
Undergraduate Research & Intellectual Property Rights

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The problem of intellectual property rights in research done at universities is one which has attracted a great deal of attention.¹ Traditionally, this discussion has focused upon allocating rights among the university faculty and staff who do the research, the university which provides the laboratory space and employs the researchers, and the external funding entities (corporate or governmental), if any.² Over the years, a variety of both patent and copyright law doctrines have been developed and applied to these relationships which have helped to clarify this allocation of rights. Most universities today have developed intellectual property policies which establish clearly who owns what rights in any commercially valuable process that may be developed in a university laboratory.³ Commonly such policies deal with who has the right to patent or copyright a particular discovery, determines who has the right to publish the details of any discovery, and allocates royalties derived from any discovery amongst the various potential claimants.⁴ Commonly, such policies are implemented in one of a number of ways. First, of course, some universities simply permit their faculty and staff to retain all rights in any discoveries they may make. While such a policy creates a strong incentive for research, increasingly universities see the intellectual property created by their faculty and staff members to be a valuable university asset.⁵ In order to ensure that the university has at least some share in this asset, many universities require that all university research staff sign contractual agreements regarding intellectual property as a condition of employment.⁶ In

such cases, these contracts will specify in detail the allocation of all rights in any research which may be done in the course of employment. In other institutions, intellectual property rights may be incorporated by reference into employee contracts. Often a faculty or staff manual will contain the university policy and the contents of such a manual will be explicitly or implicitly deemed to be incorporated into the employment agreement.⁷ In those institutions which have not adopted such specific written policies, patent and copyright law will still set some standard by which potential claimants will have their rights allocated. As regards discoveries which are copyrightable, the "work for hire" doctrine, as developed in statutes and case law, will regulate how the intellectual property rights will be allocated between institutions and employee researchers.⁸ In regard to patentable discoveries, the "workplace doctrine" will perform a similar function.⁹ In all of these various scenarios, however, there is in common the fact that the researchers are paid by the institution to do the research which may lead to a valuable discovery, and, therefore, an employee-employer or independent contractor-purchaser of services relationship exists at law.¹⁰

In recent years, attention has been drawn, as well, to the intellectual property rights of graduate students working in university laboratories.¹¹ In some universities, graduate stu-

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dents in engineering and the hard sciences are either explicitly employed by the university as research assistants or are receiving financial aid conditioned upon their doing such research.¹² Those universities have, in general, therefore, modified and extended their written intellectual property policies to apply to such graduate students.¹³ Here again, it is normal to require graduate students to sign agreements setting forth the respective rights of all parties to any research done by these graduate students.¹⁴ In the cases where such written agreements are not used, the tendency of the law has, in many cases, been to treat such graduate students as employees and treat them no differently from faculty or professional staff.¹⁵

Thus, under most university policies, graduate students are either required to sign agreements regulating their claims to intellectual property rights in any discoveries made by them or in collaboration with them. In universities which do not have such written agreements, either directly or indirectly, then property rights will generally be allocated by application of such doctrines as the "work for hire" or "workplace" doctrines already mentioned.¹⁶ Indeed, most recently, a great deal of attention has been focused on such agreements and the rights of graduate students as a result of the criminal prosecution of a graduate student in Florida for theft of intellectual property developed in a university laboratory.¹⁷

While much attention has been given to the rights of faculty and graduate students, little, if any, thought has been given to the rights of undergraduate students. The reason for this

