emory university ownership in their startup in exchange for utilizing certain Emory resources).

160. Brian Love, *Facebook IPO Belies Perils of Collegiate Inventors*, BOSTON GLOBE (May 16, 2012), http://articles.boston.com/2012-05-16/opinion/31719096_1_winklevoss-mark-zuckerberg-paul-ceglia.

cerning students in the wake of a dispute over rights in a mobile application created by a student.[161]

B. *Considerations for Universities In Assessing or Implementing Policies Concerning Student Inventions*

For universities seeking to own intellectual property rights in student inventions, one issue is how to obtain such title. As discussed above, a student inventor will initially own the patent rights in his or her invention.[162] Accordingly, in order for a university to own those rights, it needs to acquire them via a written contract.[163] Unlike faculty, students do not sign employment agreements (unless employed) with the university, so they may not be parties to a contract with the university in which intellectual property rights are assigned.

Whether written policies are part of a binding contract between the university and student will likely depend on state law and the particular language included in materials exchanged between the university and student.[164] In a recent case, a district court held that the plaintiff failed to meet her burden of proving that Howard University's "Graduate School Rules and Regulations" constituted a binding contract between her and the university.[165] The court noted the plaintiff's failure to point to any language in the school policy demonstrating the school's intent to be bound by its terms. Also, there was no other evidence, such as signatures of the parties, demonstrating the university intended to be bound by the policies. The court ruled that the university intended its "Rules and Regulations" to "communicate its expectations regarding academic conduct to its students," and therefore that policy did not constitute a binding contract.[166]

In the context of employees, court decisions addressing the binding nature of intellectual property assignment provisions in employee handbooks are also highly fact dependent.[167] In the *Chou v. University of Chicago*

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161. *Student Inventors Prompt Colleges to Revamp Intellectual Property Rules*, AZCENTRAL.COM (January 24, 2011), http://www.azcentral.com/news/articles/2011/01/24/20110124 student-inventors.html.

162. Bd. of Trs. of the Leland Stanford Junior Univ. v. Roche Molecular Sys., 131 S. Ct. 2188 (2011).

163. 35 U.S.C. § 261 (2001) ("Applications for patent, patents, or any interest therein, shall be assignable in law by an instrument in writing."); *see also* Abraxis Bioscience, Inc. v. Navinta LLC, 625 F.3d 1359, 1366 (Fed. Cir. 2010) ("Common corporate structure does not overcome the requirement that even between a parent and a subsidiary, an appropriate written assignment is necessary to transfer legal title from one to the other.").

164. *See* Eileen K. Jennings, *Breach of Contract Suits by Students Against Postsecondary Education Institutions: Can They Succeed?* 7 J.C. & U.L. 191, 192-93 (1981).

165. Mosby-Nickens v. Howard Univ., 2012 WL 18627726, at *5 (D.D.C. May 23, 2012).

166. *Id.*

167. *See* Chou v. Univ. of Chi., 254 F.3d at 1347, 1357 (Fed. Cir. 2001). *See also* Regents of the Univ. of New Mexico v. Knight, 321 F.3d 1111, 1118 (Fed. Cir. 2003) (holding that the university's patent policy created an implied contract between the faculty inventor and the

case discussed in Section II.B. above, the Federal Circuit applied Illinois law to find that intellectual property assignment obligations in the Faculty Handbook were binding on the plaintiff. The plaintiff's appointment letter expressly made the appointment subject to the administrative policies of the university and the plaintiff's course of dealing with the university demonstrated she understood she had an obligation to assign patent rights to the university.[168]

In addressing whether a university desires to hold rights in inventions created by non-employee students, universities should consider the circumstances surrounding most student inventions and how those differ from faculty inventions. As opposed to employees receiving salary and benefits, students are typically paying tuition in order to have access to the university resources leading to the creation of their inventions. This will typically warrant universities deciding to treat students differently than faculty in determining ownership of inventions created with university resources.

Also, one of the significant benefits of working through a university's technology transfer office is the upfront payment of patent expenses. It is likely that a greater proportion of student inventions are software-related and are not the types of inventions for which patent protection is essential. Accordingly, some of the university resources that come along with university ownership of intellectual property may not be applicable to many student inventors.

Universities should also note that rights in intellectual property do not have to be an all or nothing proposition. In other words, one party does not have to hold all rights unconditionally, and another party hold no rights. Intellectual property rights are extremely flexible. One can divide them by fields of use or by territory and rights can be licensed exclusively or nonexclusively and under various conditions. For example, a university could provide that students own the intellectual property rights in their inventions, but the university obtains a nonexclusive license to use the intellectual property for its internal, noncommercial research purposes. Before adopting such a policy, a university should consider whether such a limited license would impair a student's ability to commercialize the intellectual property.

Universities that take ownership of intellectual property in student inventions might also consider modifying their revenue sharing policies for student inventors. Rennselaer Polytechnic Institute, in recent years,

university concerning intellectual property ownership); *see also* Regents of the University of New Mexico v. Knight, 321 F.3d 1111, 1118 (Fed. Cir. 2003) (holding that the university's patent policy created an implied contract between the faculty inventor and the university concerning intellectual property ownership.).

168. *Chou*, 254 F.3d at 1357.

amended its policies so that certain student inventors now receive seventy-five percent of revenues and the university receives twenty-five percent.[169]

C. *Inventorship Determinations for Student Inventions*

Regardless of which policy approach a school takes to student intellectual property ownership, the initial rights holder of a non-employee invention is almost always the creator. Accordingly, whether a university is seeking to obtain rights in that student intellectual property or assist students in commercializing their intellectual property, identifying the creators of that intellectual property is a necessary starting point.

1. The Complicated Nature of Rights Determinations in Student Inventions

As mentioned above, inventorship is a legal determination and is the first step toward determining ownership of patent rights. Inventorship determinations concerning student inventions can be particularly murky for a number of reasons:

First, a substantial number of student inventions come out of engineering design courses in which students work on teams in solving a problem.[170] Therefore, joint inventorship is the norm giving rise to "one of the muddiest concepts in the muddy metaphysics of patent law" in the words of federal courts.[171]

Second, an inventorship determination may be counterintuitive to a group of students completing a class project. It is not the case that every member of a student team will necessarily qualify as an inventor. Moreover, the considerations for inventorship are much different than the grading considerations to which students are accustomed. Types of contributions that earn good grades – quantity of effort, or the contributions to the final group project, such as analyzing the problem solved, the design process, the potential market, and the benefits of the invention – are not dispositive of patent inventorship.[172] In contrast, the student providing the least effort during the semester may qualify as an inventor, and vice versa.

