A Philosophy of Licensing and Technology Transfer for Academic and Nonprofit Research Institutions

2005 AUTM President Mark Crowell, University of North Carolina at Chapel Hill

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I am grateful to have been asked, as 2005 AUTM president, to author an introductory chapter in this edition of the *Technology Transfer Practice Manual.* The *TTP Manual* is one of association's most important and most utilized publications in technology transfer offices, and organizations literally throughout the world have embraced the manual in major ways. As an example, AUTM was pleased to partner with Taiwan's Association of Science and Technology Professionals (ASTP) pursuant to ASTP's interest in translating the *TTP Manual* into Chinese. Similar discussions are under way in other technology transfer organizations outside the United States and with at least one group heavily involved in technology transfer for least developed countries. It is, thus, an honor and a challenge to discuss a philosophy of licensing with esteemed colleagues in the U.S. and abroad who I know make constant use of the *TTP Manual* and who are already partnering with AUTM in so many ways.

I have been a technology transfer director for eighteen years at three *very* different universities (a large private university dominated by life sciences, a large public land grant university with strong engineering and agriculture and no medical school, and a large public flagship university with multiple strengths, especially the life sciences.) This background is offered *not* as a case study of one person's career development—but rather to establish a contextual basis of how my background and experience have shaped my philosophy of licensing.

In the eighteen years in which I have been involved in academic technology transfer, I have seen the emergence of a very different philosophy of academic licensing. When I began my technology transfer career, technology transfer offices at most universities were almost

viewed as an oddity. There was little evidence that such offices were created with a strategic view as to how they should support the universities' missions—traditionally enunciated by most universities as teaching, research, and service (or, at land grants, teaching, research, and extension/engagement). Universities typically started their technology transfer operations as a result of one or more of the following objectives:

- To respond to specific pressure from an insistent faculty member, a corporate research sponsor interested in intellectual property rights, or some other pressing urgency
- To generate revenue to supplement decreasing federal research dollars
- To comply with federal-funding regulations issued by various funding agencies pursuant to the passage of Bayh-Dole

In other words, with notable exceptions, most universities historically launched their technology transfer operations in a reactive manner rather than from a proactive or strategic perspective. As a result, licensing activity tended to be somewhat reactive, very rules-and compliance-focused, extremely risk averse, and driven much more from the licensee partner's perspective rather than from the goals and objectives of the academic licensor.

Over the last five to eight years, I have witnessed a sea change in the practice and philosophy of academic technology transfer. Universities have openly embraced an expansion of their traditional mission of teaching, research, and service to include a fourth leg—economic development and knowledge transfer. Technology transfer offices are shifting from rules-driven, reactive, risk-avoidance bureaucracies to sophisticated transaction-focused intellectual property IP management firms within the academy. Our offices eighteen years ago tended to be staffed by managers, lawyers, and bureaucrats originating in university grants offices, business affairs offices, or legal offices. Today, the profile of technology transfer managers working within universities includes individuals with significant scientific training (including many with doctorates), experience and/or training in business and finance, and, more and more often, specific academic training in areas related directly to academic technology transfer (e.g., IP management, technology evaluation, business plan development, and others). Special courses and even graduate degree programs focusing on technology transfer are beginning to emerge; many practicing academic technology transfer professionals now have adjunct faculty appointments and teach courses related to the profession in business schools, engineering schools, and elsewhere within their institutions.

The institutions we work for have shifted dramatically as well. As noted, many have acknowledged the addition of a fourth leg (economic development) to the traditional three-legged stool (teaching, research, and service) often used to describe the mission of the university. More and more universities have developed a strategic focus for their technology transfer activities—and many no longer articulate or prioritize licensing revenue as one of the top priorities for their efforts (e.g., many now give higher priority to objectives such as company creation, supporting faculty recruitment and retention, enhancing research funding, creating an entrepreneurial culture, attracting venture investment to their regions, and related objectives). The university for which I currently work—the University of North Carolina (UNC)—does not include revenue generation as a specific goal for the office. Instead, the priorities focus on maximizing the development and utilization of the institution's knowledge assets and creating new venture-backed companies that can develop the technology, generate investment and jobs locally, sponsor research, and become resident on a planned research campus. In my role as AUTM president, I have traveled extensively over the last six months throughout the U.S., Canada, the Pacific Rim and Australia, and Europe, and my sense is that UNC is far from unique among major research universities through the U.S., and, in fact, throughout the world.

At its core, however, technology transfer remains a profession whose basic focus is the management of knowledge assets and related IP in concert with the institution's objectives. The basic tool or method by which we accomplish this task is through licensing our knowledge assets. In carrying out a licensing operation within an academic or nonprofit institution, the following basic functions and principles are among those considered essential by this author.

- **IP management:** Assessment of innovations for proper IP protection is a basic function required of a technology transfer office. Ideally, the technology transfer office should have personnel skilled in both the basics of IP law and IP protection and in the development of IP strategies to maximize the commercialization and research utilization of innovations. Because universities are concerned with commercialization of important discoveries and widespread dissemination of discoveries that are research tools, the IP management and strategy philosophy required in an academic institution will differ to some degree from that required in licensing offices within for-profit companies.

- **Bayh-Dole compliance:** As stewards of IP often developed with the use of government research funds, university technology transfer offices have a duty to ensure that their technology assets in the U.S. are managed in compliance with the provisions of the Bayh-Dole Act. Initial reporting, election of title, patent-filing decisions, and licensing practices should be pursued in good-faith compliance with Bayh-Dole. And technology transfer officers should be well-versed with the specifics of Bayh-Dole and able to explain these provisions accurately to faculty inventors and prospective commercial partners. (The Bayh-Dole example is offered simply as a frame of reference; clearly, technology transfer professionals from other countries will have legal or policy frameworks in which to operate other than Bayh-Dole.)

- **Valuation:** University technology transfer offices should approach valuation of their technology assets from several different perspectives. Universities should never apologize for seeking a fair business deal. Financial terms should reflect the stage of development of the invention, its relative value as part of a product that might include other royalty-bearing IP, its stage of development in terms of proof of concept and additional investment required to obtain regulatory approval, and related factors. At the same time, university technology transfer officers should be on guard against overvaluing and taking an overly rigid approach to financial terms in a license agreement. Given that we have many major nonfinancial terms that we consider essential in a licensing transaction, we need to be willing to include the financial terms among those we trade off in the course of negotiating an agreement. In negotiating a license—and especially in considering the financial terms—university technology transfer officers should remember that the licensee must have a deal that provides proper financial incentive to get the product into the marketplace as quickly as possible.

- **Publication:** No university that I know of will agree to allow a licensee to prevent or edit proposed publications by faculty or student researchers. However, it is typically appropriate for academic institutions to allow a licensee to review manuscripts about to be published—but the grounds for this review should be specified as identification of patentable subject matter or of the company's proprietary information.

- **Field-of-use licensing:** One of the indicators of the increasing sophistication and maturity of the academic technology transfer profession is the skill of university licensing officers in pursuing field-of-use licensing of IP assets. Fifteen years ago, it seemed standard practice for most university licensees to grant exclusive rights in all fields. In some cases, this practice may still be appropriate. But more and more often, academic licensing officers are attempting to license their broad or platform discoveries by field of use. This is a useful mechanism for ensuring maximum possible technology development and utilization—and is a key strategy for ensuring that platform discoveries are properly and widely developed and deployed. Another related technique often pursued is licensing discoveries by geographic territories. This is an excellent way by which the university technology transfer office can assure its various constituencies that each technology asset will be developed and commercialized in as many markets as feasible.

- **Technology development milestones:** As noted, a fundamental philosophical underpinning of academic technology transfer is to ensure that each technology asset is licensed to a partner best able to diligently pursue the development and commercialization of the invention. This mandate comes not only from a regulatory sense (via Bayh-Dole), it actually is most fundamentally a component of our missions as research institutions to broadly disseminate the results of our research activities, as well as an excellent mechanism by which we achieve our mission of serving the public. Thus, university technology transfer officers often work and negotiate just as hard on the diligence terms in a license agreement as they do in negotiating financial terms. Milestones may include dates or timeframes for securing regulatory approval, dates by which certain amounts of investment capital must have been raised, dates for initial product introduction or for achieving certain levels of sales, and many other variations of such terms.

- **Research use of inventions:** It is incumbent in managing IP assets that universities take affirmative steps to ensure that inventions that are research tools, or which have the potential to facilitate the advancement of fundamental research, are made available to the widest extent possible to researchers in academic and nonprofit institutions. Some criticism of university technology transfer has emerged because universities are perceived to have done less than an ideal job of reserving the right to grant research use

of key discoveries. Whether the criticism is deserved or not, it is essential that we stay diligent on this issue and that we seek to incorporate such terms as a major component of our licensing philosophy and practice.

- **Global health/public health/orphan applications:** Related to the previous issue of research use, this issue is listed separately because of its increasing importance in terms of ensuring the highest and best use of our technology assets—and in terms of meeting a number of important university objectives in the way that we manage these assets. Technology transfer professionals are increasingly aware that many important discoveries—licensing exclusively for commercialization in the major market of the world—may also have important applications in other markets. Examples include orphan drug applications, agricultural discoveries that increase yield or improve disease resistance, therapeutic discoveries that have application in treating diseases found only in least developed countries, and so forth. These types of applications may be difficult or impossible to pursue via traditional market-based approaches and may require new and creative approaches by university technology transfer offices to find, for example, nonprofit organizations, government agencies, or other nontraditional licensing partners to develop and disseminate products for such markets. Many research sponsors, university constituents, international technology transfer colleagues, technology transfer critics, and others are becoming increasingly interested in the development of strategies within academic institutions for managing our IP assets in a way that seeks such applications—and it is incumbent on technology transfer professionals to manage technology assets with such uses in mind.

In outlining these key functions and principles, it is important to note that one such function that is not mentioned is that of revenue maximization. Obviously, the degree of importance or focus on revenue is going to vary from institution to institution, and some institutions do, in fact, articulate revenue generation as one specific objective for their office. There is nothing inherently antithetical about managing technology for revenue generation while, at the same time, pursuing technology transfer management for the public good. In fact, even in environments where revenue maximization is not a critical objective, I have noted above that universities have a right (and perhaps an obligation) to seek a fair deal, which includes fair financial value. For all institutions, and particularly for

those where revenue enhancement is not a major objective, it is especially important to align the metrics used to evaluate technology transfer effectiveness in a way that reflects the objectives and values enunciated for the function. We all have heard the story of the many technology transfer offices where revenue is deemed unimportant, but when such offices request increases in budget to allow for growth, the first response is, What were your revenues last year?

As an eighteen-year practitioner of university technology transfer, I am amazed at the increased sophistication of our profession—and at the increased potential we have to manage the IP assets developed in our institutions for the public good. We work in different institutions and in different regions; we have different objectives, different resources, and different institutional histories and cultures. What we have in common is that we have been entrusted with responsibility for managing the IP assets generated within our institutions for the public good. The record is replete with evidence that we have risen to the challenge presented by Bayh-Dole—and expanded by our institutions, our regions, our states, and our countries—to capture and protect IP assets and partner with companies and other organizations to transfer these discoveries to the marketplace for public use and for economic development.

In December 2002, *The Economist* referred to Bayh-Dole as "possibly the most inspired piece of legislation to be enacted" in the past half-century. That assessment clearly reflects the development of a successful technology transfer profession within the institutions affected by Bayh-Dole—U.S. academic and nonprofit research institutions. As we continue to adapt our philosophy and our objectives for academic technology transfer, and as we respond to the newly emerging mandate around economic development, the stage is set for continued contributions to societal well-being, to public and global health, to regional economic development, and to research enhancement within our institutions.

Technology Transfer Office Models: An Introduction

Catherine Innes

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This section presents various thought-provoking perspectives on how technology transfer offices are structured to meet differing objectives and environments. As a whole, this series of articles provides perspectives from seasoned technology transfer professionals representing both public and private institutions, as well as large and small offices, and offers insight into the strategic and tactical issues encountered in diverse institutions. Several common themes emerge from these articles. First, it is clearly articulated in each that a primary role of a technology transfer office is to facilitate interaction between the university and the private sector. It is also clear that all technology transfer offices engage in providing service, generating income, and complying with regulations; however, there are some very distinct differences in how each office approaches these three missions. Finally, the authors illustrated that technology transfer offices tend to evolve over time as objectives and environments change.

Christopher Capelli, MD, presents an example of a technology transfer office engaged in licensing, intellectual property management, and education, but clearly set up as a business unit with a stated objective "to seek the fair market value of the university's intellectual property ... for the benefit of the university, faculty/staff, and community." In this model, the University of Pittsburg emphasizes assessment of the fair market value of a technology and negotiates with potential licensees to extract the agreed-upon fair market value. Capelli's chapter details the process the office uses to value technologies and how the office effectively uses a faculty-based technology transfer committee in the selection of the most promising inventions for patent applications.

Andrew Neighbour, PhD, discusses technology transfer operations at the University of California at Los Angeles, a large state university within a large state university system. UCLA serves the three goals of technology transfer—revenue, service, and compliance—

but is clearly aligned toward service over revenue generation. The UCLA office encompasses "six distinct, but integrated, groups of specialist individuals." These groups include licensing, business development, patent management, marketing, materials transfer, and administration. An interesting element of the UCLA program is the use of business development professionals to forge relationships with key faculty in areas that are likely to produce potential solutions to market needs. Once an opportunity is identified, the project is handed off to the licensing professionals to finalize the agreements.

Michael Batalia, PhD, provides an example of a technology transfer office in a private university that is set up under a "hybrid model that focuses its efforts on the development of the value proposition of each technology disclosed." The Office of Technology Asset Management at Wake Forest University is also structured atypically in that it reports to the financial administration of the university in contrast with a more common reporting structure through research administration. An interesting element of the Wake Forest model is the use of a wholly owned, for-profit subsidiary called Seed Stage Associates (SSA). This for-profit entity in-licenses technologies that need further development and business-development expertise, rather than just an infusion of capital, to become commercially viable. In addition, SSA provides other highly customized services such as technology transfer consulting to other schools in the state of North Carolina without established technology transfer offices.

James Severson, PhD, provides a view on technology transfer operations at a large, standalone state university. UW TechTransfer is a large office with four distinct operational units: invention licensing, digital ventures, policy and strategic initiatives, and finance and business operations. The University of Washington has been a pioneer in licensing software and digital assets, and the parallel licensing office model provides a method for optimizing licensing and campus interaction strategies for traditional patented inventions and software and other copyright works. UW TechTransfer considers itself to be a service organization, and it emphasizes outreach to campus units, interaction with the local venture and business community, and completion of licensing transactions to ensure technologies are effectively moved to commercial application.

Robert MacWright, PhD, Esq., presents a view of a midsized technology transfer operation focused on faculty service using a deal-based business model. The deal-based model in use at the University of Virginia Patent Foundation emphasizes marketing prior to patenting and only pursuing patents where a licensee can be found. The University of Virginia Patent Foundation was developed in 1978 as a non-for-profit corporation that is not part of the university. The foundation and UVA have a contractual relationship that provides for assignment of inventions to the foundation in exchange for evaluation, protection, licensing, and revenue-distribution services. MacWright provides an analysis of the advantages of the separate foundation structure and advocates that this model allows for greater flexibility in decision making and hiring than a traditional office within a state university.

Bruce Wheaton, PhD, comments on managing a midsized technology transfer office in a state university. Wheaton discusses the hierarchical set of priorities used in patenting and licensing decisions at the University of Iowa: Adhere to applicable laws, optimize the opportunity for the public benefit, create or retain research opportunities, and "don't be dumb about money." This priority scheme establishes Iowa as an office more closely aligned with compliance and service missions than that of revenue generation; and most specifically, one that illustrates that the activities of technology transfer offices are largely influenced by legal considerations.

Technology Transfer Office as a Business Unit

Christopher C. Capelli, MD

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Introduction

In 2001, the University of Pittsburgh restructured the Office of Technology Management (OTM) as a business unit to provide technology transfer services to commercialize new technologies developed by members of the university community in an efficient and cost-effective manner. The OTM staff includes a director, three licensing managers, a marketing associate, a business manager, a documents manager, two full-time accountants, one part-time accountant, two full-time administrative assistants, and one part-time secretary. The university provides the operating budget. The OTM director reports to the provost and the senior vice chancellor, health sciences.