may be quite simple. The assumption has long been that research at universities is done by faculty, professional staff, and graduate students. Traditionally, undergraduates, particularly at research universities, have had little or no role in research. This, however, is changing. Increasingly, undergraduates are spending more time in university research laboratories. This change is attributable to a number of things. First, in the past few years the National Science Foundation (NSF) has taken steps to encourage undergraduate involvement in science and engineering research, such as the creation of the Research Experiences for Undergraduates (REU) Program.¹⁸ In fact, the NSF has gone so far as to indicate that applicants for funding in many categories of research awards will be favored in their applications if they include plans for involving undergraduates in their research plans.¹⁹ The theory underlying these NSF initiatives is that an undergraduate research experience is one of the most effective techniques for attracting gifted undergraduate students to mathematics, science, and engineering.²⁰ Given the current national demand for students in these subject areas, undergraduate research is seen as a national priority. A similar attitude is evidenced in a newly created program of the Department of Energy called the "Science and Engineering Research Semester" (SERS). Second, many university faculty are recognizing the instructional value of undergraduate research. Involvement of undergraduates in serious research activities is a form of "active learning," learning which a number of studies have indicated is more effective than tradition-

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al, "passive" undergraduate classroom instruction.²¹ Third, many faculty have realized that by inclusion of undergraduates on their research teams, they are able to recruit these undergraduates as graduate students. Recent studies, including one at Purdue University, show that a majority of undergraduate engineering students who decided to pursue graduate work in engineering did so precisely because they had been exposed to engineering research as part of their undergraduate program.²² The Purdue study found that fifty percent of incoming graduate students had been involved in some form of research as undergraduates.²³ Even more striking, eighty percent of those polled indicated that their undergraduate research experience had been a significant factor in their decision to go to graduate school. Indeed, it has been suggested that the great advantage of involving undergraduates in a laboratory experience is that it starts them early down the path of recognizing the important link between research and learning and, thereby, becomes a critical factor in instilling the notion of life-long learning since it teaches students how to solve problems in a setting other than within the controlled parameters of the classroom.²⁴ Finally, there is also a practical advantage to faculty and laboratory directors using undergraduates as research assistants. Undergraduate students will generally do research for credit and will not require any form of financial support, unlike graduate students who are accustomed to receiving tuition waivers and living stipends in exchange for working as research assistants.²⁵ Many third and fourth year undergraduates are capable of doing serious work in a research laboratory. Since making such opportunities available to undergraduates increases the labor force available to the laboratory without increasing costs and also serves to recruit these

undergraduates to go on to become graduate students in the field, more and more universities - backed by the NSF and industry - have decided to encourage undergraduate involvement in university research efforts.

The increasing use of undergraduates as research assistants, however, poses some very significant potential legal and policy problems in the allocation of intellectual property rights developed in a university setting. First, informal surveys by the authors indicate that many universities do not ask undergraduate researchers to sign agreements allocating intellectual property rights.²⁶ This may simply be an oversight, or it may be the result of specific policy. Second, traditional intellectual property law doctrines such as the "work for hire" rule in copyright law or the "workplace" doctrine in patent law will not provide solutions in dealing with this allocation problem, since most undergraduate researchers are not employed by the institution where they are doing research.²⁷ On the contrary, they are paying the institution.

The failure to have adequate regulation of the intellectual property rights of undergraduate researchers may lead to some unexpected and ironic results. For instance, a university may have a rule that requires faculty, graduate students, and professional research staff to assign to the university all rights in any discoveries made using university equipment or on university premises. One can, therefore, imagine a situation where a university research team consists of faculty, graduate students, and undergraduate students. The faculty members and graduate students would have no property rights in their discovery, since they had prospectively assigned these to the university or its designee. The undergraduate students, however, having signed no such assignment

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agreement and not being covered by a legal scheme created by the "work for hire" doctrine or the "workplace" doctrine, might well be the only individuals in a position to challenge the university for a share of the property rights in the discovery.²⁸ Such a challenge might delay transfer of the technology from the university laboratory to the marketplace. It might even prevent publication of the results - to the detriment of the faculty and graduate students involved.²⁹ Almost certainly, it could lead to litigation. The cost of such litigation, let alone its impact on faculty morale, would be significantly negative.