Third, students often work closely with their instructors or other mentors. The dynamics of this relationship can be confusing. Faculty and

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169. Samantha Stainburn, *Who Owns Your Great Idea?*, N.Y. TIMES, ED26 (Jan. 4, 2009), http://www.nytimes.com/2009/01/04/education/edlife/whoseidea-t.html?pagewanted=all&_r=0.

170. Susannah Howe, *Where are We Now? Statistics on Capstone Courses Nationwide,* ADVANCES ENGINEERING EDUC., Spring 2010, at 9-10; Alan Dutson, Robert H. Todd, Spencer P. Magleby & Carl D. Sorensen, *A Review of Literature on Teaching Engineering Design Through Project-Oriented Capstone Courses*, 86 J. ENGINEERING EDUC. 17, 23 (1997).

171. *See* Murphy, *supra* note 108, at 226 (quoting Mueller Brass Co. v. Reading Indus., 352 F. Supp., 1372 (E.D. Pa. 1972)).

172. *See* Burroughs Wellcome Co. v. Barr Labs., Inc., 40 F.3d 1223, 1227-28 (Fed. Cir. 1994).

mentors often contribute their own ideas during the design project, but then leave it to the students to confirm the soundness of those ideas. Whether the mentor's suggestion is permanent and definite enough to constitute inventive contribution will depend on the particular facts. Also, students may feel uneasy with questioning the contribution of an instructor or mentor who might have a say in the student's grade. Compounding the problem, many instructors misunderstand the law of patent inventorship, and may feel entitled to be named as an inventor on a resulting patent.[173]

Fourth, student inventions may be particularly early-stage and students are often particularly cash-strapped. Therefore, students may be even farther away from filing a patent application than the typical inventor. Because inventorship ultimately depends on the final version of the patent claims,[174] those involved may struggle more than normal with defining the invention to which contributions are being assessed.

Fifth, student inventors are likely to be first-time inventors having limited information or experience concerning the law of patent inventorship.

Sixth, student inventors are not likely to have legal resources to help them. In a situation where joint inventors share a common employer, the employer's counsel is present to provide guidance as to inventorship questions. Even though that counsel will represent the employer and not any inventor individually, that counsel will still have an interest in correctly identifying inventorship and will be able to guide the inventors through the necessary inquiry.

2. Universities' Role in Assisting with Determining the Rights holders of Student Inventions

Universities may have multiple roles in addressing inventorship questions concerning students. One role is in trying to fairly and efficiently manage inventorship determinations so as to avoid unnecessary conflict. Universities have a number of reasons for assisting in this process even when it is clear a university does not hold any rights in the students' invention.[175] Also, with schools' newfound interest in promoting entrepreneurship to students, schools will also want to simplify the process and not dissuade students from seeking to commercialize their classroom innovations due to the appearance of hopelessly complex questions at the early stages.

Another role for the university might be that of a potential owner. A potential inventor might have an assignment obligation to the university (such as through an employment agreement). Therefore, the outcome of

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173. *See*, *e.g*, CURRY & CHOHAN, *supra* note 121.

174. *See* Murphy, *supra* note 108, at 236; *See also* Ethicon, Inc. v. U.S. Surgical Corp., 135 F.3d 1456, 1460 (Fed. Cir. 1998) ("[A] co-inventor need not make a contribution to every claim of a patent. . . . A contribution to one claim is enough.").

175. *See supra* Part II.B.

the inventorship determination might also dictate whether or not the university has any rights in the invention. In this case, the university's credibility to address its first role of facilitating a fair determination between students may be jeopardized (at least in the eyes of the students).

While inventorship questions are inherently complicated and raise the potential for conflict, there are some steps universities can take to avoid unnecessary problems in addressing student inventorship determinations. First, instructors should educate students concerning intellectual property inventorship and ownership standards at the initial stages of the course and prior to the creation of any intellectual property. Such clarification can take the form of a letter to students, explaining that (i) inventorship is a legal standard, (ii) inventor status is unrelated to any grading considerations, (iii) how ownership of class intellectual property is handled, and (iv) various options for pursuing commercialization for class intellectual property post-class.[176]

Second, universities should consider making an intermediary available to students who can explain the standard for inventorship and offer guidance in sorting out inventorship issues. While university intellectual property attorneys may be likely candidates for such a role, students should be informed that the attorney is not their attorney and in fact has obligations to the university. A perceived conflict could exist if a university employee is a potential inventor or if a university policy providing for university ownership is at issue. The ideal intermediary would not have this conflict.

Third, as part of broader entrepreneurial education, universities should stress to students that inventorship status does not equate to founder status, and vice versa.[177] Therefore, a student enthusiastic about pursuing

176. Such a letter has been used by Dr. Aileen Huang-Saad in teaching a graduate-level Biomedical Engineering Course at the University of Michigan.

177. Although not the focus of this article, the author has seen firsthand the problems with too many founders in student startups. Such problems include difficulties in splitting equity in the company, insufficient commitment from all founders, and difficulties in governing the venture. Many startup experts recognize the value in limiting the number of founders in a startup. *See* Dharmesh Shah, *What's the Optimal Number of Co-Founders for a Startup? 2.09!*, ONSTARTUPS.COM (Feb. 27, 2007), http://onstartups.com/tabid/3339/bid/1242/What-s-The-Optimal-Number-Of-Co-Founders-For-A-Startup-2-09.aspx; Brad Feld, *How Many Founders does a Startup Need?*, FELDTHOUGHTS (Feb. 25, 2007), http://www.feld.com/wp/archives/2007/02/how-many-founders-does-a-startup-need.html.
It can be hard to limit the number of founders in student startups, because students typically work in teams of 4-5 students in their engineering design courses. Inventions arising from these courses often have several co-inventors, all of which are enthusiastic about their new invention. A school enthusiastic about entrepreneurship may bombard these co-inventor students with the wonders of pursuing commercializing their invention through a startup. There is often limited guidance during the period of time between invention and startup formation to assist the students in assessing which of the multiple co-founders are best suited to be founders of the startup (e.g., willing to devote a full-time effort to the startup). Moreover, many students do not know their future plans, as they wait to hear from potential employers, graduate schools, or generally figuring out the next step in life. Accordingly, many student startups are formed with a larger-than-ideal number of founders.

commercializing an invention through a startup may still be involved with the startup even if they are not an inventor of the underlying technology.[178]

Fourth, university should also keep in mind that the named inventors for a patentable invention rely on the particular claims pursued in the application.[179] Accordingly, in a situation where an individual contributed only to tangential aspects of the invention, claims can specifically be included or excluded in order to purposefully include or exclude an inventor from the patent. In this way, the scope of joint owners of a patent can sometimes be controlled.