Philosophically, the university believes that, to be a successful business unit, OTM must provide superior service to both the faculty and staff and to its potential industrial partners.

For the university community, the services that OTM provides include:

- managing the intellectual property and completing good business deals with startup ventures and other licensees
- providing education and counseling on intellectual property and technology transfer

For industry, the services that OTM provides include:

- acting as a bridge between science and business
- providing access for the business community to intellectual property assets of the University of Pittsburgh
- working with industrial and independent investors to match their interests with the available portfolio of intellectual property or by introducing them to world-class University of Pittsburgh researchers who are developing the next generation of innovations

- aiding companies in forging business relationships between university innovators and federal government contractors

Mission

The mission of the University of Pittsburgh's OTM is "to seek the fair market value of the university's intellectual property using best business practices for the benefit of the university, faculty/staff, and community." To advance this mission, the three primary functions for OTM are intellectual property management in compliance with the university's Patent and Technology Transfer Policy, licensing/optioning university inventions, and education of the university community on intellectual property and technology commercialization matters.

Fair market value represents the net present value of the university's intellectual property (IP) based on an arm's length transaction to be discussed in more detail below. Best business practices involve structuring the license agreement to extract such fair market value, taking into account both risk, or uncertainties, and return that is commensurate with the level of risk undertaken as well as consistency in certain key terms of the license agreement as discussed below.

By seeking fair market value and using best business practices, OTM protects the interests of the university and its faculty inventors. By obtaining fair market value, OTM also ensures that the university's tax-exempt status and tax-exempt, bond-financed facilities are not improperly leveraged or jeopardized by for-profit entities. By extracting a fair market return for any technology generated with these dollars, and then reinvesting a portion of such return in further research, OTM serves the broader public interest in advancing scientific knowledge and developing new technologies.

Licensing

Commercializing intellectual property developed at the university in an efficient and cost-effective manner is a measure of providing excellent service to the university community. As a result, licensing and generating revenue from licensing are the key functions of the OTM.

OTM generates revenues from the licensing of university IP. The potential licensee typically becomes interested in a specific technology that it has identified for future revenue growth. The potential licensee becomes informed about specific university IP that may meet its needs usually through the efforts of the IP's inventors. Typically, the licensee identifies specific IP of interest at presentations given by the faculty inventors at conferences, reviewing inventors' articles that are published in the scientific journals, or finding the published abstract for the patent. Direct marketing of technology is performed by the OTM. However, the majority of deals are a direct result of the licensee's relationship with the inventor.

The licensee can be an individual or companies ranging from startups to large multinational companies. In terms of startup companies, they may be nonuniversity ventures or university ventures where the university acts as a founder in the formation of the venture.

Regardless of the status of the licensee, the technology transfer process that OTM uses is essentially the same. First, the fair market value for the intellectual property is assessed by OTM. Second, OTM and the potential licensee negotiate an agreed-upon fair market value for the technology. Finally, using best business practices, OTM and the licensee negotiate a deal structure that extracts that agreed-upon fair market value and license terms consistent with the university's requirements, discussed below.

Fair Market Value

Fair market value represents the net present value of the university's intellectual property (IP) based on an arm's length transaction. Fair market value typically is derived first by determining if relative value can be established. Relative value is obtained by examining the value of comparable IP that is currently on the market or is being developed for market launch. Fair market valuation techniques also involve evaluating the net future cash flows that the IP can reasonably expect to generate. Then, taking into account the timeframe and risks involved in realizing the relative value or the projected cash flows, such amounts are discounted and compared to derive a net present value that best reflects fair market value.

As noted, there are risk factors that must be considered when calculating net present value, including without limitation such factors as (1) stage of technology development,

(2) strength of IP protection, (3) time to market, and (4) competing technologies. The risk factors increase when the stage of technology development is early, the time to market is long, the costs to market are high, competing technologies are numerous, and other obstacles or uncertainties are present (e.g., regulatory or legislative issues).

As an example of how OTM would employ relative valuation techniques to assess fair market value, suppose that the university has IP for a cancer therapeutic and that similar cancer-therapeutic agents currently have a definitive market value. In this case, OTM would estimate the additional costs to develop its cancer therapeutic. Then, taking into account the timeframe to market, the risks involved, as well as the impact of a new therapeutic on the market, such future net value (i.e., the relative value to be received, net of development costs) would be discounted to derive a net present value.

Deal Structure

Once the fair market value is determined, OTM and the licensee will negotiate a deal structure that extracts this agreed-upon fair market value using best business practices. Best business practices involve structuring the license agreement to address both risks and return.

Deal structures to extract the fair market value range from simple to complex. Simple-licenses deal structures are those that return the fair market value of the technology to the university through upfront fees and royalties. Complex deal structures are those that extract the IP's value through a combination of upfront fees, maintenance fees, milestone fees, royalties, and, possibly, equity. If a deal structure involves the university receiving the licensee's equity in exchange for part of the IP's fair market value, the value of this equity is calculated using the current value of the licensee's equity. If the company is a publicly traded company, then the value of the equity is almost equivalent to receiving cash for the fair market value. If the company is not publicly traded, then the value of the licensee's equity needs to be determined. This may be done by reference to some independent third-party sale of the company's equity. Regardless, if the equity is not publicly traded, then the value of the equity provided by the company in exchange for the university's IP should be greater to account for the added risk the university is taking in accepting equity instead of cash.

A deal structure where all the value is provided in the form of a milestone payment at some later date when the product is launched means that there is substantial risk. Therefore, the return the university expects for the IP has to be substantially higher to compensate for the added risk. The fair-market-value return is determined by discounting the future value of the expected milestone payment using an appropriate risk factor.

Finally, deal structures that provide value over time through upfront fees, royalty payments, and/or milestone payments, etc., are evaluated by determining the present value of each future payment, net of any associated costs. The sum of the present valuations for all of these net future payments approximates the fair market value that has been determined for the particular IP.

OTM Licensing Practices

Best business practices in licensing require that the university standardize license terms to the extent possible. Standardizing license terms (other than financial terms) levels the playing field for licensees and creates a common understanding of the balance of risks acceptable to a university (which may differ markedly from the for-profit sector). For example, the university's policies limit the amount of equity the university and inventors can accept in a startup company to no more than 20 percent. In situations where fair market value for the IP would dictate a higher equity position for the university, OTM may instead accept a lower amount of equity, but with antidilution rights that assure that the university receives the appropriate value while still operating within its limits as a nonprofit entity.

OTM, in collaboration with the Office of General Counsel of the University of Pittsburgh, has developed standard template agreements for exclusive and nonexclusive licenses. In the arena of nonexclusive licenses, specific templates have been developed for patented and nonpatented technologies. In each case, license agreements have been designed to recognize the unique role of universities and the need of faculty members to continue research in their chosen field, even as a commercial entity begins to move the technology into the marketplace. Thus, the university's license agreements always retain for the university and its faculty the nonexclusive right to continue to use licensed technology for noncommercial educational and research purposes. In addition, if the invention was

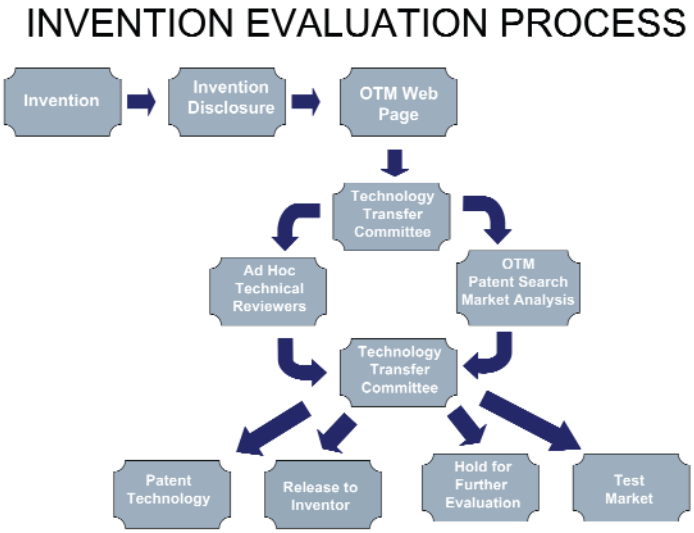
supported by federal research funds, each license includes a reservation of government rights and a provision that all products sold in the United States pursuant to the license must be manufactured in the United States pursuant to the Bayh-Dole Act. Publication of research results is another key requirement for universities, although this need must be balanced against the legitimate interest of a licensee, who may wish to file for patent protection prior to publication. As with most other major research institutions, the university cannot accept the business and financial risks associated with products liability, so it requires indemnity for commercial activities and products liability from its licensees.

A final area of licensing practice in which the university operates differently than the for-profit sector is in the involvement of faculty in startup companies. As part of OTM's mission to assist in the retention of entrepreneurial faculty, it will work with faculty interested in starting companies around university technology. Such startups must provide fair market value for their licenses, however, and faculty must abide by the university's Commercialization of Inventions through Independent Companies policy.

Intellectual Property Management

A second major function of the OTM is management of the intellectual property process. At the University of Pittsburgh, the intellectual property process is shown in figure 1. After an invention has been made by the innovator at the university, an invention disclosure (ID) is submitted to the OTM. At the University of Pittsburgh, the ID is submitted electronically so that it becomes part of the database that is used for tracking and reporting of all inventions. Once a month, a separate committee, called the Technology Transfer Committee (TTC), meets to determine which IDs should be considered for filing of a patent application, which should be held for further data, and which may be marketed as unpatented research tools or copyrights. The committee is composed of various science and engineering faculty appointed by the provost and the senior vice chancellor, health sciences for specific terms, as well as representatives from OTM and the Office of the Provost. Several members of the current TTC are inventors. The committee began operating in January 1993. The TTC has become extremely effective in its selection of the most promising inventions for patent application. In addition, the TTC has been most helpful to inventors in helping them focus on a better or more complete presentation of the invention. OTM provides the organizational support for the TTC.

Figure 1: Intellectual Property Process



The consideration for whether an ID should be submitted to patent counsel for preparation of a patent application is often evaluated during the period between the TTC meeting at which the invention was first submitted for consideration and the following meeting. During this period, the ID may be sent out for review by the TTC to scientists within the university who have some expertise in the field of the invention. The questions that are posed to these reviewers are whether they believe the idea is novel and nonobvious based on their knowledge and whether it may have commercial potential. During this same period, OTM conducts a patent and market analysis. At the following TTC meeting, the results of the scientific review, as well as the input from the OTM, are provided to the committee. The TTC then decides whether a patent application should be filed. In some cases, the TTC may believe that the invention has promise but the inventor needs to submit more data before it makes a final decision. In rare circumstances the invention is released to the inventor.

OTM manages the process of selecting outside counsel to work with the inventor to write a patent application. After a patent application has been submitted, the OTM manages the prosecution in consultation with patent counsel.

Patent Expense Management

As a business unit, OTM is involved in managing the patent expenses. In selecting among invention disclosures for patent application, the OTM and TTC are selective based on a realistic assessment of an invention's market potential. With a more stringent analysis of each invention, the university believes that there can be a decrease in the filings and, thus, the patent costs, without materially impacting the revenue flow from the patents that are marketable. If the invention is very early stage, is only a modest improvement to existing technology, or has little apparent commercial potential, there is little hope that the university will ever recover costs through licensing. These inventions are not typically patented.

Another means of managing the patent expenses is to utilize provisional patent applications where there is an imminent publication or where the invention may hold some commercial promise and/or inventors are close to a more complete data set to reduce the invention to practice. A provisional patent application is often less detailed than a utility application and is much less expensive. After filing a provisional patent application, there is a year to decide whether or not to convert it to a regular application.

The university ordinarily does not file in foreign jurisdictions, except for the PCT (Patent Cooperation Treaty). To file in the national phase, which is very expensive, there must be a licensee or optionee that agrees to absorb the cost.

Each bill from patent counsel is carefully reviewed by OTM to determine, for example, that the items being charged are, in fact, matters for the University of Pittsburgh, that the details on services performed are sufficient to justify the charge, and that each itemized service is only charged once. It has been OTM's experience that this audit process is time well-spent since law firm accounting departments do make mistakes.

Education

A third major function of the OTM is providing education services to the university community. Education services that are performed by OTM include presentations at departmental staff meetings, seminars, distributing educational material, and individual counseling

on university policies, IP, and technology transfer issues. Intellectual property, in the form of invention disclosures and patent applications, is the "product" that OTM uses in generating license revenues. Marketing and education programs are also used by OTM to improve the quality of invention disclosures and subsequent patent applications.

Improve the Quality of Invention Disclosures and Draft Patent Applications

The OTM sees a wide variety of quality in the invention disclosures that it receives from faculty, ranging from a few paragraphs of text that do not permit thoughtful review and decision making to comprehensive disclosures that include a search of patent and scientific literature and clear statements of the perceived novelty of the invention. The incomplete nature of some of the invention disclosures causes a problem not only with review, but also with the patenting process. In numerous situations, scant information is provided to patent counsel on the invention, which puts the onus on patent counsel to collect background knowledge and draft the patent application. This leads to additional charges from patent counsel for patent-application preparation and also loses the benefits that might accrue from having the expertise of the faculty inventor engaged to a greater extent in the patent-application drafting process. By educating faculty on matters such as what constitutes a good invention disclosure, OTM hopes to improve the quality of the material being sent to patent counsel.

Performance

The entrepreneurial culture at the University of Pittsburgh is still young. However, with the emphasis of the OTM in 2001 as a business unit, the university is beginning to see the new academic entrepreneurial culture produce results. One way to evaluate the entrepreneurial culture change at the university is by the results of technology transfer activity from the OTM performance measures including

- a greater than 300 percent increase in total licensing revenue (i.e., license revenue, option fees, and patent reimbursement) from around $1.7 million in FY2001 to greater than $5.3 million in FY2004 (figure 2)
- a greater than 250 percent increase of license/option deals from 20 in FY2001 to 51 in FY2004 (figure 3)

- a major increase in the number of startup companies that licensed university technology going from four in FY2001 to ten in FY2004 (figure 4)
- a positive growth trend in invention disclosures submitted with FY2001, 84 invention disclosures, and FY 2004, 140 invention disclosures (figure 5)