In order for undergraduate research efforts to pose such a serious problem in regard to the allocation of intellectual property rights, a few conditions would have to be met. First and foremost, the undergraduates who might claim rights would have to prove that their efforts were significant enough to warrant a finding by a court that they were joint authors or creators of the work in question.³⁰ Were the undergraduates' involvement in the laboratory limited to menial tasks, such as clean-up, it is likely that they could not sustain any claim to a share in the intellectual property.³¹ On the other hand, by limiting undergraduate efforts to perform menial tasks, the faculty member supervising the research would lose the instructional advantages inherent in having the undergraduate play a serious role in the research. It is hardly likely, for instance, that such an experience would encourage undergraduates to go on to do graduate work in the laboratory where they were only permitted to clean-up.³² The whole point of undergraduate research is to make the student a "partner" - albeit a junior partner - in the research effort. Restricting the undergraduate's activity in the laboratory in order to limit her intellectual

property rights would be an exercise in futility. It would be far better simply not to permit undergraduate involvement at all.

If one accepts, as we do, the proposition that serious undergraduate involvement in research has positive values for a university, then it is necessary to confront the legal problems such involvement presents. It is our opinion that the risk of undergraduate researchers making claims to rights in the fruits of their labors is not negligible, particularly in computer science and other types of research where even young researchers may well be able to do significant work. While it may well be unlikely that an undergraduate can make a contribution to a discovery in experimental physics sufficient to warrant allocation of intellectual property rights by a court, such will often not be the case in computer software research, for instance. One needs only to look at recent developments in software research to recognize that gifted undergraduates (even high school students) do have the capability of doing original research which might well result in commercially valuable products.³³ Furthermore, the culture of computer science is such that young researchers may well be aware of their potential property interests and willing to prosecute these interests at law if necessary. Again, the recent history of intellectual property litigation, such as the litigation over Internet browser software, suggests that universities and university faculty must be prepared for their students to make claims to the fruits of their labors. Computer software research is, of course, only one potential field in which such a problem might occur. It could occur, in fact, in any science or engineering subject. Those who are sceptics should remember that Brian Josephson developed his Nobel Prize winning research which resulted in the "Josephson Junction" as an undergraduate at Cambridge

University.³⁴ Indeed, a patent was recently granted to an Ohio eighth grader for helping to develop an innovative oil filter.³⁵ The gift of creativity and inventiveness is not limited to those who possess an M.S. or Ph.D.

If one accepts that the increasing use of undergraduate students in university research laboratories does, in fact, pose a problem as to the allocation of intellectual property rights in university research, what, then, is the solution to the problem? The simplest solution, of course, would be to accept that undergraduates do have intellectual property rights in research discoveries to which they contribute. At those universities which permit faculty and student researchers to retain exclusive rights in their research, such a policy will be relatively simple to maintain. But even in such an institution, faculty and graduate student researchers must still consider what this will mean to them. If undergraduates are used as researchers and if the university permits faculty and students to retain intellectual property rights in their discoveries, then faculty and graduate student researchers will still want to regulate the allocation of those rights vis-a-vis undergraduates in their laboratories.³⁶ It will be the responsibility of the faculty, in particular, to insure that the undergraduate students are aware of their rights. Furthermore, the faculty members will want both the graduate students and the undergraduate students to agree by contract to a specific allocation formula.³⁷

In those institutions where faculty and graduate students agree by contract to assign either all or part of their intellectual rights to the university or its designee, then the simplest solution would again be to modify and extend university intellectual property policies to undergraduate researchers. Indeed, if this is

done, then it will also be necessary to have such undergraduate researchers sign contractual agreements with their universities implementing these policies. This will be necessary because such undergraduates will, for the most part, not be employees of the universities (as are faculty and most graduate students) and, therefore, not covered by such doctrines as the "work for hire" rule in copyright law or the "workplace" doctrine in patent law.³⁸