D. *Procedures for the University Confirming that it Makes No Claim to Any Rights in Student Inventions*

It is common for mentors, advisors, or attorneys to caution an entrepreneur to make sure the startup owns the intellectual property it uses in its business.[180] Best practices would typically include obtaining a written assignment from any person that interacted with the invention upon which the startup is based.[181] Such documents can ward off future disputes and demonstrate to investors that the startup has no loose ends that could potentially lead to future entanglements. In cautioning student entrepreneurs to get written statements from the university confirming the student owns the rights to an invention, one intellectual property attorney explained, "You want to get these things cleared up when there hasn't been a lot of value recognized. If you try to clear things up later, people's memories change."[182]

University instructors or employee-mentors frequently work closely with student inventors. Even if the university employee does not qualify as an inventor, a student inventor may nonetheless seek written clarifica-

178. It is a common misunderstanding that allocation of founders equity in a startup should generally track the proportional contribution to the incoming intellectual property. In the author's experience, the equity allocated based on incoming intellectual property is typically small as compared to the equity allocated to the anticipated future work of founders (which is typically issued as restrict stock subject to reverse vesting). As one point of comparison, universities licensing intellectual property to a startup based on that intellectual property typically receive 3-8% equity in that startup at the first round of institutional investment. Interview with Robin Rasor, Dir. of Licensing, Univ. of Mich. Office of Tech. Transfer, President, Association of University Technology Managers (Oct. 15, 2012). Given that this is typically based on federally-funded, faculty-invented intellectual property, for which patent applications are already filed, the equity allocated to student-created intellectual property should in most cases be at the low end of this range.

179. Interview with Robin Rasor, *supra* note 178.

180. FELD & MENDELSON, *supra* note 66, at 167; Bautista, *supra* note 67, at 129; Bowman, *supra* note 68.

181. *See* Ryan Roberts, *Lockdown Lost-Founder IP,* STARTUP LAWYER (Jan. 26, 2010), http://startuplawyer.com/incorporation/lockdown-lost-founder-ip.

182. Stainburn, *supra* note 169 ("Lone-wolf inventors should get a written statement from their university confirming they own their idea.").

tion from the university and/or its employee that the university will not later claim any rights in the invention.

Such a request can be challenging for universities to address unless they have an established process for assessing such requests. One question is whether, assuming a case in which only student inventors were involved, university policy provides for student ownership. At a school where university ownership is contingent upon the nature of university resources used, the school will need to investigate the nature of the invention and resources used. However, even at schools providing for student ownership of their inventions (regardless of the extent of university resources used) there is still a question as to whether a university employee contributed to the conception of the invention such that the employee could be a co-inventor. If a university employee is a co-inventor, and the invention was made within the scope of the employee's work for the university, then the university is likely a joint owner. Accordingly, the university will need to become comfortable that its employee is not a co-inventor. In conducting this analysis, the university will likely want to do at least the following: (i) interview any university employee that contributed to the students' work at issue; (ii) understand the nature of the invention at issue; (iii) investigate whether any sponsored research funds were used to support the invention; and (iv) have patent counsel perform at least an initial inventorship determination to understand whether any university employee made an inventive contribution to the invention-in-question. Inventorship determinations can be complicated and often depend upon the claims included in the patent when it issues in the future.[183] Therefore, it might be impossible for the university to be certain it has no rights in the student's invention. Universities might be tempted to make the requested disclaimer of rights contingent upon no university employee constituting a named inventor on the resulting patent. This begs the question, however, because it is the potential of a university employee inventor that may discourage investors. Accordingly, such a contingency leaves open the very issue any potential investor wants to see closed.[184]

In this situation, a university might first consider whether a slight chance that a university holds a joint ownership interest in an invention should outweigh the benefits of providing clear title to a student start-up venture.[185]

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183. For a discussion of inventorship, see *supra* Part III.A.2.

184. Lori S. Hoberman, *Due Diligence in Venture Capital Deals*, in VENTURE CAPITAL 2008: NUTS AND BOLTS, 477, 486-87 (PLI Corporate Law and Practice, Couse Handbook Ser. No. B-1660, 2008) ("The first goal in conducting intellectual property due diligence is to establish whether the company actually owns clear rights and title to its patents and to confirm that the company's rights to such patents are still valid.").

185. Pappano, *supra* note 41 (quoting Director of George Washington University Office of Entrepreneurship as saying "[s]uccessful alumni breed successful schools."); *see also supra* Part II.B.

A university might also consider a hybrid approach. It could disclaim any claims to ownership it has under any university policy (assuming its policies provide for student ownership in the circumstance at hand). Though, instead of irrevocably assigning to the student any potential rights the university may have (through a university employee being named as an inventor on a resulting patent), the university can grant a royalty-free exclusive license to the startup. The university could provide a relatively lenient mechanism for the license to revert to the university if at a later time the student has entirely given up on the venture (for example, if the student has decided to abandon patent prosecution). This nuanced approach would provide the necessary clear title to the student venture, while protecting the university from irrevocably giving up rights it can never reclaim.

Obviously, the above process can be resource-intensive, especially on a large campus with an entrepreneurial student body where such requests may be frequent. Universities will need to balance the time needed to make proper determinations with the risks of prematurely making an incorrect determination, as well as the corresponding benefit to a student entrepreneur of having clear title to core intellectual property.

V. Managing Joint Ownership Between Students and the University

At a university where students typically own rights in their inventions, the existence of a university employee co-inventor will often cause the university to jointly-own intellectual property with the students. For example, university faculty members will often mentor a team of students on an engineering design project. That faculty member may make an inventive contribution to the project. If the faculty member's work falls under the terms of his or her intellectual property assignment to the university,[186] then the university will own the faculty member's rights in any resulting patent. Absent any written contract assigning the students' rights, the university (as assignee of the faculty member's rights) and each student inventor will jointly own the intellectual property rights.