Figure 2: Total Licensing Revenue

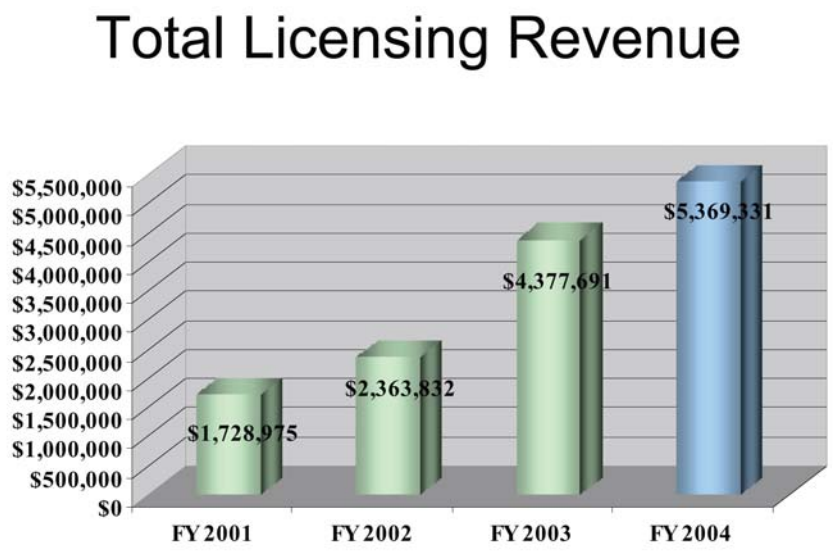


Figure 3: Licenses/Options

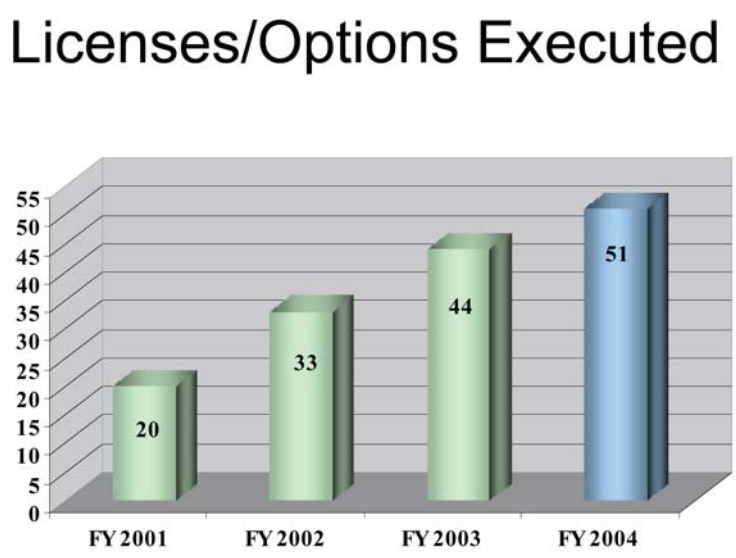


Figure 4: Company Startups

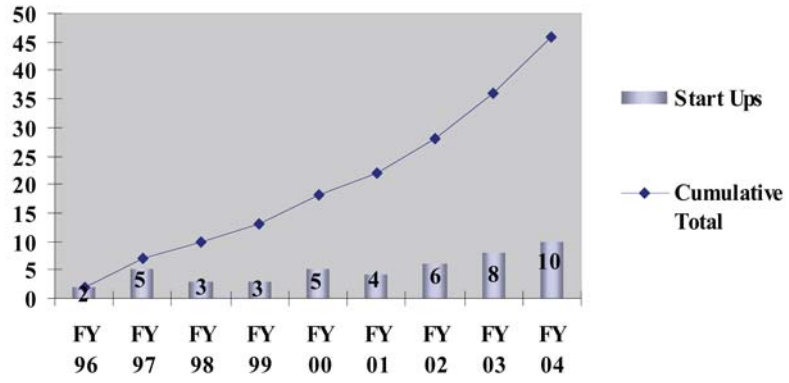
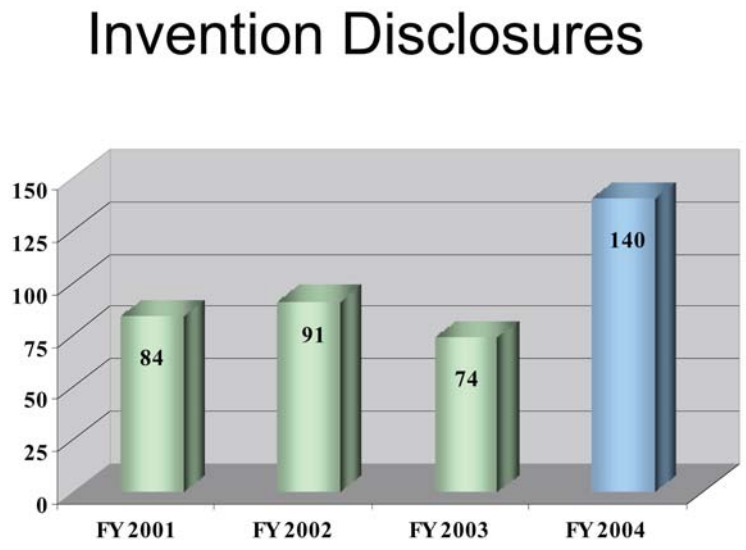


Figure 5: Invention Disclosures



Conclusion

In 2001, the University of Pittsburgh restructured the Office of Technology Management as a business unit to provide technology transfer services to commercialize new technologies developed by members of the university community in an efficient and cost-effective manner. OTM's primary activities—licensing, intellectual property management, and education—are focused on advancing the mission of the university so as to retain entrepre-

neurial faculty, attract outstanding graduate students, and enhance university research. The number of deals (i.e., licenses and options) that have been completed and the revenue generated from those deals are a sign that the OTM is performing its mission as a business unit well.

Managing Technology Transfer at a Large State Institution: The University of California at Los Angeles

Andrew Neighbour, PhD

Since writing this article in early 2005, Andrew Neighbour, PhD, who was associate vice chancellor for research at the University of California at Los Angeles, has retired. Currently, he is living as an artist in Santa Fe, New Mexico.

Background: A Brief History of Technology Transfer at the University of California

The University of California (UC) comprises ten campuses situated throughout the state. Each is a comprehensive teaching and research university, with its Los Angeles campus (UCLA) as the largest in student enrollment and research activity. Over the past five years, UCLA has consistently ranked in the top five research universities in terms of research award dollars. As a public institution, with approximately $800 million of extra-mural research funding, a research faculty in all disciplines of more than 4,000, and more than 10,000 graduate students from all over the world, the University of California is a major contributor of innovation and economic development for the state and the nation. Collectively, each year, the campuses together file more U.S. patent applications than any other U.S. university.[1]

Traditionally, technology transfer has been centered at the Office of Technology Transfer (OTT) in the UC Office of the President (UCOP), now located in Oakland. The OTT served the entire university by providing disclosure review; patent evaluation, prosecution, and management; licensing; and accounting for all technology transfer activities. Almost fifteen years ago, recognizing the need for local campus involvement, UCLA obtained permission from UCOP to establish its own technology transfer unit, as an authorized licensing office (ALO). Successful implementation led to the establishing of ALOs at the Berkeley, San Francisco, San Diego, Davis, and Irvine campuses over the next few years. By 2000, each of these campuses was responsible for all or part of the portfolio arising from research at its own campus, with OTT providing additional case-management capacity

and centralized services such as patent prosecution coordination, accounting, and policy oversight. UC Santa Barbara, Riverside, and Merced (UC's newest campus) continue to rely almost completely on OTT's case-management services.[2]

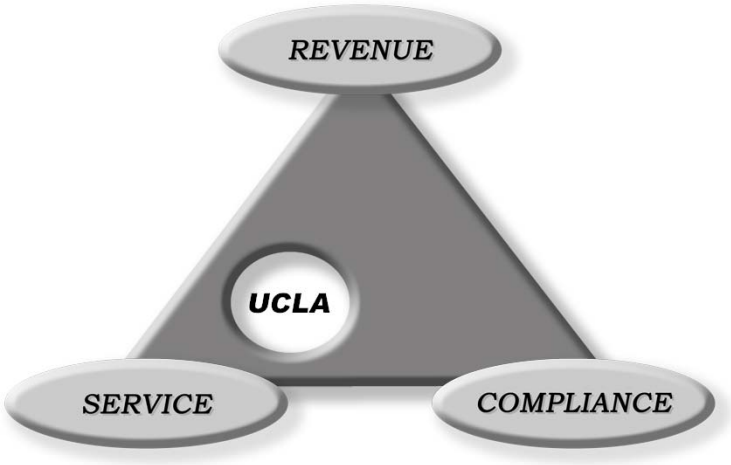
Thus, throughout these years, there has been a gradual decentralization of technology transfer, bringing case management to the campuses so that staff can interact more effectively with faculty on site. The university is presently accelerating this process and expects to complete decentralization of patent management and licensing to all ten campuses within two or three years. OTT will continue to provide policy support and oversight, accounting, central information, and database services, and a linkage to general counsel, who will provide policy and legal advice. All decisions concerning business terms will be delegated to the campuses, and authority to provide exceptions to certain policies will be granted.

Like many technology programs, UCLA has experienced the swinging pendulum of resources, organizational structure, mission, and successes. By the mid-90s, the UCLA technology transfer office, which became known as the Office of Intellectual Property Administration (OIPA), had reached a peak of almost twenty people and was establishing a competent and supportive reputation amongst faculty. However, during the second half of that decade, there was a rapid and, somewhat devastating, decline in resources and organizational support for OIPA, and much of the portfolio was returned to OTT for central management. This deterioration in the services provided to faculty created a legacy of animosity toward the administration that has been slow to mend. External partners were frustrated by the slow and, sometimes, lack of responsiveness; some faculty felt that the commercialization potential of their inventions was not realized; and a general aversion to risk prevailed among senior university administrators. Finally, under new leadership, the campus administration decided that a significant fix was required. The program described below outlines the changes that were made and their impact on reversing this trend.

The Goal

At any university, the goal of technology transfer can be thought of as lying somewhere within an isosceles triangle bounded by three drivers: service, revenue, and compliance. For some institutions, the expectation of revenues from technology licensing is a major

goal. For others, serving the faculty and research enterprise is the most important. Few institutions do technology transfer solely because of federal mandate, but complying with external and internal regulations does often influence the scope and approach taken by most universities. Usually, the goal of any particular institution lies somewhere in the middle of the triangle, with a skew toward one or other of these three drivers. UCLA's overall intentions for its technology transfer program lean toward a service-oriented approach.



UCLA's service mission has been adopted in response to several environmental factors. One of this university's major continuing challenges is attracting and retaining research faculty in a highly competitive market in California. Cost of living, decaying infrastructure, population density, commuting congestion, and schooling are major factors influencing a potential researcher who may consider moving to the greater Los Angeles area. The university frequently faces direct competition from private universities and even from campuses within the UC system that may be able to offer more attractive incentives. Consequently, it is imperative that research administration and assistance with the commercialization of faculty innovations be both value-added and efficient. In addition, because of the legacy of less-than-ideal service in the recent past, as discussed above, providing excellent service to meet faculty needs is a significant expectation of university leadership.

It is also clear from many years of experience within UC that, in relation to the amount of extramural funding received for supporting research activities, revenues from commercialization represent a modest, almost insignificant, source of additional discretionary money to support the enterprise. Currently, UCLA receives approximately $12 million from its technology transfer activities. After deduction of the inventors' shares (35 percent of gross income less unreimbursed patent costs) and portions to cover out-of-pocket costs (operational costs of OTT and the local technology transfer office), patent costs, and a state refund, less than $3 million is available for the schools to reinvest into research. While these are extremely useful dollars, they are minimal in relation to the financial needs of the institution that can be more easily met through state allocation, retained indirect costs from sponsored research, tuition fees, and philanthropy.

With respect to compliance, it is clear that providing good service requires that policies, regulations, guidelines associated with the university's nonprofit structure, and the terms and conditions attached to extramural funds be met. An effective service organization must achieve a balance between acting within the plethora of rules while at the same time not being completely risk-averse. Good service, thus, includes providing creative options and approaches to achieving complex business relationships with full knowledge of the rules and the liabilities that may accrue if the envelope is pushed too far. To be effective, technology transfer should adopt an approach of risk management rather than aversion.

While UCLA's current approach is one of putting service ahead of revenue, this strategy is under constant re-examination and is often adapted to meet the needs of individual circumstances. For example, while there are times that the TTO will actively manage cases with minimal commercial value to build trusting relationships, budgetary constraints and common sense often lead to an aggressive triage of new inventions to maximize the efficient use of university resources. As stewards of state assets, the TTO is obligated to use university resources wisely and cost effectively. A highly commercial invention may tend, therefore, to receive more attention from the office.

Finally, one of the fundamental missions of UC is to support the economic development of the state by creating jobs and industries for the future of California. While the TTO does not seek nor focus solely on those inventions that will lead to new companies, this

mission does impact some of the decision making regarding the mode of commercialization of particular discoveries. The service goal is then frequently met in two ways, by supporting the entrepreneurial interests of certain faculty members and creating new business ventures within the state that, if successful, may enhance the economy. Since revenue to UC is not the main goal, this allows us occasionally to support the creation of a new venture even when the technology could be licensed and effectively developed by an existing out-of-state, mid- or large-cap corporation. (Note: The creation of startups will be dealt with in greater detail later in this chapter.)

The Current UCLA Technology Program

Resources

Perhaps the greatest determinant of success in any technology transfer office is the level of resources committed to the program. Adequate staffing levels as well as sufficient patent and marketing budgets tend to track closely with the success of any individual program. [3]

A simple analysis of the *AUTM Licensing Survey*™ data[4] shows that universities with well-regarded technology transfer programs have approximately 4 to 6.5 full-time equivalents (FTEs) per $100 million of extramural research awards. In addition, the higher the staffing levels, the more disclosures are reported. This, perhaps, reflects the ability of larger offices to be more proactive amongst their faculty in supporting the identification of potentially commercial inventions.

At UCLA, when I arrived in early 2001, OIPA had dwindled to five staff. Presently, the organization has been increased to seventeen FTEs, and, through an organizational merger with the Office of Research Administration, has benefited from the ability to share certain additional core services (information technology, reception, general office administration, etc.), thereby adding additional leverage in a budget-constrained environment.

UCLA, in common with most UC campuses, does not have a defined and separately budgeted fund to support its filing, prosecution, and maintenance of patents and copyrights. As a matter of practice, we endeavor to transfer the responsibility of patent costs to our

licensees at the earliest opportunity. Typically, we recover approximately 70 percent of our out-of-pocket intellectual property costs from our commercialization partners. The remaining unreimbursed, or so-called at-risk portion, is recovered from the portion of income allocated to the campus before the final net revenue is passed on to the school whose inventions generated the income.[5]

In addition, we recently introduced a fast-track patent program[6] to expedite rapid last-minute filings necessary to protect rights from public disclosure and as a way to control initial costs. Working with a select group of local IP law firms, we negotiated a flat fee for filing provisional applications. Once filed, we spend the next nine to eleven months evaluating commercial potential before deciding whether or not to convert to a utility application. The decision to use the fast-track approach with any particular invention is made carefully because of the known limitations and occasional dangers of provisional-patent filings resulting from incomplete support of desired claims.

Merging the Offices of Sponsored Programs and Intellectual Property

In a very large university such as UCLA, faculty can be overwhelmed by the separate administrative units whose activities frequently overlap. The faculty need is to get the deal done. They may not appreciate that different skills are required to negotiate a federal contract, approve a state award proposal, negotiate a clinical-trial agreement, or license an invention. Furthermore, it is common for research administration to evolve into a number of quite separate groups having exclusive responsibility for just one component of the process. Unfortunately, these silos obfuscate smooth processing of sponsored research or technology transfer.

In the past three years, specific efforts have been made at UCLA to encourage the separate functions to collaborate, especially on the more complex projects. Since commitments made in research contracts often involve the disposition of downstream IP rights, it is imperative that the contracts officer understand the implication of setting option terms and that licensing staff be aware of commitments that are made as part of the funding agreement. In addition, both federal and state agencies, and even some nonprofit foundations, are requiring specific intellectual property management plans as part of otherwise

standard extramural grants. Traditionally, grants officers have minimal experience with intellectual property issues, thus, the intellectual property team can provide necessary and immediate support during the funding negotiation.

Some practitioners feel that there is an inherent conflict of interest between sponsored programs and licensing. I believe otherwise and favor the streamlining of process to simplify faculty service by providing a one-stop-shop approach. At UCLA, this merger was absolutely necessary to reduce the gaps between pre- and post-award groups and OIPA. Since these offices were already co-located in one building, it made sense to combine them to create an Office of Research Administration reporting to the vice chancellor for research. This also had the added benefit of sharing common services and avoiding unnecessary budgetary costs. Thus, for example, one receptionist could represent all groups; the information technology group could manage computers and databases for everyone; and general office functions such as filing, photocopying, mail services, etc., could be shared.

Some might question the need to connect the nonprofit pre-award group with technology transfer. However, it is becoming increasingly necessary for the pre-award grants and contracts negotiators to be aware of and understand the implications of the disposition of intellectual property rights under these awards. Many agencies now require intellectual property sharing plans as part of all new proposals. Also, with a closer connection, it is more likely that the sources of funding and any associated conditions will be evident to the technology transfer staff when managing a new invention.

The only real challenge in implementing this merger was to bring about the partnership of individuals and groups that were used to working in defined and somewhat cloistered areas. Change management in a large institution can be challenging, since changes unsettles and threatens stability and security, moving staff into unfamiliar territory. There is always the concern that an individual will be expected to be an expert in areas outside of his or her career experience. Special effort is needed, therefore, to facilitate communication and team building. We did not experience any of the conflict-of-purpose concerns that others have expressed when combining the technology licensing activity with sponsored

research. This is largely because the administration was not forcing an agenda that was aimed at encouraging one activity at the expense of the other. In fact, we invited and followed their wishes with regard to priorities of research versus commercialization in their laboratories. The business development managers serving as faculty liaison helped significantly in establishing the desired balance.

OIPA Organization

In addition to the executive director, OIPA consists of six distinct, but integrated, groups of specialist individuals.