The use of contractual agreements in dealing with undergraduates will not be completely easy, however. First, there is a problem of the consideration for such a contract.³⁹ When such contracts are signed by faculty and graduate students, they are signed as a condition of employment and the consideration for the employee's agreement is the employment itself and the compensation received as an employee.⁴⁰ Undergraduates, however, are generally not employed by the university and do not receive compensation. Indeed, they generally pay tuition for the privilege of doing the research because they receive credit for it. Thus, in order to have adequate consideration for such an agreement, it will be necessary either to employ the undergraduate as a research assistant (on the graduate student model) or to make signing such an agreement a precondition of the undergraduate being permitted to work in the laboratory.⁴¹ The first possibility - employing the undergraduate - should work, but it does mean that universities and researchers will have to find funds sufficient to pay undergraduates for their research assistance. Nominal payments will not do.⁴² These undergraduates would have to be paid a fair wage if the contractual assignments are to stand up in court. This may be impossible from a fiscal perspective. It may also conflict with university policies prohibiting compensat-

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ing students for work they do for academic credit.⁴³ It may also, because of the fiscal consequences, actually inhibit the use of undergraduate researchers, precisely the opposite of what many universities now favor for the reasons given above.

In the event that it is the faculty member or laboratory director who initiates the contractual agreement (in those universities where faculty are permitted to retain their intellectual property rights), other problems may arise. Even though the university may well be willing to permit the faculty member to retain rights for herself, it may be wary of permitting the faculty member to contractually limit undergraduate researchers' rights. This could be, without a university policy and monitoring, an invitation to exploitation of student researchers.⁴⁴ Universities, in such a situation, would be well advised to standardize such arrangements even if they have no financial interest in them.⁴⁵

The alternative to compensating undergraduate researchers and, thereby, providing consideration for any contractual allocation of intellectual property rights may be equally problematic. That alternative would be to require all undergraduate researchers to assign their prospective intellectual property rights in any research results as a condition of doing research. Such a rule may well conflict with university or governing board policies regarding undergraduate rights. To require a student to assign away all intellectual property rights in work done by the student as a prerequisite to being permitted to enroll in a course may well be viewed as antithetical to the educational mission of the university and highly exploitative of undergraduate labor. It may also not be accepted by courts as sufficient consideration

to uphold the contract as valid under the doctrine of adhesion contracts.⁴⁶

One other possible means may exist for dealing with undergraduate intellectual property rights. This may be to ask students who wish to be involved in undergraduate research to assign their rights to the university gratuitously (i.e., make a gift of any property rights they might acquire as a result of their research efforts). Such a gratuitous assignment would avoid the consideration problem from a legal standpoint, so long as the assignment were truly a gift.⁴⁷ But this itself would require a willingness on the university's part to permit a student who refused to make such a gratuitous assignment to do the research nonetheless.⁴⁸

The appropriate answer as to how to deal with the intellectual property rights of undergraduate researchers must, to a large extent, rest with each university and its research faculty and must be framed within the legal and policy context of each university. What is clearly not an acceptable answer, however, is to deal with the problem ostrich-like, by ignoring it and hoping that it will simply go away. It will not do so, and any university which attempts to deal with these problems by inaction may well find itself embroiled in lengthy and costly litigation. On the other hand, we must hope that most universities will also recognize that there is a great deal to be gained by undergraduate research activities. Thus, we would hope that in spite of the potential difficulties inherent in undergraduate research, university faculty and administrators will attempt to find fair and equitable solutions to the intellectual property problems that will continue to make undergraduate research a viable part of undergraduate instruction in science and engineering.