Joint ownership is not ideal for a technology which one owner is seeking to commercialize.[187] There are at least three primary options for managing the commercialization of an invention jointly-owned by the university and one or more students.

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186. If the faculty member's contribution did not fall under the terms of his or her assignment obligation to the university, then absent some other contract, the faculty member would own his or her rights in the invention individually. *Stanford*, 131 S. Ct. at 2195 ("Our precedents confirm the general rule that rights in an invention belong to the inventor."). In this case, each individual inventor would jointly own the rights.

187. Yang, *supra* note 130, at 225 ("Joint ownership almost always causes problems."); see *supra* Part III.A.2., for a discussion of the problems surrounding commercialization where there are joint owners.

First, the students may assign their rights to the university so that the university is the sole owner of the patent rights in the invention. It seems most fair that in this situation, as consideration for the assignment, the university would agree to treat the students as faculty/employees under the university policies concerning royalty-sharing with employee inventors.[188] Universities could either apply to the students the same royalty-sharing scheme used for employee inventors or universities may consider having a distinct scheme for non-employee students.[189] A typical royalty-sharing scheme for employee inventors is:

> After recovery of University Expenses, aggregate revenues resulting from royalties and sale of equity interests shall be shared as follows. The division of revenues are subject to change through appropriate University procedures.
>
> Up to $200,000:
> 50% to the Inventor(s)
> 17% to the Inventor's department
> 18% for the Inventor's school or college
> 15% to the central University administration
>
> Over $200,000 (and up to $2,000,000):
> 30% to the Inventor(s)
> 20% to the Inventor's department
> 25% to the Inventor's school or college
> 25% to the central University administration
>
> Over $2,000,000:
> 30% to the Inventor(s)
> 35% to the Inventor's school or college
> 35% to the central University administration[190]

Students may find this attractive because they would receive the benefits of working with the university's Office of Technology Transfer, which typically would include the university paying for up-front patent prosecution

188. Bayh-Dole requires universities to share with inventors royalties resulting from the licensing of patent rights derived from federally funded research. 35 U.S.C. § 202(c)(7) (2006). Most universities will do this for non-federally funded inventions as well. *See The University of Michigan Technology Transfer Policy*, *supra* note 152, at V.

189. A case could be made that students should have a greater share of royalties because the students are typically paying tuition whereas an employee inventor is typically receiving salary and benefits for its inventive work. *See* Stainburn, *supra* note 169, at ED26 (describing change of policy at Rensseleaer Polytechnic Institute to increase the royalty-sharing policies for students in studio courses); *see also supra* Part IV.B.

190. *The University of Michigan Technology Transfer Policy*, *supra* note 152, at V.

costs,[191] guidance on commercialization, business formation advice, and/or marketing of the invention to third parties.[192]

Indeed, some students may prefer university ownership of intellectual property in their invention. As explained in a recent New York Times article:

> University help can be a boon for student inventors, too. A third to half of the money generated by a product is typically assigned to the student, with the rest split between the student's department and the university. That's a better deal than the zero percent collected by scientists working for corporations. And universities cover the legal fees involved in obtaining patents on inventions they own, which can easily total $15,000 a patent.[193]

If a university decides to later abandon its efforts to commercialize the technology, the university will typically "reassign" the rights to the inventors.[194] In this case, it is typical for universities to retain a share of any proceeds the employee-inventor receives from the reassigned intellectual property rights.[195] The theory behind this provision is that while a university is deciding to no longer invest in the commercialization of the invention, the invention was still funded by taxpayers who should still share in any proceeds resulting from that invention. Arguably, this type of provision should not apply to students who are reassigned rights because the students' original assignment to the university did not take place pursuant to an existing obligation, but rather as a part of an arms-length transaction.

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191. *See, e.g.*, David Fagundes and Jonathan S. Masur, *Costly Intellectual Property,* 65 VAND. L. REV. 677, 689-90 (2012) ("Once PTO fees and other attorneys' costs are figured into the equation, an average patentee will spend approximately $22,000 to successfully prosecute a patent application."); Kathleen A. Denis & Judith Hasko, Collaborating with Academic Institutions,Presentation at ALI-ABA Course of Study Emerging Issues in Biotechnology Law at Washington, D.C. (September 2007) (identifying reimbursement of patent expenses as a standard aspect of university patent licenses).

192. Pappano, *supra* note 41 (describing situation where Emory ownership of students' intellectual property provided benefits to students).

193. Stainburn, *supra* note 169.

194. *An Inventor's Guide to Technology Transfer at the Massachusetts Institute of Technology*, MASS. INST. OF TECH. 15 (May 2005), http://web.mit.edu/tlo/www/downloads/pdf/inventors_guide.pdf ("If the Technology Licensing Office decides not to pursue patent protection and/or chooses not to actively market the invention, MIT may, upon request by the inventor(s), reassign (transfer ownership) to the inventor(s). Reassignment of inventions funded from U.S. government sources requires government's prior approval. Among the key factors in MIT deciding to reassign are whether additional MIT resources or private resources could best improve marketability and whether all inventors agree with the reassignment plan. Upon reassignment, the inventor(s) are responsible for payment of prior patent costs and all further development, patenting and marketing expenses. MIT may also require you to share with MIT some of any revenue you derive from the commercialization of the invention. If additional MIT resources are used to further develop the invention, MIT may reassert ownership interest in the invention.").

195. *The University of Michigan Technology Transfer Policy*, *supra* note 152, at VI.3 ("Consideration to the University for assignment of ownership of University Intellectual Property shall consist of recovery of any out-of-pocket University expenses, plus 15% of royalties, equity, or other value received by the Inventor(s) through subsequent use, licensing, or further assignment of the Intellectual Property.").

Because the students' work was not taxpayer funded, but instead funded by the students themselves, the rationale for the taxpayer's still sharing in any proceeds received by the students seems less persuasive.

Second, another scenario is that the university may decide not to pursue commercializing the invention, and therefore may "reassign" to the employee inventor its rights to the invention.[196] In this case, the university employee would jointly own the intellectual property rights with the individual students. The inventors would be free to determine their own commercialization path, which may include forming a startup company to which they assign the intellectual property.