- *Licensing* (four licensing officers, one of whom serves as director of licensing): Each has either extensive prior licensing experience or a combination of a science education with intellectual legal experience.
- *Business development* (three business development managers): Each has extensive industrial experience in building new businesses and acquiring technologies in industry segments directly relevant to the university research portfolio. In addition, one was a partner in a local venture fund, thus providing specific expertise to support new venture creation.
- *Patent management:* An attorney and a paralegal provide patent and copyright oversight in collaboration with the patent prosecution group at OTT.
- *Marketing:* Three marketing staff with science backgrounds and communications experience provide internal promotional activities and support the technology marketing activities of the licensing and business development officers.
- *Materials transfer:* Two experienced staff with science and legal backgrounds manage all material transfer agreements and tangible material bailments.
- *Administration:* Two administrative staff support document, data, and financial management activities.

The business development managers work closely on campus within the schools establishing knowledge of and relationships with key faculty working in areas that may yield potential solutions to market needs. Through their industry contacts, they can link professors with key industry leaders to understand markets and the requirements of the commercial environment for new technologies. They may find new inventions and/or opportunities

for encouraging industry-sponsored research. As such, they form an active bridge between the intellectual property and sponsored projects offices. Having identified an opportunity, they team with a licensing or research contract officer who will negotiate and finalize the legal agreements.

Licensing officers typically are first to review new inventions that flow into the office and serve as the case manager responsible for oversight of each docketed invention. They will tap into the knowledge of the business development staff in formulating a decision regarding the technology. Similarly, they may use this expertise to assist in defining appropriate commercial partners for a focused marketing campaign.

If there is a decision to file, the licensing officer will work with the patent management team to select an appropriate intellectual property attorney and establish the necessary files and documents.

The marketing team will develop a nonconfidential summary of the invention for posting on the OIPA Web site and written promotional materials for distributing to targeted companies. This process is highly focused. Through a major campaign, the marketing group maintains a dynamic and detailed database of industry contacts who have specifically indicated to UCLA their interests in specific technology areas.

Case management, therefore, draws on the specific expertise of individuals drawn from the group according to their technology/industry knowledge to interact as a team through the life of the case. Although one individual—the case manager—is responsible for each case, collaboration within the office with others who can extend the capabilities of each licensing officer is employed as a business practice. This extends the more typical cradle-to-grave model followed by most TTOs.

Proactive Technology Transfer

A very specific and somewhat understandable consequence of the prior benign neglect afforded to faculty at UCLA was their reluctance to disclose their inventions to OIPA. Many chose instead to publish believing that building their resumes would have greater

benefit to them than commercialization through university channels. For a comprehensive university receiving $700 million to $800 million in extramural research support, an annual disclosure rate leading up to the year 2000 was well below competing institutions, averaging less than 120 inventions.[7] Therefore, a deliberate effort was to shift, where possible, to a more proactive method of invention mining. Several approaches were adopted: Holding seminars to provide information on the process of disclosure and how inventions would be handled by OIPA, increased presence on campus (OIPA is situated in an off-campus building approximately ten minutes away by foot), attendance at lab meetings and research reviews, and direct interaction with selected faculty working in fields matched with known market needs.

Internal Marketing and Education

It will come as no surprise to any technology transfer practitioner that many faculty and graduate students are frequently ignorant of their rights and obligations as employees of the university and as recipients of extramural funds. At many institutions, including UCLA, all permanent and temporary employees (i.e., faculty, graduate students, and staff, including visiting appointments) are required to sign a patent acknowledgement agreement. Typical language usually requires that "all employees be required to disclose and assign all inventions that are made within the scope of their employment, and conceived or reduced to practice using university resources, facilities and managed funds." These agreements, by their very nature, can often be interpreted in a number of ways causing ambiguity and confusion among both researchers and administrators. The impact of the employees' permissible external business activities (e.g., consulting) can further complicate the situation, often because these activities are personal to the individual, may not be disclosed to the university, and may require a level of confidentiality that may impede such disclosure.

It is essential, therefore, that all staff responsible for interacting with faculty on issues relating to research administration be fully conversant with all relevant university policies and practices. In addition, this information must be made easily available to researchers, together with training modules to explain the nuances of interpreting these complex requirements. UCLA achieves this through the publication (on the Web and in printed

copy) of tailored brochures and FAQs and by offering explanatory seminars to individual laboratories, divisions, and departments. Depending on the relative roles of the central office and local departmental administration, it may also be advisable to train those who serve as conduits between faculty and the central administration.

One of the significant advantages of being part of a large university system is that each campus can share experiences with their peers throughout the system. The directors of each technology transfer office meet quarterly in person to discuss issues, trends, new policies, etc., and staff at all levels meet regularly at one campus on a rotating basis several times during the year. Listservs and e-mails are also used frequently to share knowledge and experiences between officers.

The UCLA Pre-Seed Fund

On arrival at UCLA, I was confronted with a long line of venture capitalists (VC) from the local and state community wishing to improve their access to university inventions. Because of the low number of disclosures, it occurred to me that perhaps I could use the VC community to provide some help and encouragement to faculty to reawaken their interest in technology transfer. Being a public university, state laws prohibited our entering into privileged agreements with selected commercial entities that would ascribe them preferential access to intellectual property rights. However, in return for funds provided to support research, it was, in fact, feasible to at least grant a first look. Consequently, we created the *UCLA Lab2Market Fund* that would be used internally to support the enablement or acceleration of early-stage inventions that required additional proof of principle or prototyping to establish commercial potential. The university itself has no internal discretionary funds to organize such a funding vehicle. We approached most of the first-tier venture funds in the state (centered around Los Angeles and the San Francisco Bay area) to solicit their participation. Thus far, a small number of these funds have provided $100,000 investments each to a pool that is used to fund certain projects that OIPA believes could benefit from this funding. The money is provided the faculty in the form of zero-overhead grants of up to $25,000. Clear milestones must be negotiated with OIPA, and the money should be used to address a key question that may facilitate commercialization. Examples of projects funded so far include: the collection of animal

data for a novel osteoporosis therapy, programming a user friendly graphical user interface for an antenna design software, and prototyping a new stent. Meetings are held regularly with representatives from the consortium of participating funds to discuss proposed projects and to describe new disclosures received by OIPA that might be of interest to the funds or their portfolio companies. The VC firms gain facilitated access to faculty aided by OIPA, invitations to on-campus technical reviews and seminars, and a modest return on their investment derived from future license revenues or founder's equity if a startup venture is formed. In addition, the funds may each participate in seed or first-round financing of the startup. The partnership is not exclusive and OIPA will not exclude other VC funds from participating in venture generation around university technologies.

Creation of Startups

Because of the keen desire of many of UCLA's faculty to engage in their own entrepreneurial companies, we have agreed to support these interests by allowing them to license inventions they have made—provided there is no other prior claim of rights from a commercial sponsor and following conflict-of-interest and commitment review and approval. OIPA provides introductions when necessary to outside venture funds and angels, as well as advice and broad assistance in creating a commercial venture. Most commonly, we execute a letter of intent, followed quickly thereafter with an option to a future exclusive license. Occasionally, we have granted the license in place of an option when circumstances warrant it. In all cases, whatever the nature of the agreement, we require that (1) the negotiation be with an officer of the new venture (or an attorney acting on his or her behalf) and not the faculty member and (2) the agreement contain clear, drop-dead milestones to enforce diligent development of the technology toward commercialization. For example, if the new venture cannot raise predefined levels of funding within a certain time period, the agreement is terminated and all rights return to the university. The venture must operate exclusively off campus, and the inventors cannot serve as officers in the company unless they take a leave of absence. UC does allow these companies to sponsor ongoing research in the inventors' laboratories subject to review by our independent conflict-of-interest committee. Licensing terms include fees, milestones, royalties, and, in most cases, equity. Our policy allows the university to acquire up to 10 percent equity at issuance. All equity decisions require additional review and approval by general

counsel, and any shares are held and sold by the treasurer of the UCOP using a defined protocol without input or influence from the campus administration or inventors.

Conclusions and Final Comments

There Is no Best Practice

In rebuilding technology transfer offices, I am frequently asked, Who has the best program? or Which university's program are you going to emulate? My response is that one of the mistakes many make in this business is to assume that what worked at a major Massachusetts institution could necessarily be exported to one in the Midwest or Southern California. An effective program must adjust to the local campus culture and needs. Clearly, one should be aware of, and may even introduce, specific initiatives that have succeeded at, for example, Columbia, MIT, or Stanford. However, it is imperative that (1) any expectation that it will work at your institution needs to be carefully managed and (2) it must be tweaked or significantly customized when implemented at your campus to work effectively. Even within one university system such as UC, each technology transfer program is structured, funded, sized, and motivated differently. The directors of each program share their experiences and seek advice from each other, but each brings his or her approach and solutions to common problems.

Perhaps the best example of this is the often-believed misconception that "if we could only create an organization like San Diego's Connect, we could transform this state into the next biotech capital of the world!" Consequently, my caveat to this chapter is that, just because the programs described here are producing results at UCLA, they may not work well at your university. Perhaps the best advice when creating or modifying an organization is to visit several TTOs at institutions similar in structure and size to your own and learn from their successes and failures. I find that TTO directors are, by and large, extremely willing to share their experiences and advice.

Interesting Times

It is important to make the point that the world of technology transfer continues to evolve. Currently, our federal and state congressmen, funding agency leaders, faculty, and our university presidents are becoming more engaged in discussing and influencing the academic technology transfer enterprise. Our industry of professionals has become

smarter and more experienced, and we have seen excellent results and accomplishments throughout most, if not all, research universities. This success, unfortunately, has caught the attention of those who criticize this progress. It is imperative, therefore, that all technology transfer professionals become familiar with these viewpoints and work collectively through organizations such as AUTM, the Council on Governmental Relations, the Association of American Universities, and others to bring knowledge, understanding, and perspective to those who seek to influence our efforts at bringing innovative solutions to those in society who will benefit from them. A critical part of this is that each TTO must maintain its organizational and policy flexibility to serve its constituents well as regulations and the environment in which we work undergo inevitable change.

Notes

1. U.S. Patent and Trademark Office Press Release, #04-04, February 9, 2004.
2. University of California, Office of Technology Transfer Web site: http://www.ucop.edu/ott/.
3. It should be noted here, that by success, I mean the favorable achievement of the overall goal at each institution—not some arbitrarily selected metric, such as the number of inventions disclosed, patents filed or issued, or revenues received. Clearly these measurements can be used, provided this is done carefully and that they reflect the specific goal of the organization.
4. *AUTM Licensing Survey, 2003.*
5. Within the UC system, each campus manages the distribution of income according to its own internal procedures, which may differ slightly from each other. After deducting any unreimbursed patent and legal costs, the UC patent policy defines that 35 percent of the net income be allocated to the inventors (http://www.ucop.edu/ott/patentpolicy/pat-pol.html). OTT then deducts a calculated share of OTT's operating costs prorated to each campus, a portion is returned to the state general fund, and the rest sent to the campus. Once there, UCLA, for example, a portion is retained by the chancellor to cover the cost of its internal technology transfer staff, and, then, any remaining balance is distributed to the school from which the invention was derived.
6. http://www.research.ucla.edu/oipa/fasttrack/
7. *University of California Annual Technology Transfer Report,* FY00: http://www.ucop.edu/ott/ars/ann00/ar00.pdf.

Managing a Medium-Sized Technology Transfer Office

Bruce Wheaton, PhD

Bruce Wheaton, PhD, began phased retirement September1, 2005. However, this article was written in early 2005, when he was serving as executive director of the University of Iowa Research Foundation and director of Technology Innovation Center and Oakdale Research Park in Iowa City, Iowa. Since then, the technology transfer program is under different management, and, therefore, some of the principles, strategies, and objectives mentioned in the article may have changed.

Introduction

Having agreed to undertake the task of commenting on managing a "medium-sized" technology transfer office, a few fairly obvious questions come to the fore: How is managing a medium- sized office different from managing a big one—or a small one? Would one imagine different missions, different philosophical underpinnings for operations of varying sizes? And what in the world defines a medium-sized office?

Factual Background

Let's start with a sense of where I'm coming from—a sense of the University of Iowa Research Foundation (UIRF)—an organization that, in some way, must be, by definition, medium-sized. In our fiscal year that ended June 30, 2004, we earned $10.7 million, received 86 invention disclosures, and filed 118 U.S. patent applications and 62 additional foreign counterparts. In the same period, we received 46 patents and entered 47 licenses. (The relationship between the number of issued patents and the number of new licenses is largely coincidental; despite our fondest hopes, we are not able to license 97 percent of patents as soon as they issue.) Our staff includes 5.3 FTE licensing professionals and 2.5 FTE support persons. During this same fiscal year, the university received about $333 million in grants and contracts. Given this scale, it might be said that the University of Iowa is a "small" large university, and that the UIRF is a medium-sized office as a consequence.

At Iowa, the technology transfer office is aggregated with (though not literally integrated with) the business incubator and the research park.

Underlying Principles

Unequivocally, at UIRF, we assert that our mission is to assure that public benefit flows from intellectual property created at the university. Such a view is in tune with the broad conventions crystallized in the Bayh-Dole Act some twenty-five years ago—though it is seen as almost naively quaint in certain circles nowadays as selected universities adopt an emphasis on revenue generation. Our fairly conventional formulation of purpose reflects the institutional tradition, as well as a fairly heavy institutional reliance on public funding, to fuel our research base. I do not believe that this fundamental bias follows from the size of our office—though it is conceivable that the modest size of our technology transfer office follows from this fundamental bias. Our office is, after all, self-sustaining.

As an operational matter, we routinely make patenting and licensing decisions based on a hierarchical set of priorities:

- Adhere to applicable laws, regulations, contractual obligations, and academic policies.
- Optimize opportunity for public benefit.
- Create or retain research opportunities or prerogatives.
- Don't be dumb about money.

A bit of elaboration might be helpful. Placing the need to follow the law and the dictates of contracts, regulations, and policies in a trump position is not controversial, though I am surprised that, from time to time, such necessary prominence is left as a tacit point. Better to write it down if for no other reason than to remind us that our professional activities are largely conditioned by these considerations.

Our emphasis on public benefit is a hobbyhorse that might bear a bit more riding. This consideration guides not only license determinations, but can also guide decisions on whether or not to seek patent protection. We may well choose not to patent an invention if, for example, such a patent would be enforced only against research organizations. The notion of benefit readily finds its way into license determinations. Assessing the breadth of potential benefit is the pivotal consideration in our initial determination of whether a licensing strategy should be based on exclusivity or nonexclusivity. In those happy circumstances when we have a choice of exclusive licensees, our first cut in choosing the

preferred partner routinely will be based on a comparative assessment of the candidates' ability to bring a product (or products) to the market in a timely and efficient manner. All other factors being equal, we would choose the more efficient partner even if a competitor might offer an apparently more lucrative compensation package.

As something of an interstitial note, I observe that, an office operating on a revenue-first mandate might reach the same decision based on the same set of facts. One might readily believe, for example, that the more efficient time to market was an important sign of reduced business risk and, so, from a different set of priorities, might reach the same conclusion we would. That is to say, a rationale tilted toward public benefit and a rationale tilted toward revenue are not always antithetical. There is an undeniable relationship between commercial efficiency and the ability to deliver benefit and vise versa.

Our desire to create or retain research opportunities and prerogatives is not particularly novel in academic intellectual property offices. We're delighted when a license can generate a companion research agreement. We'll take pains to assure that researchers can receive samples of patented and licensed materials for appropriately constrained purposes. We don't budge on agreement language that would prohibit publication of novel research results. These are standard across offices of all shapes and sizes.

As for our self-injunction "Don't be dumb about money:" First, the negative phrasing compared to the positively phrased alternative, "Be smart about money," better reflects the priority ranking of this consideration. Second, we want to remind ourselves that, from time to time, it is quite possible to be too smart about money and to enter an agreement that limits the partner's opportunity to succeed. This is particularly true of startup companies or any other licensee that might feel an urgent need to document a license transaction to obtain additional financing. One might argue that the partner should take care of itself in negotiation and that the liability for a bad deal lies with the partner. This is not always true, however, since a transaction with inflated terms creates revenue expectations among the inventors and other stakeholders. If, in the face of business realities, these terms must be modified, the expectations will be dashed precipitously. Disappointing inventors and stakeholders is usually not good for a technology transfer office—even if the cause of the disappointment is inevitable or meritorious.