Notes

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1. See, e.g., Sunil R. Kulkarni, *All Professors Create Equally: Why Faculty Should Have Complete Control Over the Intellectual Property Rights in Their Creations*, 47 *Hastings L.J.* 221 (1995); Sandip H. Patel, Note, *Graduate Students' Ownership and Attribution Rights in Intellectual Property*, 71 *Ind. L. J.* 481 (1996). Mr. Patel argues for greater graduate student rights, a position with which we do *not* agree.
2. The problem of third party rights, in private corporations or in the government, is particularly problematic and would apply to undergraduate research, just as it applies to faculty and graduate student research; see, Patel, *supra*, note 1.
3. In the past two decades, universities have come to not only realize the value of these rights, but to depend upon their sale for income.
4. Most universities will claim at least some rights. The University of Kansas and its Board of Regents, for example, claims full ownership rights in intellectual property developed on its campus, but reassigns a portion of these rights back to the researcher. An informal survey of universities indicates that this is commonplace.
5. Indeed, in some cases, such rights have proven to be of immense value. Thus, for instance, the University of Kansas has received substantial income from the time-release capsule developed by Prof. Higuchi. The University of Illinois was so concerned about receiving a share of the income generated by the Internet software known as Mosaic that it has assiduously pursued litigation on its own behalf.
6. This requirement seems to be spreading, based upon the authors' anecdotal evidence. At the University of Kansas, faculty rights are set out in the faculty manual. Graduate students are required, generally, to sign a formal, written contract assaying their rights to the University.
7. See, e.g., *Logan v. Bennington College Corp.*, 72 F.3d 1017, 1022 (2d Cir. 1995) (stating that it is a jury question whether a faculty handbook constitutes a contract of employment containing rights and obligations of the parties); *Dahlman v. Oakland Univ.*, 432 N.W. 2d 304, 305 (Mich. Ct. App. 1988) (finding that a grievance procedure set forth in the employee's manual was part of the plaintiff's employment contract).
8. See MARSHALL LEAFFER, UNDERSTANDING COPYRIGHT LAW § 5.2(A), (B) (1995). There are two types of works made for hire: those prepared by an employee in the scope of his or her employment and those which are specifically commissioned by an independent contractor. If a work is categorized as a work for hire, the general rule is that the employer is considered the author for copyright purposes unless the parties have otherwise agreed.
9. See PETER D. ROSENBERG, PATENT LAW BASICS § 12.06 (1997). Employees retain exclusive property rights to their employment-related inventions unless (a) there is a contract that assigns the invention to the employer, or (b) the employee is working under a contract to make a particular invention or solve a particular problem. However, even when the employee retains property rights in the invention, the employer is still entitled to a "shop right" - a nonexclusive license to produce and use any invention made by the employee during the hours of employment and/or using the employer's materials.
10. See *id.*; LEAFFER, *supra* note 8.
11. See Patel, *supra* note 1.
12. See *id.* at 502, 505.
13. See *id.* at 505-506.
14. See *id.*
15. See *id.* at 502. There has not been much litigation on the employee status of graduate students for intellectual property purposes. In labor cases, the trend would seem to be towards treating graduate students as employees. For instance, Kansas now treats graduate students as employees for collective bargaining purposes. On the opposing view, see Patel, *supra*, note 1.
16. See LEAFFER, *supra* note 8; ROSENBERG, *supra* note 9.
17. See Ron Grossman, *Patently Unfair Researcher Scoops World with Discovery, Ends up on Chain Gang*, *Chi. Trib.*, Mar. 21, 1997, at 1.
18. Program Announcement for the NSF Research Experiences for Undergraduates, NSF 96-102.
19. See for instance the Program Announcement for the NSF Faculty Early Career Development (CAREER) Program, NSF 97-87, or the press release for the new NSF Recognition Awards for the Integration of Research and Education (RAIRE), NSF PR97-10, both of which emphasize the integration of undergraduate research and education.
20. See *infra* note 22.
21. See CHET MEYERS & THOMAS B. JONES, PROMOTING ACTIVE LEARNING, STRATEGIES FOR THE COLLEGE CLASSROOM 3-6 (1993). See generally, June Cicero, *Piercing the Socratic Veil: Adding an Active Learning Alternative in Legal Education*, 15 *Wm. Mitchell L. Rev.*