Third, if the students or university decline to have the students assign their rights to the university, and if the university retains the employee's rights, the students and university may continue on as joint owners. In this scenario, it is advisable for the university and students to enter into an agreement covering how the technology will be commercialized. As discussed above, the default rules of joint ownership are troublesome to technology commercialization, so joint owners are wise to alter those default rules via contract. Such a commercialization agreement should address at least the following issues:

(i) How the joint owners will apportion patent expenses;
(ii) How the parties make decisions concerning patent prosecution;
(iii) What happens if one party no longer desires to pursue commercializing the technology;
(iv) What happens if one party does not wish to pay for a certain aspect of patent protection (e.g., foreign patent applications);
(v) Which party will lead in marketing the technology to licensees or in forming a startup;
(vi) Which party will control the decision over how to commercialize the technology;
(vii) What terms must be included in any agreement with a third party concerning the intellectual property;
(viii) How any revenues resulting from the jointly-held intellectual property will be shared;
(ix) How the parties will interact if they need to enforce the intellectual property against another party; and
(x) How the parties will apportion risk/liability in the event of a claim against one or both owners.

VI. Managing Student Interactions with Third Parties Concerning Intellectual Property Rights

This Section analyzes how universities can appropriately manage student interactions with third parties concerning intellectual property rights. Section VI.A. provides a background of capstone engineering design courses. Section VI.B. identifies problems that can arise with interactions between students and third parties in capstone design classes. Section

196. *An Inventor's Guide to Technology Transfer at the Massachusetts Institute of Technology*, *supra* note 194.

VI.C. lays out procedures for universities to avoid problems with student-sponsor interactions.

A. *Background of Capstone Engineering Design Courses*

After World War II, the United States increased its focus on engineering education.[197] New engineering courses and curricula tended to be highly theoretical, replacing more practical courses aimed at manufacturing and design.[198] As concerns rose about the inability of new engineering graduates to meet the basic design needs of industry, engineering schools in the early 1990's begin to develop "capstone" engineering design classes.[199] For example, an early "capstone" engineering course was titled "Integrated Product and Process Design"[200] involving engineering students in the departments of Manufacturing Engineering an Mechanical Engineering at Brigham Young University. That class was designed to "provide[ ] a realistic engineering experience as a capstone of undergraduate engineering education."[201] The students worked on teams that were each assigned to an industrial sponsor.[202]

In the coming years, capstone engineering design classes would become increasingly common in engineering schools.[203] In a 2005 study, out of 444 respondents at 232 institutions, 98% reported offering a capstone engineering design course in their program.[204] Indeed, the Accreditation Board of Engineering and Technology now essentially requires capstone design courses:

> Student must be prepared for engineering practice through the curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating engineering standards and realistic constraints that include most of the following considerations: eco-

197. Dutson et al., *supra* note 170, at 17.

198. *Id.*

199. Robert H. Todd et al, *Designing a Senior Capstone Course to Satisfy Industrial Customers*, 82 J. ENGINEERING EDUC. 92, 92-93 tbl.1 (1993) (identifying "'Industrial Perceptions of Weaknesses in Engineering Graduates' [as including:] Technical arrogance, No understanding of manufacturing processes, A desire for complicated and 'high-tech' solutions, Lack of design capability or creativity, Lack of appreciation for considering alternatives, No knowledge of value engineering, Lack of appreciation for variation, All wanting to be analysts, Poor perception of the overall project engineering process, Narrow view of engineering and related disciplines, Not wanting to get their hands dirty, Considering manufacturing work as boring, No understanding of the quality process, Weak communication skills, Little skill or experience working in teams, Being taught to work as individuals.").

200. *Id.* at 94.

201. *Id.*

202. *Id.* In the 1992-1993 version of the course, industry sponsors included Geneva Steel, Thiokol, Boeing, Pacific Gas & Electric, Harris Computer, Valtek, Ford, GM, Utah Medical, Ballard Medical, Ohmeda Salt Lake City, IBM, Burr-Oak Tool Co., K-Tec, and Hill Air Force Base.). *Id.* at 94 tbl 3.

203. Howe, *supra* note 88, at 2.

204. *Id*.

nomic environmental; sustainability; manufacturability; ethical; health and safety; social; and political.[205]

While capstone classes come in all shapes and sizes, they tend to share a few common attributes.

First, the involvement in industry in capstone classes is prevalent. One engineering professor explained, "industrial projects capture greater student commitment than invented projects."[206] A 2005 survey showed that industry sponsored projects were increasing in popularity as compared to a similar 1994 survey.[207] Industrial support for capstone projects involves different forms of support. Industry commonly makes a financial contribution to a design project. This contribution varies drastically but is typically in much smaller amounts than a typical industry-sponsored research project for faculty-led research. The Howe survey showed that many projects receive less than $500 and only 12% of respondents indicated having at least on project in their course that received greater than $5,000.[208]

It is also common for industry personnel to work closely with the student design team. "The involvement of a liaison engineer" from the industry sponsor has been cited as one of the most important factors in determining the success of industry-sponsored projects.[209]

Industry sponsors often seek to obtain title to the intellectual property created by students during the design project. The number of sponsors requiring at least some transfer of intellectual property rights from the students to the sponsor increased from 40% to 64% between 1994 and 2005.[210] Capstone courses frequently provide some education on intellectual property issues.[211] Though, at least some capstone courses focus this discussion on intellectual property issues faced by industry in developing a product and are not aimed at educating students on the rights in their classroom inventions.[212]

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205. Denny Davis et al., *How Universal are Capstone Design Course Outcomes?*, 2423 PROC. 2003 AM. SOC'Y FOR ENGINEERING EDUC. ANN. CONF. & EXPOSITION 2 (2003) (citation omitted).

206. Dutson et al., *supra* note 170, at 22.

207. *Id.* at 8-9.

208. *Id.* at 15-19.

209. Dutson et al., *supra* note 170, at 22.

210. Howe, *supra* note 88, at 22-23 fig.24.

211. *See* Howe, *supra* note 88, at 8 tbl.3 (finding that 45% of respondents covered IP/Patents in class whereas question was not asked in 1994 survey).