Finally, our sense that we should not be dumb about money follows from a sense that it is not always possible to be as smart about a particular transaction as our private sector counterparts can be. As tech transfer offices become more sophisticated in their licensing practices, we seem to be coming to believe that we are always on equal footing with even the most sophisticated of negotiating partners. Now, we might be as clever and we might be as experienced, but I fail to see how we can be as routinely knowledgeable about the business aspects of a particular transaction as somebody whose professional activities are limited to products in a narrow market space and whose employer might have economic records documenting things such as historic costs and margins in that market space. There will be times when the person on the other end of the phone simply knows more than we do about the specific business opportunity at hand. This may be less common in large offices that are able to hire more specialists than for those of us in medium-sized offices. Even so, the largest of offices can't cover the entire waterfront of special expertise and so must face this problem from time to time. The point is, you don't have to show up the experts to meet your objectives, you don't have to clobber them to take pride in your work, or outsmart them to make a workable and valuable transaction. Just "Don't be dumb."

Day-to-Day Activities

As is the case in most technology transfer offices, UIRF does considerably more than manage patents and process royalty checks. We work closely with our colleagues in the Grants and Contracts Office to assure that we collectively can live with the intellectual property (IP) language in various award instruments. In our last fiscal year, we negotiated or participated in the negotiation of 125 grants and contracts that contained nonstandard IP language. Mercifully, this is not the majority of grants and contracts processed through the university system.

UIRF also manages all outbound material transfer agreements. Last fiscal year, we entered 109 such agreements and do not delude ourselves by believing that only 109 tangible properties left campus during this period.

Management of copyright materials and responding to questions on copyright matters occupies an increasing fraction of our staff time—as it must elsewhere. UIRF is the designated owner of copyrights held by the institution, and so we are the designated arbiter of

copyright ownership disputes that might arise between the institution and individual employees. Perhaps more important, we must—as appropriate—license or otherwise permit others to use institutional copyrights—whether pedagogical materials or software. In order to avoid misunderstanding, I quickly add that Iowa's copyright policy is very similar to others around the country, so we are not involved in managing copyright materials conventionally owned by faculty members, staff members, or students.

Still and all, the majority of our time is spent managing patents—receiving disclosures, determining whether to file, working with outside counsel on prosecution matters, finding licensees, negotiating licenses, and monitoring license compliance. Large office, small office, or medium-sized office—these tasks will be common.

We divide our workload by giving each professional a portfolio with the responsibility to manage each item in it from cradle to grave. We believe that there is value in maintaining continuity throughout the lifecycle of a project—that knowledge gained while receiving a disclosure may prove useful in licensure, for example. We also believe that this vertical work structure makes it easier for researchers to develop a collegial relationship with their technology transfer officer. While understanding that many offices succeed using a horizontal work structure that encourages specialization in tasks such as licensing or prosecution, we believe that there may be more opportunities for professional development of our staff colleagues if they are allowed to practice their profession in a broad range of activities. We also believe that all should have the satisfying opportunity to conclude a transaction based on a disclosure they helped document and a patent they helped to file.

Because of the many demands placed on our office—and because we can imagine more things to do than we can accomplish—we are particularly reliant on a uniform and shared digital information system to relieve selected burdens. No one and no system can manage away all of the operational inefficiencies inherent in IP management. There will always be urgent questions, urgent deadlines, and urgent opportunities that disrupt the planned course of a smooth workday. We can, however, manage away those inefficiencies related to careful documentation, the docketing of deadlines, the ready tracking of correspon-

dence, and the careful management of fiscal affairs. With a scrupulously maintained shared information system, we can make it easier for one colleague to help out another home with a sick child or on vacation in Mexico. We would behave like a very small office, indeed, were it not for the transparency and relative ease and comprehensive nature of our tracking system.

Special Challenges

The University of Iowa, like other public institutions around the country, presently feels acute pressure to participate in the growth of our state's economy by licensing more frequently to in-state companies and by licensing more frequently to startup companies driven by academic inventiveness. Indeed, the mission of economic development has—or almost has—become a fourth mission for the institution to go along with education, research, and service.

Sorting out the political implications of this pressure will require time and a better understanding by both academics and elected officials of what universities can and cannot do to spur private-sector activity.

Our office, like other similarly positioned offices, is further challenged by the palpable need for more direct staff contact with researchers—whether this contact would be aimed at providing education on laws, policies, and practices germane to successful technology transfer or whether this contact would be aimed at generating additional disclosures of inventions that might otherwise be unnoticed.

The needs to participate actively in economic development and to spend time directly with researchers are symptomatic of the general rise in expectations of technology transfer offices. Whether these increasing expectations are measured by some surrogate for public benefit, by faculty satisfaction, by licensing revenue, or by the number of jobs added to the regional economy, they do move an otherwise medium-sized technology transfer office to look for ways of becoming larger.

Avant-Garde Technology Transfer at a Midsize, Private University

Michael Batalia, PhD

Michael Batalia, PhD, is director of the Office of Technology Asset Management at Wake Forest University Health Sciences in Winston-Salem, North Carolina.

When there is overt public acceptance of what is still only an idea in the mind of leadership, it means truthfulness has hit its mark.[1]

Over the last twenty years, interest in academic technology transfer has grown dramatically. The financial returns, jobs, and product success stories have attracted the attention of government, business, and academia. Many metrics are collected, but it is safe to say that no two technology transfer programs are alike. It's probably even safe to say that no two technology transfer programs are close to similar, even though many of the underlying policies, standard agreements, and operating philosophies are shared.

The reasons for these discrepancies are no mystery. Like any other department in a university or a company, the organization and regional stakeholders have a lot to say about which needs come first. In cases where venture investments are made in university technology, the venture interests may dictate where resources are focused and which efforts take precedent. In addition, staff requirements and administration turnover result in different dynamics within the community. All these factors result in unique offices that are changing to meet the demands of the moment.

The budgetary requirements of an office are unique to the individual programs—whether the office exists within a public or a private university. Even though a university may derive large sums from royalties and other financial considerations, the budgets of the technology transfer programs typically are set year by year. Most programs don't get to capitalize on the windfalls and reinvest funds into future technology.

With this in mind, let's spend a moment on the classic models of technology transfer most institutions draw upon in the course of doing business as an office. Each institution chooses a technology transfer strategy predicated in whole or in part on the following models of technology transfer: the service model, the revenue model, and the economic development model.[2] I will briefly review these models before reflecting on the unique patois that currently is the office at Wake Forest University Health Sciences.

Service Model

In the service model, the technology transfer office exists to disseminate knowledge and serve internal clients who are members of the university community. Universities generate knowledge from raw information. Long before the Bayh-Dole Act was passed, technology transfer was embodied in the publication of scholarly works, the graduation of students, and community outreach. In fact, these are still extremely important technology transfer functions, and ones that most technology transfer professionals strive to support and keep intact.

To accomplish these functions, the university has to maintain several key departments, including a research office with pre- and post-award responsibilities, an institutional review board (if research involves human subjects), a conflict-of-interest committee, and numerous other key administrative staff. At some universities, the technology transfer function is exclusively wrapped into this support mission. The technology transfer office is charged with managing the institution's intellectual property in a manner that maximizes the distribution of knowledge and the satisfaction of faculty clients.

Measures of success for a service model technology transfer office include number of published patents, exposure to new research funding, and recruitment and retention of faculty. Less emphasis is placed on license revenue, equity, startup formation, or local job creation.

Revenue Model

In the revenue model, emphasis is placed on profitability. The technology transfer office is given the latitude to make savvy investment decisions from the time of invention disclosure. Office personnel spend time with select faculty members and develop intellectual

property investment strategies to generate licensing and startup opportunities. The focus stays on how to maximize the financial return to the institution. *Investment* is the operative word. There may or may not be an expectation for a particular return on investment. Senior administration will support the office's decision not to invest in a faculty member's technology—even if the faculty member has strong external funding and political sway within the institution. Investments take the form not only of patent applications, but also prototype development, proof-of-concept studies, business-plan development, outside consultants, and other resources.

Although most technology transfer offices strive to become profit centers within the university, the unpredictable nature of licensing revenue and equity investment makes it difficult to project profit or loss; hence it is hard to achieve steady growth. This model of technology transfer is predicated on a diversified portfolio of intellectual property developments. If an office is reliant upon a single home run, the institution is susceptible to cash-flow problems, because large revenue streams may be threatened by charges of infringement, inappropriate patent award, license renegotiation, and market volatility. This is a field of high risk and high reward.

Measures of success for a revenue model technology transfer office include gross revenue, net revenue (minus patent expenditures), equity grants, equity cashout, new industry-sponsored research partnerships, and percent legal expenses reimbursed.

Economic Development Model

In the economic development model, the emphasis is on improving the local economy. *Local* may mean the immediate municipality or, for larger public institutions, the entire state. The office looks for platform technologies that can become the basis of a startup company or for technologies that dovetail with local companies. For universities located in economically depressed areas, this model may take on special importance. The technology transfer office may work closely with regional, state, and/or local economic developers to achieve common goals.

The development of a mixed-use government-academia-industry campus often accompanies the economic development model. The space available is beyond the bread-and-butter

business incubator, often there is high-tech laboratory space, shared instrumentation, access to students, common administrative support, and other services appropriate to that setting. Companies that locate on these campuses are usually required to have a connection to the university, and the preferred connection is either as the sponsor of research or as the licensee of university-owned technologies.

A measure of success is the creation of local jobs and the retention of graduated students in those jobs. Tax revenue generated, office and/or laboratory space occupied, and community growth are also tabulated.

No office works purely from a service model, a revenue model, or an economic development model. Most programs dynamically blend these models to address the current needs of their campuses and regions.

Technology Transfer vs. Technology Development

There is a continuum of value that technology transfer offices can add to their disclosures depending upon their size, resources, and predominant model style.

This section will outline the difference between technology transfer programs that follow the premise of patent, option, out-license, receive consideration at one end of the spectrum vs. programs that start for-profit companies, develop the value of their intellectual property internally, and exploit technology derived from university research in unique partnership arrangements at the other end. Most offices can claim some combination of the classic models described above, but each will be composed of a unique and dynamic blend. Wake Forest University Health Sciences represents such blend.

Wake Forest University Health Sciences Office of Technology Asset Management

Wake Forest University Health Sciences operates under the umbrella of the Wake Forest University. WFUHS Office of Technology Asset Management (OTAM) is responsible for managing technology development and commercialization activities for all campuses in the Wake Forest University organization. OTAM currently operates under a hybrid model

that focuses its efforts on the development of the value proposition of each technology disclosed. At WFUHS, *value proposition* is defined as a clear, concise series of factual statements on tangible results related to product-like derivatives of the related invention disclosures.

By this definition, value-proposition development not only includes filing patent applications and bringing patents to issue, but also surveying the marketplace, identifying market opportunities, funding product-like prototypes and proof-of-concept efforts, and competitive testing of product-like derivatives against products already in the marketplace.

The name of the office is atypical—although *intellectual asset management* became part of the corporate world's lingo in the mid-1990s, most universities eschew names that call attention to assets, probably in deference to public perception of their not-for-profit status and their history of free dissemination of knowledge. Wake Forest University has recognized that universities have many assets—land, buildings, endowments, art collections—and that intellectual assets ought to be actively managed just like any other asset.

OTAM is also somewhat unusual because the office reports to the financial administration of the university and not to the research administration. To my knowledge, this is a rare reporting structure for a technology transfer program. This is not to say that OTAM doesn't have an active relationship with the Office of Research and the Office of Sponsored Programs, but this is a dotted-line relationship where each office works with the others to achieve separate but aligned goals.

OTAM has the liberty to act only on the invention disclosures where the office can add value at the time. Caseloads are kept very small and average about ten new cases per licensing professional per year. This lighter load allows the licensing staff to drill down to the details, perform careful due diligence, and give each technology significant support. In some cases, OTAM performs the heavy lifting needed to secure funding for a new startup company, manage prototype development and proof-of-concept studies, as well as work to file patent applications and market technologies. In this mode, OTAM functions more like a "Skunkworks" than a traditional out-licensing program.

Seed Stage Associates

OTAM recognized the need to spend even more time on some projects that might otherwise get caught in the technology transfer chasm—when the technology needs further development outside the realm of university research, but is not yet able to attract capital. To fill this need, Wake Forest University launched Seed Stages Associates LLC in 2003.

Seed Stages Associates is a wholly owned, for-profit subsidiary of WFUHS. The employees of OTAM are "loaned" to SSA—they spend up to 20 percent of their time on SSA projects. In addition, consultants are brought in to address project needs on a retained or ad-hoc basis. SSA performs several missions.

SSA in-licenses technologies, from WFUHS or from outside organizations, that can benefit from added development and heavy lifting and that need business development expertise more than they need a heavy infusion of capital. Currently, SSA has only selected technologies from the WFUHS portfolio of internal development projects. The criteria for technology in-licensing to SSA have been established on a case-by-case basis, but the general scheme is that the technology must be embodied in a product-like prototype that can benefit from early customer partnerships that build on the value proposition.

SSA licensed its first technology from WFUHS in the fall of 2003. The Predictive Assessment of Reading (PAR) was developed in the WFUHS department of neuropsychology; PAR stems from a decade of federally funded research. The result is a reading assessment tool that can determine the present level of a person's reading ability and prescribe specific remediation for that individual in approximately fifteen minutes. PAR was field-tested nationally, and several big publishers initially became very interested in the program. Although separate negotiations progressed with two well-known publishers, a deal wasn't consummated because the research-based ideals of the program were in jeopardy of being scrapped in lieu of publisher objectives.

As a result, the office decided to take the next step of development through SSA doing business as Child'sMind Publishing. For a modest investment—relative to typical patent expenses—of approximately $25,000, an online scoring engine was developed and a train-

ing CD-ROM was published to support early adopters who paid for large pilot studies. Since in-licensing PAR, SSA has licensed the use of PAR to schools around the nation and has developed relationships with numerous partners who offer PAR. Under the license agreement, SSA pays royalties to WFUHS that are substantially larger than the standard 10 percent authorship agreements offered by the publishing industry. The goal has been to understand and build the value proposition.

Going forward, WFUHS/SSA can spin out Child'sMind Publishing into a separate for-profit company that can raise additional capital or it can pull together the entire package of intellectual property collected under Child'sMind Publishing and either sell or out-license these assets for a reasonable multiple. Regardless of the exit, OTAM rescued a technology off the shelf and was able to develop it through a modest investment of dollars and sweat equity to a point where national partnerships have been created. But the real story is not about the money; it's about how many people, mostly children, will learn to read when otherwise they may have been lost. Both realistic financial returns and public good can flow from these types of activities.

In addition to technology in-licensing and development, SSA offers technology transfer consulting services. For two years, SSA has held a contract with the University of North Carolina Office of the President to provide technology transfer support to about half of the UNC-system schools. With one exception, these schools are located in the central and western part of the state. Some are entirely new to technology transfer, and others have well-established programs.

SSA provides highly customized services, depending on what each campus needs. While formal presentations, workshops, and educational seminars are sometimes provided, SSA does not specialize in these areas. Rather, the emphasis is on real-world, situation-specific advice. SSA provides invention-disclosure triage, including technology assessments and patentability surveys, preparation of nonconfidential marketing summaries, marketing phone calls, and license-negotiation assistance. SSA advises on faculty conflicts, university investment/equity opportunities, patent and copyright policies, confidentiality agreements, material transfer agreements, copyright assignment, trademark and servicemark registration, and student involvement in IP-generating projects.

Milestone-Based Developments

Over the years and through the experience of this unique partnership of OTAM and SSA, a more flexible interpretation of venture investment has evolved. Instead of following an investment pattern where large sums of money are dedicated to a company or a technology, small investments are committed to the advancement of individual projects and future investments are predicated on milestone assessments. This can be illustrated by a technology OTAM has been developing.

A unique high-flow catheter was disclosed to the office several years ago. Patent applications were filed and patents issued, but the initial marketing efforts fell on deaf ears. The biggest critique was the lack of evidence that the novel design was any better than what was in the marketplace. The faculty inventor crafted an initial prototype, but the tubing was not of the proper characteristics and it failed. OTAM and the faculty created a milestone-driven investment plan to build the value proposition of the high-flow catheter.

The first milestone was to hire a consulting firm with expertise to fabricate a second-generation prototype out of commercially acceptable materials. The second milestone was to test the second-generation prototype against known competitors in the marketplace. The third milestone was to initiate directed marketing efforts and establish a partnership to move to FDA approval. Each of these milestones received only the requisite finances necessary to move forward. At the milestone, a go/no-go decision was made. In this case, the technology moved through all three milestones, but, at any level, if the outcome didn't meet the milestone, the financial input would have stopped. Crafting a limited strategic plan and sticking to it can minimize losses.