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- 1011 (1989) (suggesting that active learning techniques would improve the quality of legal education).
22. See W. Dale Compton *Encouraging Graduate Study in Engineering* J. ENG'G EDUC 249-255 (July 1995).
23. *Id.* p. 249.
24. See David A. Sabatini, *Teaching and Research Synergisms: The Undergraduate Research Experience*, J. PROF'L ISSUES ENG'G EDUC 98-102.
25. There are exceptions, such as the NSF REU Program, however.
26. To our knowledge this is not done, for instance, at the University of Kansas or the University of Illinois, both of which have large scientific research establishments.
27. See, note 15, *supra*.
28. See *id.*; LEAFFER, *supra* note 8.
29. It is possible to conceive a scenario where an undergraduate researcher's claims to property rights would require a court-ordered injunction against publication in order to protect the integrity of the intellectual property rights at issue until those rights were secured.
30. See LEAFFER, *supra* note 8, § 5.4(A). A work is a joint work if its authors intend to merge their contributions into "inseparable" and "interdependent" parts of a whole. "[W]hat counts is primary intent to create a joint work." *Id.* § 5.4 (B).
31. See *id.* ("[A] joint author must not only intend that his contribution be part of a joint work but must contribute more than *de minimus* authorship to the resulting work."); see also *Erickson v. Trinity Theatre Inc.*, 13 F.3d 1061 (7th Cir. 1994) (holding that stage actors were not joint authors of a playwright's plays).
32. See generally Patel, *supra* note 1 at 503 (discussing the importance of valuable research opportunities to graduate students when choosing universities).
33. In fact, Bill Gates started Microsoft, at the age of 19, as an undergraduate student.
34. See 6 *The New Encyclopedia Britannica, Micropedia* 622-23 (15th ed. 1986). Josephson won the 1973 Nobel Prize for Physics for his work on superconductivity that he first developed as an undergraduate student at Cambridge University's Trinity College in the late 1950s.
35. See *Chronicle of Higher Education*, August 15, 1997, at A10.
36. They *must* do so, in order to establish their own rights. In effect, the researchers will allocate the rights amongst all entitled parties.
37. Failure to do so, in cases where the university relinquishes rights, would mean that the faculty would be liable to litigate as the primary parties involved and should, therefore, demand that all potential claimants be signatories to any allocation agreements.
38. See *id.*; LEAFFER, *supra* note 8.
39. See JOSEPH M. PERILLO & HELEN HADJIYANNAKIS, 2 CORBIN ON CONTRACTS, FORMULATION OF CONTRACTS § 5.4 (1995).
40. See *id.* § 5.9.
41. Here, since no cash payments are made to the undergraduates, consideration must take the form of permission to do research. As a precondition to this, it must be clear that the undergraduate does *not* otherwise have an entitlement to do the research, i.e., the instructor should state that admittance to the course is "by instructor's discretion" and *all* students should be required to sign the contracts & waivers.
42. See RESTATEMENT (SECOND) OF CONTRACTS § 71 cmt. b (1979) ("[A] mere pretense of bargain does not suffice, as where there is a false recital of consideration or where the purported consideration is merely nominal.").
43. At the University of Kansas, for instance, a number of schools and colleges prohibit students from receiving *both* credit and compensation for course-work.
44. Universities may well want to set parameters for such faculty-student agreements in order to assure that students will be treated fairly.
45. Again, as a fairness matter, universities may want an *institutional* rule as to allocations of rights, to prevent broad discrepancies between colleges, departments, or even research projects within single departments.
46. See RESTATEMENT (SECOND) OF CONTRACTS § 211 (1979); Todd D. Rakoff, *Contracts in Adhesion: An Essay in Reconstruction*, 96 HARV. L. REV. 1174 (1983). Adhesion contracts are standard form contracts presented on a "take-it-or-leave-it" basis.
47. See SAMUEL WILLISTON & RICHARD A. LORD, 3 A TREATISE ON THE LAW OF CONTRACTS, § 7:2 (4th ed. 1992) ("[T]he line between a bargained-for exchange and a gift is not always an easy one to draw . . .").
48. Failure to do so would void any characterization of the transaction as gratuitous.
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