212. *See* Matthew Franchetti, Mohamed Samir Hefzy, Mehdi Pourazady & Christine Smallman, *Framework for Implementing Engineering Senior Design Capstone Courses and Design Clinics*, 13 J. STEM EDUC., no. 3, 2012, at 30, 40 ("Considering that the end result of the project is a technological project, students have a tremendous opportunity to learn about technology transfer and intellectual property. The Design Clinic integrates this into the course by dedicating one lecture period to the related issues. A Patent Lawyer from the university's Technology Transfer Department provides a presentation and holds a question/answer session that covers patents, trademarks, commercialization, and entrepreneurship. The Patent Lawyer also discusses the university's role in technology transfer, the evaluation of potential ideas using a standardized process, financial support inside and outside of the

Another common aspect of capstone classes is that students typically work on teams.[213] In both the 1994 and 2005 studies, the vast majority of capstone courses organized students into teams.[214] Reasons for this team-based approach include: (i) teamwork is "one of the most sought after qualities" in an engineering graduate; (ii) modern engineering is almost always performed through teams; and (iii) the ability to handle larger projects.[215] While teams sizes vary, the most common teams sizes are four to six students.[216]

Another common aspect of capstone design courses is that they require significantly more work for instructors than do traditional lecture-based courses. Studies have noted the intensive amount of work required for such courses. As one professor explained, "Some faculty avoid making their contribution because the exhausting labor is offset with correspondingly little credit, and it bears no connection to their scholarly activities."[217] Other commentators have noted, the "commitment to support a really effective, professional process-design course. . .. Requires at least twice as much time to teach as an ordinary lecture course."[218] In particular, the effort required for an instructor to find new and exciting projects for each class is particularly intensive.[219]

B. *Problems Arising with Student-Sponsor Interactions*

A sponsor bringing a project into a class will often desire to own the intellectual property resulting from the project and/or to maintain the confidentiality of any proprietary information disclosed to students or other university personnel. From the sponsor's perspective, the sponsor is often funding the project and sharing certain sensitive information with the students. While the sponsor is eager to contribute to a student's education through providing this "real-world" project and mentoring from experienced industry personnel, a sponsor does not want its information or intellectual property it funded to fall into the hands of a competitor. Also, a sponsor may be wary of having to negotiate with students after the conclusion of a class in order to obtain rights to the intellectual property arising from the sponsored class project.

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university, and legal aspects associated with working with an outside client on a new design.").

213. *See* Howe, *supra* note 88, at 9-10.

214. Howe, *supra* note 88, at 4, 9-10.

215. Dutson et al., *supra* note 170, at 22.

216. *See id.* at 23; Howe, *supra* note 84, at 9-10.

217. Dutson et.al, *supra* note 170, at 20 (citing Vincent W. Uhl, *Development and Critique of the Contemporary Senior Design Course*, 16 Chemical Engineering Educ., no.1, 1982, at 30, 30-33, 48).

218. *Id.* at 21 (citing Vincent W. Uhl, *Development and Critique of the Contemporary Senior Design Course*, 16 Chemical Engineering Educ., no. 1, 1982, at 30, 30-33, 48).

219. *Id.*

In the new entrepreneurial environment on college campuses, these arrangements may present several problems if not properly managed:

(i) Students could misunderstand the terms of the deal they sign;
(ii) Students may feel they have no bargaining power to negotiate or question the deal;
(iii) Students may feel uneasy raising issues with a sponsor or instructor who will grade them;
(iv) Students may sign the deal but have later concerns;
(v) Students may sign the deal but unnecessarily give away more rights than needed, thus foreclosing their ability to work with their class inventions in the future;
(vi) Students could aggressively negotiate with the sponsor, thus stalling the ability to begin the project;
(vii) Students feel the need to pay for an attorney to review the agreement proposed by the sponsor;
(viii) A student has a relative who is an attorney and who reviews the agreement and is surprised at the unfair terms being presented to the student;
(ix) Uncomfortable interactions with the students could dissuade an industry sponsor from future university engagement;
(x) A sponsor may misunderstand the level of effort or quality of care it will receive from the student team; or
(xi) A sponsor may mistakenly assume the university will own the rights in inventions created by students during the project.

C. *General Practices to Avoid Student-Sponsor Difficulties*

At universities where students own the intellectual property in their inventions, any agreement with a sponsor of a student design project concerning intellectual property will typically take the form of a contract between the sponsor and each student taking part in the project. Universities may not always be involved in reviewing these documents. Given a student's lack of expertise, bargaining power, and access to legal resources, some universities will elect a more proactive approach in managing the contractual terms industry sponsors impose on students. These universities should consider the following general practices.

1. Consider a General Prohibition on All, or Certain Types of, Agreements Between Sponsors and Students

As an initial matter, it is worth considering whether universities should generally prohibit outside sponsors of class design projects from requiring intellectual property assignments or confidentiality from the student teams. The reasons for such a prohibition include:

(i) Students might not be equipped to ascertain the legal importance of the deals they are signing;
(ii) Even if students understand the legal aspects of the deal, they do not have bargaining power to negotiate with the industry sponsor;
(iii) An argument can be made that sophisticated corporations are not disclosing truly sensitive information to students they barely know. It is well understood that nondisclosure agreements are relatively weak mechanisms to

protect sensitive information.[220] They can be troublesome to enforce because breaches are costly and difficult to prove. Moreover, suing a collection of undergraduate students would risk unfavorable publicity. Accordingly, it seems unlikely that corporations are routinely divulging sensitive proprietary information to students in the university classroom setting.

(iv) Sponsors of class design projects are typically making a relatively limited financial contribution to the project. As the Howe study shows, contributions to a project are typically less than $5,000.[221] In most university settings, this type of contribution is not commensurate with full intellectual property ownership of resulting work.

Rather, what seems most in line with the contributions of the sponsoring company is to provide the company the freedom to use any resulting intellectual property (i.e., freedom to operate). Accordingly, a full royalty-free, non-exclusive license to the sponsor would seem more than adequate to fairly compensate the company for its sponsorship of the project. If a company desires exclusive rights in the intellectual property it can negotiate with the students for an assignment or exclusive license.