From the university perspective, certain types of technology developments are better-suited to this investment model: medical devices, software, and materials. Therapeutics may seem out of reach due to the length of time and money to develop advances, but even therapeutic development can be serviced with one or two well-designed proof-of-concept studies.

Conclusions

"It's not about the money" is the mantra heard throughout the technology transfer community, and rightly so. Yet as technology transfer continues to grow, the industry faces constantly changing pressures from surrounding communities to do more—create jobs and companies, generate income, service the needs of the faculty, and so on. As venture capitalists, industry, and entrepreneurs are looking for low-risk opportunities, bringing technologies forward quickly is going to be a challenge. In addition, the United States Patent and Trademark Office has tightened its examination process, and what was once broadly covered is now subject to much more specific claims. These and other factors taken together suggest that the chasm between leading-edge technology disclosed to the technology transfer office and the transition to the commercial sector is getting a bit wider. Academia and industry each will have to do more, in innovative ways, to bridge the gap. Therefore, technology transfer is going to have to spend more resources building value in intellectual capital and longer times in development before partnering or licensing technologies.

But as much as we continue to search for new metrics to track avant-garde technology transfer, there is one that is constant and immeasurable: the number of people our technologies touch. In this way, it doesn't matter if the technology is a billion-dollar therapeutic or a vaccine for developing nations. Getting the ideas out of the lab and into the public good is the real measure of success.

Notes

1. Thomas Cleary, *The Book of Leadership and Strategy: Lessons of the Chinese Masters* (Shambhala Publications Inc., 1990).
2. Association of University Technology Managers, *AUTM Directors' Kit* (Northbrook, IL: Association of University Technology Managers, 1999).

The University of Virginia Patent Foundation: A Midsized Technology Transfer Foundation Focused on Faculty Service, Operated Using a Deal-Based Business Model

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The University of Virginia Patent Foundation was started in 1978 by a group of alumni who felt that the University of Virginia should actively protect and license its own inventions. Initially modeled on the Wisconsin Alumni Research Foundation, the Patent Foundation is a not-for-profit corporation that is not part of the university. However, it is one of twenty-six officially recognized UVA-related foundations that provide support for UVA's research, real estate management, fund raising, and other UVA needs. The Patent Foundation's relationship with UVA is contractual; UVA has agreed to assign its inventions to the foundation, in exchange for our agreement to evaluate, protect, and license them and to distribute revenues according to the royalty-distribution schedule set forth in the UVA Patent Policy. As an officially recognized UVA-related foundation, we also adhere to a set of requirements set out in the UVA Policy on Related Foundations. This policy requires the foundation to, among other things, provide UVA with an annual independent auditor's report, reserve one seat on the board of directors for a representative of the UVA president, and reserve another board seat for a member of the UVA board of visitors.

Throughout most of its history, the Patent Foundation was a small operation, with a director, a business manager, and an administrative assistant; it typically handled about 25 to 35 inventions per year. However, the financial success of one licensed product considerably changed the magnitude of the Patent Foundation's operational needs. That product, marketed by the Fujisawa Pharmaceutical Co. as Adenocard, is a solution of adenosine for the emergency treatment of certain types of heart fibrillations. A combination of the growing UVA research budget and inspiration from the multimillion-dollar

royalty stream from Adenocard appears to have had a big effect on the invention disclosure rate. This ultimately led the Patent Foundation in 1997 to undertake a broad expansion of its program and staff. The number of invention disclosures has continued to grow, and the Patent Foundation received 150 invention disclosures in FY2004.

As of February 2005, the Patent Foundation has fifteen full-time employees: a director/chief executive officer, six frontline licensing professionals (an associate director, an assistant director, two senior licensing associates, and two licensing associates), two full-time patent attorneys (who exclusively handle preparation and prosecution of patent applications), a chief financial officer, a business manager, two paralegals, and two administrative assistants.

The Patent Foundation focuses its attention primarily on faculty service rather than on making money. The philosophy here is that strong faculty service leads to strong deal flow, which, in turn, leads to increased revenues over the long run. At present, faculty satisfaction with the Patent Foundation is extremely good: the university rarely hears of any faculty complaints, but hears many compliments. Deal flow is also quite high. Over 50 option and license transactions were completed by the Patent Foundation in each of the five fiscal years from 1999 to 2004.

Advantages of the Foundation Structure

The belief here is that a technology transfer organization that is a separate corporate entity, as the Patent Foundation is, has enormous operational and managerial advantages over an internal university technology transfer office. These are: segregation of legal risk, freedom from requirements imposed by state bureaucracy, independent and timely decision making, flexibility in hiring and personnel management, collaborative decision making by board members having both academic and business backgrounds, clear financial profit-and-loss responsibilities, and independent accountability.

Segregation of Legal Risk

Anyone who has been in the technology transfer business for a while recognizes that there are many legal risks that come with the territory. As technology transfer professionals,

we sometimes interact with litigious companies; we negotiate complex, long-term legal agreements, the interpretation and enforcement of which may lead to disputes; we make decisions about protecting valuable intellectual property assets; and we face the prospect of having our patents challenged in court or having to sue to protect the value of those assets.

Universities are generally considered to be risk-averse, and for good reason. All universities seek to maintain and build their reputations among their peer institutions, faculty, students, and the public. These sensitivities may be heightened in public universities that are more dependent upon governmental good will, but they are very important in the life of private universities too, as they are just as dependent on recruiting faculty and students, fund raising, and obtaining federal and state research funding. It is largely for these reasons that the unavoidable legal risks from technology transfer activities are a considerable concern for some universities.

In addition, universities often wish to limit the possibility that a patent-related lawsuit would place the university's endowment funds at risk. One of the primary reasons that people start companies is to segregate risks, as a corporation can generally only be held liable to the extent of its own assets. If a company gets sued, it can lose everything, but the employees and officers of the company generally don't lose their personal money or property. Similarly, transferring inventions to a separate technology transfer corporation may help protect a university's assets, since any lawsuit liability of the foundation would generally be limited to the foundation's own assets.

Lack of State Bureaucratic Requirements

A public university such as UVA must follow the statutory and regulatory requirements of state agencies in general. Procurement must go through the state bidding process; the university attorneys are employees of the attorney general's office and must get the AG's approval for substantial matters. Moreover, there are restrictions on what the university itself can agree to, e.g., it cannot agree to an arbitration provision or an out-of-state dispute resolution venue; it is subject to disclosures under the Freedom of Information Act; salaries must be set in accordance with state guidelines; and there are many other requirements as well. The Patent Foundation is not subject to these because it is a separate corporate entity with no direct relationship to the state.

Independent and Timely Decision Making

The corporate structure of the Patent Foundation allows us to make decisions on a corporate time scale. Offices that are part of the university sometimes find that the time scale for approval by the university administration is considerably longer. One of the reasons for this disparity is that corporate decisions often require fewer internal approvals than are needed in an academic administration.

The foundation structure allows the Patent Foundation to complete licensing transactions more quickly than some other technology transfer programs. An analysis of the transaction times for the 50 licenses and options executed in FY2004 showed it took an average of 2.7 months to complete a deal, and the median transaction time was 2.2 months—which reflects the fact that there were a few outliers that took significantly longer than average. (Of course, some of the deals were big and some were small, and bigger deals tend to take a bit longer.)

Flexibility in Hiring and Personnel Management

Salary competitiveness is one of the biggest challenges for many internal academic technology transfer offices. Especially for those in public universities, human resource offices often equate the position of licensing associate with that of grants manager, and set the salary at a very modest level. Salary increases are also tightly managed, in lock step with other academic administrative positions. Neither of these is conducive to recruiting and retaining talented licensing professionals. Recruiting can be more difficult, since experienced professional job applicants usually want a higher salary in their new job, and the office's ability to satisfy this wish may be limited by academic salary ranges and steps. Existing staff may know that there are jobs out there that pay better than their current salary, and if the office can't keep pace, it can wind up losing valuable, experienced staff members. And, since entry-level associates are learning to negotiate, it is not long before they start to apply those new skills on their own behalf.

The foundation structure avoids these impediments because the only limitations on salary, raises, or advancement are those set by the foundation itself. It can set salaries at levels calculated to allow for the recruitment and retention of top-performing technology

transfer professionals. It can also provide for competitive salary advancement with increasing experience, so that newly trained staff members have less incentive to look for positions elsewhere.

Academic and Business Input in Making Decisions

There are few substantial technology transfer issues that don't involve both business concerns (e.g., operational, financial, and contractual needs) and also academic concerns (e.g., faculty satisfaction, conflicts of interest/commitment, and core academic values such as the right to publish). Bringing together academic and business leaders on the board of directors allows for a very healthy discussion of management decisions and allows those from one realm to explain their concerns to those from the other realm. Of course, this requires that the director and the board chair develop a board agenda that is sensitive to the information needs of both business and academic members.

In practice, the Patent Foundation board has enjoyed a healthy exchange of information and perspectives, which has allowed the foundation to operate in a businesslike manner while still being highly sensitive to academic needs. Interestingly, the board almost always acts by consensus; in the last seven years, I can recall very few board votes that were not unanimous decisions.

Note: It may not be necessary to have a separate foundation to enjoy the benefits of such a board structure. Some technology transfer offices have academic-industrial advisory boards, which may provide similar benefits.

Clear Financial Profit-and-Loss Responsibilities

As explained above, the Patent Foundation board provides me, as executive director and chief executive officer, with the authority to expend funds, along with the responsibility of keeping expenditures within the budget approved by the board. The Patent Foundation's chief financial officer and I propose the annual budget to a finance committee of the board, and, once that committee's comments and concerns have been addressed, the final budget is submitted to the full board for approval. Importantly, the board also holds me responsible for the income side of the ledger. Various categories of

income are projected along with expenditures in each budget the board approves, and it is up to me to make my numbers. So, balancing early-stage payments with downstream royalties, collections, and auditing of licensees, etc., are my responsibility, too.

One of the most important responsibilities the board gives me is to manage un-reimbursed patenting costs, along with all other Patent Foundation expenditures. Patenting dollars, staff salary dollars, and other operating funds are all my responsibility, and they are fungible (subject to shuffling between budget categories).

Unfortunately, many internal academic licensing departments carry patenting costs as expenses outside of the office's operating budget. This is not a wise approach. When the costs don't come from your budget, it is too easy to patent seemingly valuable inventions and put them in inventory for another day. Admittedly, if the office is understaffed, which is too often the case, putting valuable inventions in inventory may be the only alternative to throwing them away; but they represent sunk costs that may take a long time to be recovered, if at all. If such a program had the funds to hire more staff, it could reduce those sunk costs, license more inventions, get more patenting costs reimbursed, and probably make more royalty income in the long run. Unfortunately, when the office asks for money to hire more staff, the patenting costs are taken into consideration, and the request is often denied; the program already costs way too much!

This is a classic Catch 22: You need more staff to reduce patenting costs, and you can't reduce patenting costs without more staff. To make matters worse, since patenting is a long-term commitment, patenting costs become compounded and continue to increase, which can lead to escalating administrative frustration. All of that good technology sitting idle can lead to escalating faculty frustration, too. When administrative frustration and faculty frustration reach their peak and combine, the result is often a call to replace the director! Sadly, if the director is replaced, this death spiral will likely repeat itself, as the new director probably won't be given the power to solve the Catch 22, either.

Fortunately, this death spiral can be escaped. The simple answer is to make patenting funds part of the office budget. The reason this works is that it allows the office to shift dollars toward hiring more licensing staff and away from building an inventory of unli-

censed patents. The benefits of operating under this deal-based business model are described in the last section of this chapter. Of course, this approach requires that the combined technology transfer budget is adequate. A combined technology transfer budget equal to about 1 percent of a university's research budget should, in most cases, be sufficient for success.

Some may feel that the profit-and-loss responsibilities described here are in conflict with the foundation's faculty-service model, which is described in the next section of this chapter. At the foundation, this is not the case. If you ask any customer service-oriented company (such as American Express), they will tell you that good customer service leads to revenues, and that you don't make money by focusing on money, but by focusing on customers. This is also the philosophy at the Patent Foundation regarding technology transfer. As explained in the next section, satisfied faculty disclose more inventions, which leads to more licenses, and, ultimately, more royalties.

Independent Accountability

Of the several requirements the foundation must meet to remain a recognized UVA-related foundation, the best one is that the foundation must have an independent audit done each year and give a copy to UVA. This provides the foundation with absolute accountability for income and expenditures. The foundation actually has the books audited on a quarterly basis, which allows the chief financial officer and me to assure the foundation is on track to meet the annual budget commitments. We also report this information to the board each quarter. But perhaps the most important use of these quarterly audits is to provide the chief financial officer and me with a financial report card that keeps us focused on managing costs and on meeting revenue projections. To further take advantage of the discipline this accounting imparts, and to give us statistics we can reliably report to others, the auditors also audit the number of invention disclosures, patent applications, and deals on a quarterly basis.

Faculty Service

Separating the technology transfer office from the university in a foundation structure does not result in a separation of missions. At the foundation, we are very mindful that

UVA is the only beneficiary and that serving UVA's needs is the only purpose. This is reflected in the UVA Patent Foundation Mission Statement:

- to provide accessible, responsive, competent, timely, and professional patenting and licensing services to UVA, its faculty, and staff
- to serve as an efficient and effective conduit for the licensing of promising UVA technologies to industry, thus promoting their entry into the commercial marketplace and also generating royalties that can fund further UVA research
- to support and encourage local economic development by licensing locally, by licensing to startup companies, and by encouraging and supporting faculty startup activities
- to serve as a resource for information about patents and licensing and to encourage recognition that such matters have become meaningful and valuable aspects of academic life
- to encourage greater integration between academia and industry, hence improving the flow of innovative university technologies to the public marketplace

The cornerstone of the Patent Foundation's mission, and the source of the foundation's success, is the primary commitment to faculty service. Faculty members have interests, concerns, and needs regarding the future development of their inventions. Even though faculty members assign their inventions to UVA, and UVA assigns ownership to the Patent Foundation, this does not limit the passion with which the faculty inventors hope that their inventions will improve health care or otherwise serve the needs of the public. At the foundation, we share that passion, and we work with both faculty inventors and companies to help make commercialization of new UVA technologies a reality. Of course, the Patent Foundation also works to earn royalties that are used to support future UVA research, are shared with the inventors, and are used to cover operating expenses. But, as the manager of any service business will tell you, such businesses make money by focusing on the needs of customers, not by focusing on making money. At the Patent Foundation, we feel we have demonstrated that this principle applies to university technology transfer, too.

Of course, the primary benefits of the focus on faculty service are enjoyed by the faculty inventors themselves. They can easily get professional advice about the patentability of their inventions, work with in-house patent attorneys in person, and get provisional

patent applications filed quickly enough to avoid delays in publication. They can discuss the commercialization process with experienced licensing professionals who will carry out detailed market research, develop a marketing strategy, and discuss the invention with targeted company decision makers. Once a potential licensee has been identified, the faculty inventors receive regular briefings about the progress of negotiations and can participate directly if they wish. Last but not least, the professional business staff at the Patent Foundation monitors each licensee's performance and makes sure that all payments are properly and timely made—including royalty-sharing payments to UVA and the faculty inventors.

There are many other benefits that flow from the focus on faculty service. One is that satisfied faculty inventors disclose more inventions, which, in turn, creates more licensing opportunities, leads to more new technologies reaching the marketplace, and more potential income. The 2003 *AUTM Licensing Survey*™ data show that the national average disclosure rate among universities in 2003 was 39 invention disclosures per $100 million in research funding. In that same year, the Patent Foundation received 69 invention disclosures per $100 million in research funding, which is higher than the relative disclosure rate at many other top-ranked American universities. Of course, it is the creativity and skill of faculty inventors that creates these inventions, but, at the foundation, we believe that our level of service to faculty inventors is the key to encouraging inventors to disclose these inventions and become involved in technology transfer.

Faculty inventors want to see their inventions become available in the marketplace, so the focus on providing the best faculty service drives deal flow, too. In 2003, the Patent Foundation completed 22.7 license and option agreements per $100 million in UVA research, which is more than double the national average of 11 agreements per $100 million and is higher than many other top universities. More importantly, the Patent Foundation has maintained a high level of deal flow for a long time. Over the five-year period from June 2000 to June 2004, the Patent Foundation has executed 255 license and option agreements, averaging about 50 per year. Since it generally takes about seven years to get from license agreement to product launch, we are hopeful that valuable new products and significant revenues are right around the corner.