A university-wide policy concerning sponsor-student intellectual property agreements is the most realistic way to impose any limitations on the terms sought by industry. Individual faculty members are not incentivized to impose these standards on outside companies because as the start of a new design course approaches, instructors are typically scurrying to find sponsors for the class projects.[222] Instructors' first motivation may be to assemble a full lineup of attractive class projects from which their students may choose. Individually negotiating with each potential sponsor over the scope of intellectual property and confidentiality terms will simply not be a high priority. On the other hand, if a school has an institution-wide policy governing the permitted terms in sponsor-student agreements in design courses, the burden is lifted from each individual instructor. Instructors can simply direct a potential sponsor to a published policy and (ideally) to certain form contracts.

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220. HUGH B. WELLONS & EILEEN SMITH EWING, BIOTECHNOLOGY AND THE LAW, 62 (Robert Copple el al. eds., 2007) ("At bottom, the company should remember that NDAs are a weak form of defense."); *see also* W. Scott Blackmer, *NDAs: Worth the Effort?*, INFO. L. GROUP (Nov. 16, 2009), http://www.infolawgroup.com/2009/11/articles/information-security/ndas-worth-the-effort ("('NDAs') are widely used but often poorly reasoned or inadequately implemented.").

221. Howe, *supra* note 88, at 15-19.

222. *See* Dutson et al., *supra* note 170, at 21 (citing Vincent W. Uhl, *Development and Critique of the Contemporary Senior Design Course*, 16 CHEMICAL ENGINEERING EDUC., no. 1, 1982, at 30-33, 48).

2. Best Practices for Handling Student-Sponsor[223] Intellectual Property Agreements

Short of an institution-wide prohibition on student intellectual property assignments and/or confidentiality agreements with class project sponsors, the following best practices should be considered.

a. *Students Should Have Option to Work on Projects Without Any Intellectual Property or Confidentiality Obligations*

It is typically helpful to provide students the clear option of working on interesting projects for which the sponsors do not impose any intellectual property or confidentiality obligations. This specifically requires that (i) prior to selecting a project, it is clear to students which proposed projects come with intellectual property or confidentiality obligations, and (ii) a material number of projects are available which do not impose such obligations. For students interested in having the option to seek to commercialize their classroom inventions after the conclusion of the class, this transparency allows them to select a project permitting this freedom.

b. *Students Should Sign Agreements Prior to Work Beginning*

Once students select a project for which the sponsor requires intellectual property or confidentiality obligations from students, it is helpful to present the required agreements to students and have the student sign them prior to the students beginning to work on the project. This will allow the students to understand the specific obligations prior to investing time on a project. If there are terms to which the parties cannot agree, there is still time for the student to switch to another project. Also, all parties would seem to be much more flexible at this stage because there is no tangible invention at the center of the discussion (to which the inventors, in particular, may feel particularly attached).

c. *Universities Should Consider Undertaking a First Review of Sponsor-Student Agreements*

A university should consider how it might control the contractual terms presented to students by third parties. One possibility would be to require outside sponsors of student projects to use form agreements pro-

223. Universities sometimes function as the sponsors of student design projects. For example, a faculty member may bring an existing project into class for a student team to address. Whether or not universities will ask students to assign their rights to the university (if the university does not already claim rights under its policy) is beyond the scope of this article. If assignments of intellectual property from students to the university are used for student design projects based on faculty-provided projects, universities should consider treating the students as employee inventors under applicable university policies governing royalty sharing with inventors. Universities should also consider whether, instead of an outright assignment, the university merely needs a nonexclusive, royalty-free licensee permitting it to use for research purposes any intellectual property arising from the project. *See supra* Part IV.B.

vided by the university. This system would impose the least burden on the university, although some sponsors might balk at having to deviate from their corporate forms.

Another method for ensuring sponsors of student projects do not impose unreasonable terms on students would be to pre-screen the contracts. This might work as follows. When an instructor approaches a sponsor about participating in a class, she informs the sponsor that any contracts for student signature must be approved by the university in advance. This instructor could then submit these contracts to university counsel for approval. This approach has a number of benefits: first, because the university counsel is not interacting with students, there is less of a chance that students could be confused about the role of university counsel in reviewing the documents. Second, university counsel will quickly learn of the small set of hot button issues to watch for in student agreements. A few such issues are discussed below. Third, this approach also might be more efficient for the sponsor because they are dealing with experience university counsel rather than multiple students.

On the flip side, such a review is not without burden. A large engineering school may have many engineering design classes each semester and the number of sponsored student projects could exceed 100 each semester.[224] Assuming full compliance by faculty, this could result in a large number of agreements for university counsel to review.[225] Also, because university counsel can only review on behalf of the university (with an eye toward preventing unfair arrangements being presented to its students), this review does not entirely substitute for students having their own counsel review. It is likely not realistic, though, for students to have their own counsel to review these agreements. So, the university's review, as a party interested in managing intellectual property in student inventions (as discussed in Section II.C) is better than no review at all.

d. *Universities Should Provide Sponsors an Overview of Their Policies and Practices Concerning Student Design Projects*

Beyond performing an initial review of any sponsor-imposed contract to be presented to students, universities should consider making other disclosures to sponsors. While some sponsors may have significant experience working with students, others may not and may have unreasonable expectations. Such disclosures may include: (i) information about the time

224. *See, e.g.*, *CoE Capstone Design Courses*, UNIV. OF MICH. (Sept. 1, 2010), http://www.engin.umich.edu/minors/multidisciplinarydesign/academics/Design-Courses-and-Faculty.pdf.

225. In a prior role, the author conducted this review. As more instructors learned of the issues presented by student-sponsor agreements, the number of agreements for review at the beginning of each semester increased. On the other hand, the number of student-sponsor disputes at the end of the semester essentially vanished. The time saved in avoiding time-consuming disputes more than made up for the time spent reviewing agreements and educating faculty and students.

commitment of the students; (ii) information about disclosures[226] the students will necessarily or likely make as part of the course; and (iii) the university policies concerning ownership of inventions made by students and employees involved in the course. Georgia Tech, for example, provides a website with a comprehensive set of resources for student innovators.[227] Included on the website is a document titled "Student Design Course Guiding Principles" containing information for industry sponsors of student design projects.[228]

3. Problematic Terms in Sponsor-Student Agreements

Universities should consider paying close attention to the following terms in sponsor-student agreements.

a. *Representations and Warranties of Title or Noninfringement*

It does not seem reasonable for sponsors to request representations and warranties from students. Students are simply not equipped to monitor their research and development activity such that they can stand behind the technology they develop in class. Moreover, a representation and warranty in this situation would be essentially meaningless to an industry sponsor. A breach of a representation or warranty by a student would provide the sponsor with essentially no relief. The student would likely have few assets and could not provide any monetary relief that could come close to making the sponsor whole for any harm it suffers. Also, enforcing a representation or warranty against a student is not likely to garner favorable publicity for any industry sponsor.

b. *Indemnification, Defense, and Hold Harmless Provisions*

For the same reasons as with respect to representations and warranties, it does not seem reasonable to ask a student to indemnify or defend an industry sponsor, nor would the sponsor experience any meaningful relief from triggering such a provision. Often sponsors are primarily concerned about students making claims against the sponsor. A hold harmless provision would likely address this concern. Such a provision bars a student from themselves making a claim against the sponsor. It does not, though, require the student to step in and defend or indemnify the sponsor with respect to a third party claim.