Staff members are continuously looking for ways to improve faculty service, and some of these can be formidable projects. For example, in 2004, foundation staff completed the development of a comprehensive operating manual, which describes every step in the technology transfer process used by the Patent Foundation and catalogs the foundation's checklists, analysis forms, form letters, and model agreements. From this, staff also created an interactive flow diagram of the process that is posted on the foundation's Web site (http://www.uvapf.org), and staff also developed a descriptive, abridged version of the manual that can be downloaded from the Web site by UVA faculty and others (you are welcome to download a copy, too). As expected, by improving the transparency of what the foundation is doing and why, the process works better, faculty are more comfortable working with staff, and the results are improved. There have also been other important benefits. University officials in a variety of offices with whom the staff interacts have found the manual helpful in understanding the Patent Foundation and how it works.

The unabridged version of the manual, which includes many step-by-step details, forms, and model agreements, has been distributed free of charge to academic institutions across Virginia. As a service to the university licensing community, the foundation is also providing it to academic technology transfer offices around the world, some of which are modeling parts of their process on the Patent Foundation. *(For more information on the operating manual, visit the "For the Profession" section of the Web site at http://www.uvapf.org.)*

Another important area of faculty service is supporting UVA faculty members who wish to start their own technology companies. Since 1999, the foundation has given an absolute licensing preference to faculty startup companies—yes, we will turn down offers from big companies and license to startups instead! There are two reasons for this. One is that we feel we should fully support faculty members who are themselves willing to commit their time and, often, their money, to bringing their inventions to the marketplace. The second is that this preference may lead to the development of a considerable number of startup companies here in central Virginia and may help UVA in developing the University of Virginia Research Park. Over the long run, the goal is to have a robust corporate research community here in Charlottesville that closely complements and interacts with the academic research community at UVA.

At an elementary level, the success of a new high-technology venture depends on five key ingredients: technical expertise, intellectual property assets, business expertise, physical space, and money. Faculty entrepreneurs themselves can provide the needed technical expertise, and the Patent Foundation can license key patent rights to the company. But business expertise, space, and money are often more difficult to come by. Once the foundation began giving licensing preference to faculty startups, these needs became increasingly pressing. The Patent Foundation staff initially provided business advice and referrals, but it became increasingly clear that this expanding need required dedicated resources. So, in 2000, the foundation created a subsidiary company, Spinner Technologies Inc., to develop this role. Spinner provides early-stage business expertise to faculty entrepreneurs and helps them find business partners to provide that expertise over the long run. Spinner also has a limited amount of wet lab space that it leases to faculty startups.

Not surprisingly, helping faculty entrepreneurs obtain funding for their companies is a formidable challenge. To help make this easier, Spinner Technologies is currently developing plans to form a member-managed angel investment group. This group of individual angel investors will contribute to a pooled fund and will then work together to evaluate companies and decide where and how much to invest. We are enthusiastic that this group will be able to provide early-stage funding to a number of UVA faculty startup companies. We hope that these early-stage investments will encourage established venture capital firms to consider investing in UVA spinoff companies, too.

A Pragmatic, Just-in-Time Business Model

Although I realize that many see the technology transfer profession as one that is more focused on public good than revenues, I firmly believe that academic technology transfer is a business, and that we best serve the public good when we view it that way. Since 1997, the Patent Foundation has operated under what we refer to as a deal-based business model. Under this model, in most cases, a license is negotiated before the big money is spent on converting a provisional patent application to a PCT (Patent Cooperation Treaty) or regular U.S. application. This model has proven to be far better than the patent-based model under which a separate (and sometimes open-ended) budget for patenting expenses drives the conversion process.

Just-in-Time Patenting

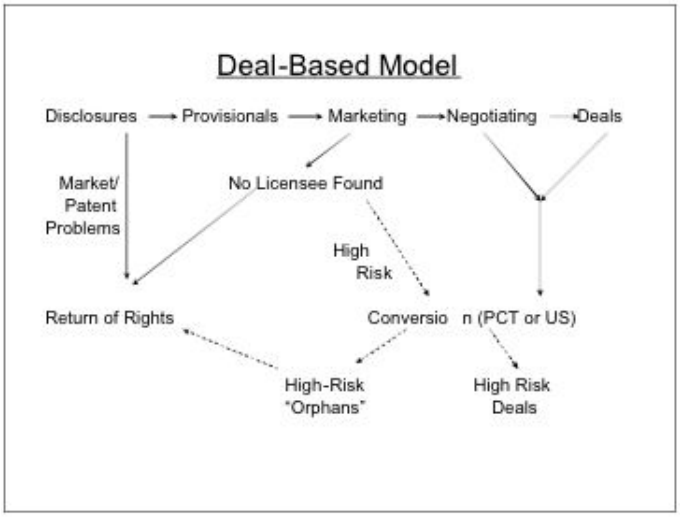
The deal-based model is founded on the fact that patents are hideously expensive "products," and making more than you can sell (license) is a terrible waste of money. The deal-based model can be equated with the just-in-time manufacturing model used in business today: because of the cost of manufacturing, keeping a warehouse of products ties up your money. So, making products just in time to be shipped to customers is far more economically efficient than building up inventory. Like just-in-time manufacturing, the deal-based model requires that production (patenting) be closely linked to sales (licensing). The key to this model is to negotiate a license, or at least identify a willing licensee, before spending money to convert a provisional application to a PCT or regular U.S. application, and let the licensee pick up the cost of patenting.

Primary Models

Deal-based: Market first, only patent if licensee is found (analogous to inventory-based manufacturing)

Patent-based: Patent those that look promising, market and license later (analogous to inventory-based manufacturing)

Figure 1: Deal-Based Model



The diagram of the deal-based model (figure 1) illustrates a few details about how the model operates. The foundation files provisional applications on every invention that the triage process says have patentable subject matter *and* a significant market. In practice, the Patent Foundation files provisional applications on 80 percent or more of inventions disclosed; but they are not all treated equally. The lawyer's time invested in a provisional for a broad, large-market invention is greater than for a narrow, small-market invention. Filing provisionals generously allows faculty to publish early; because the Patent Foundation has in-house patent lawyers, staff is able to file provisionals on as little as one day's notice.

Then, the foundation takes advantage of the provisional year to market and, we hope, license the invention. If the foundation doesn't find a licensee within about nine months, staff notifies the inventors and, often, offers to return the rights to them.

All of the go/no-go decisions on filing regular U.S. or PCT applications are made at the quarterly conversion meetings, which are meetings of the entire licensing and patenting staff. In cases where a license has been completed, or where negotiations are nearing completion, the answer is automatically yes. For cases where a licensee has been identified but a license has not yet been negotiated, when or whether to proceed is determined on a case-by-case basis (we often convince the potential licensee to cover the conversion costs in exchange for an exclusive option to enter into the desired license).

Cases for which there is no license and no licensee has been identified are considered for high-risk-investment conversion, where the foundation uses its own precious funds. To be eligible for high-risk consideration, *(a)* an invention must have been of interest to industry but the industry feels more proof-of-principle research is needed, *(b)* the inventors must still be working on the invention, and *(c)* the inventors must have sufficient research funding to carry out the proof-of-principle experiments. Those that pass this test are then ranked on the basis of potential market value, and the top-ranked one or two per quarter are converted as an investment—the funds available for this are budgeted, fixed, and never exceeded. Although some of these high-risk cases turn out to be unlicensable orphans, the foundation has a good track record of turning high risk-cases into licensed inventions—largely because the foundation has sufficient staffing to handle ongoing work as it comes up, so when the needed experiments have been completed, staff can weave the high-risk invention back into its marketing efforts in real time. The foundation has also developed a culture in which conserving patenting costs is at the core, which encourages staff to find homes for those cases in which the foundation invested. The foundation has enjoyed demonstrable economic efficiency by following the deal-based model. In 2003, the national average for nonreimbursed patenting costs was $738,499 per 100 disclosures. In that same year, the Patent Foundation's unreimbursed patenting costs were $178,138 per 100 disclosures, which is 76 percent lower than the national average.

The deal-based model is founded on two core principles. First, deals make money, while patents without deals cost you dearly. Second, a single human can carry out a certain amount of work in a given period, and no more. Operationally, the foundation has reduced this to two simple planning rules: you need to have one full-time licensing person for every 25 new inventions per year, and you can expect a reasonably trained licensing person to generate ten deals per year. (Deals are defined according to the *AUTM Licensing Survey*™ definition, which includes licenses and option agreements). These rules work. The foundation has had five full-time licensing professionals in fiscal years 2001, 2002, 2003, and 2004, and the foundation has completed just over 50 deals in each of those years.

UVA Patent Foundation Planning Rules for Deal-Based Operations

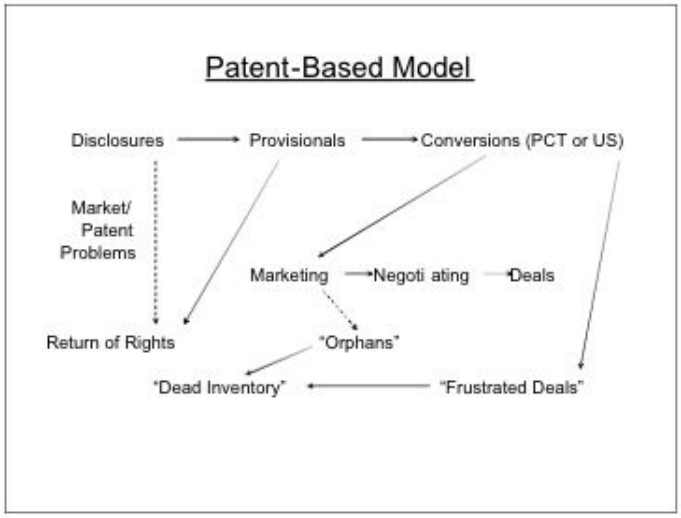
- Each experienced licensing associate (more than one year of experience) can handle up to 25 new invention disclosures per year
- Each experience licensing association can produce about 10 deals per year

Staff follows these planning rules carefully. In FY2003, the foundation had 160 invention disclosures, breaking the 150 mark for the first time. Since the foundation has seen some fluctuations in disclosure numbers from year to year, we waited until the FY2004 numbers were known before hiring. When the 2004 disclosures came in at exactly 150, the foundation hired a sixth licensing associate.

Inventory Patenting

The alternative to the deal-based model is the patent-based model, where the approach is to convert provisional applications or file initial regular patent applications in the absence of a licensee, and plan to market and license the invention at a later time (see figure 2). This is analogous to inventory-based manufacturing, where the factory floor and the sales force are not coordinated; the factory makes product continuously, whether there are customers or not. Although this model has been universally recognized by industry as being less capital efficient, this is what naturally occurs if patenting and licensing are not closely coordinated or if adequate resources are not focused on achieving a deal-based operation.

Figure 2: Patent-Based Model



The most common scenario for the patent-based model is when patenting costs are paid from funds outside of the technology transfer office's budget, and the office budget doesn't allow for staffing levels needed to operate in deal-based mode. The reason staffing is key to operating under the deal-based model is that you must have enough people to do the marketing and licensing before the provisional conversion date comes due—which comes back to the basic truism that a single human can only produce a certain amount of work in a given period of time, and no more. It appears that some universities may have forgotten this, or perhaps have equated licensing professionals with those who process grant applications, when in reality, they have very, very different jobs. When the staff workload gets too high for licensing professionals to market and license inventions during the provisional year, the office is faced with either forgoing patent rights that have not been market-tested or patenting them on their speculative value, hoping that the staff will get around to marketing them—of course, future marketing of the technology is unlikely if the staff can't even keep up with new disclosures. Once the regular or PCT application has been filed, the pressure is off, so new disclosures get priority. The inventory of patent applications continues to consume money to pay downstream patenting costs, and they may never be licensed, so those costs may be sunk costs unlikely to be recovered from a licensee. The worst result is that faculty members become quite dissatisfied, as they become hopeful when a decision is made to patent their invention, only to have those hopes frustrated because a deal never materializes—sometimes, even after they have identified some good leads. As these frustrated deals stack up, faculty dissatisfaction spreads. At the same time, patenting costs escalate. As mentioned earlier, when faculty dissatisfaction and administrative alarm over costs combine, the result can be a call for a new director.

A Results-Based Assessment of the Two Models

By making a few assumptions, we can map out the financial and programmatic results of a hypothetical academic technology transfer program that receives 100 invention disclosures in a given year. Figures 3 and 4 illustrate what would happen if that program used the deal-based model, and, alternatively, what would happen if the program used the patent-based model. Jumping to the bottom line, the deal-based model earns $1,244,800 more than the patent-based model—and the patent-based model actually winds up nearly $300,000 in the hole!

The primary assumptions are shown below; others are described in the text that follows.

1. One licensing full-time equivalent (FTE) staff member, reasonably well-trained, can handle 25 new inventions per year; and, from those, produce about 10 deals. Note that the national average, based on the 2003 *AUTM Licensing Survey* data for all respondents (total number of deals/total number of FTEs), was only 5.3 deals/licensing FTE/year. So, 10 is probably on the generous side (although using the deal-based model, the Patent Foundation has enjoyed 10 or more deals per FTE for the last five years running).
2. The average revenue per year per license that generates revenue is $126,000. This is based on 2003 *AUTM Licensing Survey* data for all respondents (total license income/total number of licenses generating revenues). Of course, income arrives many years after a deal is done, and licenses expire as others start to generate revenue, but for the purposes of this analysis, we will evaluate the steady state. Keep in mind that the error bars on this average revenue figure are probably huge—some licenses make only a few thousand dollars, and some have earned more than $50 million per year.
3. About 20 percent of the deals completed will eventually generate revenue. This statistic also comes from the 2003 *AUTM Licensing Survey,* but is not so easily calculated. It is tempting to simply divide the number of deals generating revenue by the number of active licenses, but this would not account for those executed licenses that died along the way. What we want to know is how many newly executed deals will eventually generate revenue. To estimate this, from the long-range cumulative data in the survey, I added up the number of deals done over the ten-year period of 1994 to 2003,

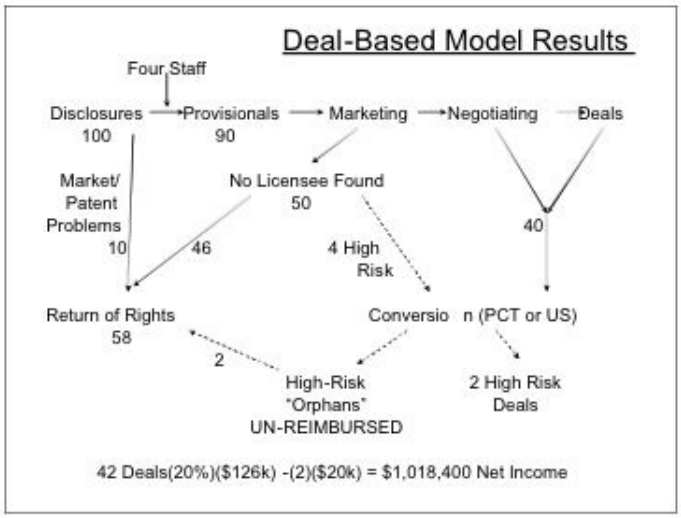
which was 29,882. Then, to see how many of the new deals executed during the ten-year period were generating revenues at the end of that period, I subtracted the number of deals generating revenue in 1993, just before the ten-year period began, from the number of deals generating revenues in 2003. The answer was 5,572. Dividing the number of deals executed during the ten-year period that earned revenue during that period (5,572) by the total number of deals executed during the ten-year period (29,882) gives the result: 18.6 percent of the deals done during the ten-year period generated revenues by the end of that period. For simplicity's sake, we will call it 20 percent.

Now you may be saying to yourself, wait a minute, there are quite a few variables that have been given no homage here, e.g., deals done near the end of the ten-year period would not have had time to generate much revenue; and some deals done before the ten-year period may generate revenues in 2003. But this is as close as we can get with the available data, and it seems reasonable to say that over the entire 29,882 deals, positive aberrations may cancel out negative ones. Interestingly, when the foundation calculates the revenue success rate for its deals, it comes out to around 20 percent. But this is only one data point, and we suspect that this number varies among institutions from 10 percent to 30 percent, depending on the inventions received, the technology mix represented, financial goals of the program, and many unknown factors affecting individual companies.