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226. It is beyond the subject of this article, but public disclosures of an invention prior to filing a patent application can negatively impact one's patent rights. Such a disclosure likely starts a one-year grace period for filing a U.S. patent application, but it likely negates any European patent on the disclosed invention. *See* 35 U.S.C. § 102 (2006); European Patent Convention art. 54(1)–(2), Dec. 13, 2007, *available at* http://www.epo.org/law-practice/legal-texts/html/epc/2010/e/ar54.html.

227. Resources for Students, GA. TECH. UNIV. http://www.industry.gatech.edu/innovators-entrepreneurs/resources-students (last visited Oct. 3, 2012).

228. *Georgia Tech Design Course Guiding Principles*, GA. TECH UNIV., http://www.otl.gtrc.gatech.edu/documents/Senior_Design_Course_Guidance.doc (last visited Oct 17, 2012).

c. *Exceptions to Confidentiality Obligations*

Sponsors should recognize that students participating on a design project are doing so pursuant to course requirements and to gain experience they can apply in future employment, entrepreneurial activity, or coursework. Therefore, a sponsor's confidentiality obligations should not be so rigid as to encumber a student from (i) including the information in any work product submitted to an instructor for evaluation purposes,[229] and (ii) generally describing his or work in an interview or other discussions with a prospective employer or graduate school.[230]

d. *Scope of Definition of Confidential Information*

Industry sponsors will often seek to define confidential information as any proprietary information provided by the sponsor to the student rather than limiting the definition to information prominently marked as "confidential." Students often do not have the record-keeping skills or infrastructure to track and protect information received from a sponsor, unless that information is relatively finite in volume and prominently marked. From the sponsor's perspective, if they are truly concerned about the confidentiality of their information, they should not expect a twenty-two year old student to recall that certain information requires special treatment unless that information is prominently marked.

e. *Term of Confidentiality Obligation*

The length of the confidentiality obligation should be limited to two years or less. It is not realistic to believe that industry sponsors are truly sharing with students in a classroom setting information of such sensitivity that a prolonged period of confidentiality is necessary. For this reason,

229. The topic of sharing confidential information with an instructor can be problematic. Often, university employees cannot sign nondisclosure agreements on their own behalf. Rather, these agreements must go through the office handling sponsored research or the office handling technology transfer, who are the two most likely offices to have signatory authority over nondisclosure agreements. This added layer of university involvement can often be enough to dissuade a sponsor from requiring an instructor to also be bound by confidentiality obligations. It is often the case that students will not have to include any confidential information in reports or work product submitted to an instructor for evaluation.

230. Rather than negotiating numerous provisions in a confidentiality agreement proposed by a industry sponsor, it often may be easier to provide carve-out language such as the following:

Students Rights: Notwithstanding the other provisions in this Agreement, Student may do the following with his or her work in Course, which may include Confidential Information ("Course Work"): (1) present Course Work to project reviewers and instructors affiliated with Course for purposes of evaluation and grading of Student; (2) discuss Course Work in general terms with any potential employer in job interviews or discussions for purposes of seeking employment, so long as Student does not provide Confidential Information; and (3) provide Course Work to the University's Engineering Department to be retained for purposes of accreditation, provided such Course Work is marked "Confidential. Nothing in this Agreement precludes Student from seeking or obtaining employment with any third party during the term of this Agreement.

students should not be subject to this obligation (and the constant cloud that goes with it) for an extended period of time.

f. *Scope of Intellectual Property Assignment*

The scope of any intellectual property assignment from the student to the sponsor should be limited to the student's work during the course. Any assignment obligation stretching beyond the scope of the course can impair the students future work and cause concerns with future potential employers. For example, a sponsor-friendly agreement may contain language assigning to the sponsor rights in any inventions made by the student based on information provided by the sponsor. Such a provision could arguably cover inventions made by the student after the conclusion of the class, and perhaps even under the employment of another party.

VII. Conclusion

With student entrepreneurship burgeoning on college campuses and universities providing unprecedented support for student-led ventures, universities are confronted with challenging new issues concerning intellectual property in student inventions. Given the importance of clear title to intellectual property for a technology-based startup, universities should consider the following steps.

First, universities should analyze their policy concerning ownership of intellectual property in student inventions and consider whether it is consistent with the current student entrepreneurial activity on campus and the university's approach to supporting that activity. Universities should seek clarity so that students understand the implications, if any, of using university resources to support their entrepreneurial endeavors.

Second, universities should consider implementing educational programs or other procedures to assist in making rights determinations in student inventions consistent with the university policy. These procedures should include mechanisms for answering student questions about intellectual property ownership, including when applicable, disclaiming university ownership of intellectual property in student inventions to provide clarity for investors.

Third, universities should implement a plan, or options, for managing intellectual property jointly-owned by the university and students. These options may include mechanisms for students to work through the university's technology transfer office, processes for the university to assign or license its rights to the students or employee inventors, or an approach for the university and students to seek to commercialize the invention as joint owners under a comprehensive written agreement outlining each joint-owners rights and obligations in order to avoid the common pitfalls of joint ownership.

Fourth, universities should formulate university-wide policy and practices concerning student interactions with third parties concerning intellectual property rights. These policies and practices should seek to support

the established capstone design classes and to continue to encourage collaboration between industry and students. At the same time, these policies and practices should strive to protect students from unnecessarily or unknowingly giving up the opportunity to work with their class inventions outside of the classroom.