4. A single U.S. patent costs about $20,000 by the time it issues. Foreign patenting costs were not considered in this hypothetical analysis, as many universities don't file them without a licensee.
5. Whichever model you use, filing provisional applications makes sense in an academic setting. Assuming offices operating under either of these models would file provisionals generously, the costs of doing so were ignored in this analysis.
6. For purposes of this analysis, every license is for only one patent application or patent. In reality, of course, it is not uncommon to license several different applications and/or patents in a single license. On the other hand, there are also nonexclusive licenses, where more than one license is created for a single patent. We have assumed these cancel each other out in this analysis.

Turning now to the first of the figures (figure 3), we can easily see the efficiency of the deal-based model. With one licensing person for every 25 disclosures per year, it is possible to find licensees before the provisional application's conversion date, and thus pass the patenting costs on to the licensee. For those where none is found, the office can pick a small number of high-risk conversions to pay for with internal funds, gambling that a licensee will later be found to cover those costs. Because there are a sufficient number of licensing professionals, it is possible to market these high-risk inventions after the conversion is done, and, perhaps, some will get licensed and others not. For the purpose of this analysis, we assumed that half would get licensed and the other half would be orphans. This has been the experience at the foundation; we generally license about half of the high-risk cases.

Figure 3: Deal-Based Model Results

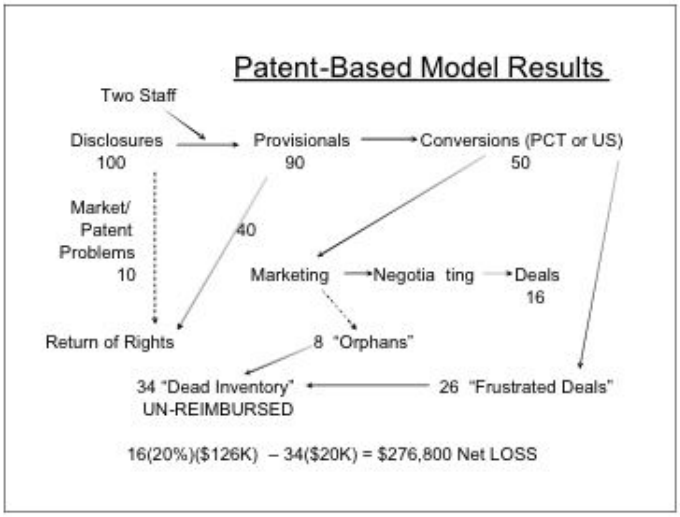


The overall financial results here are quite good. Royalties of $1,058,400 are generated ($126,000 x 42 x 20%; see assumptions above), and the two unlicensed high-risk orphans cost $40,000 ($20,000 each, see assumptions above), to give a net income of $1,018,400. Assuming that about 40 percent of the income is re-invested into running the technology transfer program (which is a practical lower limit for funding a program), this is a program that is close to being self-supporting, that is, generating enough revenue to pay salaries for the four licensing professionals. The reasons for this financial success are two-fold: under the deal-based model, the number of deals is high, and un-reimbursed patenting costs are low.

Of course, there are big nonfinancial successes here too: 42 new technologies have been transferred to industry, and 8.4 of these made it to the marketplace (42 x 20%, see the assumptions above). The inventors of 42 technologies are very happy, because their

inventions have been licensed; and they are also happy because real progress was made early on—frustration was low.

Figure 4: Patent-Based Model Results



Turning now to the same hypothetical program operating under the patent-based model, shown in figure 4, the staff is overburdened with disclosures, as is usually the case when the patent-based model comes into play. Because so much of the budget is devoted to patenting, there is only enough salary money to support two licensing professionals. Thus, the licensing professionals have twice as many technologies as they can handle in a year. Because of this, they make high-risk patent investments more often than not; they don't want to throw away seemingly valuable inventions, but they don't have the time to market them within the provisional year. Indeed, they may not ever get around to marketing at all, instead focusing on closing deals with prospective licensees that the inventors bring to them. Since the staff members are overburdened with disclosures, they can't quite make it to 10 deals each per year, so, in this example, they close only 8 each (which may be rather generous). Because it is only deals that make money, not patents, the royalty income is a modest $403,200 (126 x 16 x 20%).

Unfortunately, all those high-risk conversions are very expensive, and, since the staff never really has the time to go back and market them, few of those costs get reimbursed by licensees. Of the 34 high-risk investments, 8 are orphans, and no licensee would likely be found even if the staff had the time to look. The reason there are more orphans than in the deal-based model is that market value assessments here are little more than guesses, as the staff didn't have time to speak with companies and see what the actual industry interest was. (This is in contrast with two orphans when the deal-based model was used,

where the staff applied real-market information and invested only in those that were of most apparent value.) Worse yet, there are 26 technologies that could have been licensed, but weren't. (Note that, under the deal-based model, these were all licensed). Faculty inventors of these technologies are very likely to feel frustrated, because they feel that their technologies are valuable, but nothing is being done with them. But worst of all, many potentially useful technologies may never make it to the marketplace, and the public doesn't get to enjoy the benefits from the university's research.

Turning to the numbers, we can see that using the patent-based model has driven un-reimbursed patenting costs through the roof—$680,000 was spent on patenting, with no licensee to pick up those costs.

In the patent-based model, given that the staff is already overworked handling new cases, it is unlikely that much, if any, of these costs will ever be recovered. The modest income and very high costs of the patent-based model, in our hypothetical situation, yield a net loss of $276,800. When compared with the net gain of $1,018,400 produced by the deal-based model, the deal-based model beats the patent-based model by $1,244,800!

Conclusions

Based on our experience at the Patent Foundation, we believe that an organization with an intense focus on serving the interests and needs of faculty inventors will ultimately succeed in bringing more technologies to the public marketplace, enhancing local economic development, and providing strong long-term financial performance. We also believe that the foundation structure is a very beneficial framework for building and operating such a program, largely because it allows the program to tap the broad perspectives of a well-chosen board of directors, gives the program flexibility in contracting and hiring, and creates a level of accountability that will help maximize financial and operational efficiency. To reach that financial and operational efficiency, however, the program also needs to have budgetary control over office expenses and patenting expenses. In addition, the funds used for those expenses have to be fungible, because having more licensing professionals really is cheaper than having fewer. An understaffed program inevitably operates under the patent-based model, and un-reimbursed patenting costs soar far higher

than what it would have cost to hire more staff. Worse yet, faculty frustration and dissatisfaction can grow quickly, too. In contrast, a licensing program with one full-time professional for every 25 inventions per year can operate on the more efficient deal-based model, which can provide far better faculty service, produce a much higher deal flow, minimize unreimbursed patenting costs, and, in the long run, make far more in royalties. You can learn more about the University of Virginia Patent Foundation by visiting the Web site at http://www.uvapf.org. I welcome your questions and comments. Please also note that the Web site has a section of free materials for the profession, in which the foundation makes a number of presentations, the abridged operating manual, and other materials available for your use at no cost.

This article is for educational purposes only and should not be construed as specific legal advice. Please consult with your attorney before acting on any ideas or suggestions described in this article.

The Technology Transfer Unit for the University of Washington: An Internal Technology Transfer Office at a Public Research University

James A. Severson, PhD

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The University of Washington is a public research institution founded in 1861. A ten-member board of regents, the members of which are appointed by the governor to serve six-year terms, governs the university.

In the autumn of 2003, the university enrolled 42,757 students at its three campuses in Seattle, Tacoma, and Bothell. The great majority of students, 39,136, are enrolled at its Seattle campus. Of the total student enrollment, 30,921 were undergraduate students and 11,836 were professional and graduate students. Eighty-seven percent of the undergraduates were residents of the state of Washington. The university has 3,360 instructional faculty and 23,462 faculty and staff in seventeen colleges and schools and more than 140 departments. The university has a school of medicine and an applied physics laboratory.

In fiscal year 2003, the university received $933 million in external sponsored research, and had 5,247 active grants. Of this total, $195.7 million was from nonfederal sources. Industrial sponsored research for this period was $29.1 million.

UW TechTransfer seeks to enhance the public-service mission of the university by creating partnerships that result in investment in the development of commercial products and services from innovations made in sponsored research programs, administrative applications, development projects, and teaching programs. These products and services provide a return to the public for its investment in basic research.

Research universities engage in technology transfer for a variety of reasons: development of products for public benefit, local economic development, recognition for discoveries made at the university, attraction and retention of talented faculty, attraction of corporate research support, and revenue to support further research and education. However, the ultimate benefit of technology transfer comes from the products and services that reach the market and the jobs that result. The UW has made working with Washington-based companies a priority. One-third of the licenses executed over the past five years have been to Washington companies.

A recently published report from the President's Council of Advisors on Science and Technology observes, "the process of technology transfer is not simple and can be challenging." Complexity comes from diverse research projects, applications projects, and the many ways that early-stage innovations might be developed into products.

In our local practice, we emphasize several key approaches.

- We look to improve service to campus units and engage in outreach at both the laboratory and investigator level. Service is a key component of technology transfer, and we seek to foster productive partnerships within the research community. Through this approach, we expect to see an increase in the participation of the UW research community in technology transfer as evidenced by an increase in the number of innovation disclosures received.
- We also look to expand our interaction with the local venture and business community, which we see as essential to promoting economic development in the community and to keeping innovations within Washington.
- Lastly, we emphasize the completion of license transactions. A completed license is a partnership that furthers investment in UW innovations and creates impact for the future.

UW TechTransfer activities are closely aligned with regional economic development initiatives, and UW TechTransfer staff members actively seek to develop relationships and foster licensing opportunities with local and regional businesses. We participate in the Linking Regional Resources project with Battelle/Pacific Northwest National

Laboratory and other area universities and work with Washington state's and King and Snohomish counties' economic development agencies to foster opportunities for technology-based company growth in the region. In addition, members of the staff participate in events hosted by the Washington Biotechnology and Biomedical Association, Technology Alliance, and Northwest Entrepreneur Network, and work collaboratively with the Washington Technology Center and the Washington Research Foundation to create opportunities to develop UW innovations.

Key metrics for UW TechTransfer for fiscal year 2004 were:

- 233 innovation disclosures received, a total of 367 researchers from 54 departments at the UW were involved
- 133 patent applications filed
- 82 patents issued
- 637 material transfer agreements
- 112 software use agreements
- seven companies were formed around UW technologies
- $15.8 million total revenue received
- $1.5 million for patent protection and other legal services

History

The enactment of the Bayh-Dole Act stimulated the UW and local business leaders to form the Washington Research Foundation (WRF) in 1981—a private nonprofit foundation to assist state universities in Washington, especially UW, with the licensing of inventions.

In 1982, a university committee drafted a patent and copyright policy and recommended the formation of a university-based technology transfer office to administer the policy and fulfill the requirements of the Bayh-Dole Act. The predecessor of UW TechTransfer, the Office of Technology Transfer (OTT), was thus formed as part of the graduate school. Initially, the responsibilities of OTT were to manage the receipt of invention disclosures, federal reporting obligations, and to transfer inventions to WRF for evaluation, patenting, and licensing.

In the late 1980s, royalty revenue from WRF's licensing of a hepatitis B vaccine began to generate income, which stimulated further interest in technology transfer and resulted in a sharp increase in the number of new inventions reported. However, WRF was able to pursue only a fraction of these opportunities. Thus, to accommodate the increase in activity and increased interest on the part of researchers to pursue commercial activities, OTT evolved from a compliance-oriented operation to a patenting-and-licensing operation within the university. With time, all of the patenting and licensing of new innovations was retained by OTT, which enabled WRF to expand its role in providing venture capital to companies forming around university technologies and to focus on the management of its existing portfolio.

Senior university management recognized the differences in the management and effective licensing between software and copyright and other technology licensing. To accommodate this difference and expand its service to the UW research community, a unique software-licensing program was initiated in 1991.

Robert Miller became the director of OTT (now reporting to the vice provost for research) in 1995 and began to develop an integrated set of services to meet the needs of the university community. With the maturity of the program, in September 2000, Miller became the vice provost for the new Office of Intellectual Property and Technology Transfer, reporting to the provost. The change in title and reporting relationships "recognized the scale of the operations at UW," said Miller. It gave technology transfer more visibility within the university and allowed OIPTT to further expand its operations. OIPTT now had two distinct licensing units: the Office of Technology Licensing and the Office of Software and Copyright Ventures.

The name of the office was changed to UW TechTransfer in 2003. The renaming created a simple and direct identification to reflect the mission and function of transferring UW innovations. The renaming also eliminated a confusing set of acronyms: the licensing division previously known as Office of Technology Licensing became Invention Licensing, while Software and Copyright Ventures became Digital Ventures.

Also in 2003, the UW Office of Research and the UW's Intellectual Property Management Advisory Committee completed a major revision of the policies that govern intellectual property arising from University of Washington research (http://depts.washington.edu/techtran/tt/Resources/UW_Policies.php).

The policy simplifies the distribution of revenue received from licensing rights in inventions, patents, and copyrights. The revised policy is a "no more tiers" approach: Net revenue is split equally into thirds among inventors/creators; schools, colleges, and departments; and the university. This formula is applied to revenue of all types, including equity in startup companies based on UW technologies. Additionally, a single administrative fee of 20 percent applies to all types of intellectual property revenue.

The new policy also provides innovators the opportunity to reinvest a portion of their personal share of income to UW research. The Waiver Match Program allows faculty innovators to reinvest a portion of funds they receive from royalties back into their own research program or into a research program in another department, school, or college. The university matches the contribution dollar for dollar. The program is intended to give faculty a sense of ownership of university resources and increased responsibility and control of how and where those resources will be used.

UW TechTransfer

UW TechTransfer is comprised of two licensing units: Invention Licensing and Digital Ventures, each focused on specialized licensing strategies and opportunities. The office employs 45 staff to manage more than 2,000 active innovations, more than 800 issued patents, nearly 800 pending patent applications, and more than 400 active licenses.

UW TechTransfer is led by the vice provost for intellectual property and technology transfer. Four operating units report to the vice provost, and the directors of these units form the senior management of UW TechTransfer.

Invention Licensing

UW TechTransfer Invention Licensing actively works with faculty to develop an intellectual property strategy to complement their research efforts and encourage the disclosure of patentable inventions.

Invention Licensing evaluates the commercial viability of potentially patentable inventions and pursues patents and licensing to facilitate their commercial development. One role critical of the licensing professional is the identification of licensing candidates and the active marketing of inventions to them. As discussed above, we seek first to identify licensing candidates in the state of Washington, but because of the diversity of the research programs at the UW and the relatively small local business community, we do not restrict our marketing to just the state.

Invention Licensing also encourages company formation around UW innovations. Licensing professionals work with inventors and entrepreneurs to create partnerships to develop the inventions. As part of its negotiations for equity participation in a startup, licensing professionals will work with staff in the Office of the Treasurer to complete any agreements required for accepting stock and for the ongoing management and sale of equity. UW TechTransfer and the Office of the Treasurer have developed a model stock purchase agreement to use as a starting point in any discussions of equity.

In addition, licensing professionals from UW TechTransfer meet regularly with their counterparts in both the WRF and the Washington Technology Center (a state economic development organization, http://www.watechcenter.org) to promote startups and make connections to facilitate startup formation or fund raising. Frequent contacts are made to local venture capital firms and to several angel organizations in the community.

Invention Licensing also manages material transfer agreements, confidentiality agreements, federal reporting obligations, and numerous relationships with other institutions and entities regarding intellectual property management.

Digital Ventures

UW TechTransfer Digital Ventures facilitates the distribution and adoption of UW software technology and digital innovation as an extension of UW's teaching and research programs. Digital Ventures manages copyrights, trademarks, and patents for digital technologies and information assets, and pursues a variety of relationships with industry for product development and distribution. Most relationships begin as interactions between university and company research groups, and these typically expand over time into a university-company relationship.

Digital Ventures employs a project-centered management system that allows the university to incubate new research as an internal enterprise activity. By enabling sustainable teaching relationships with outside groups, UW projects receive early-stage validation and revenue for their work. To accomplish this, Digital Ventures assists UW research groups in forming projects early in the research development process to

- manage their intellectual property
- create common rules and understanding among research participants regarding revenue and distribution of project materials

Digital Ventures licensing relationships include

- simple permission statements placed on software or digital media downloaded freely from the Internet
- source-available, nonexclusive industry site licensing of software research tools
- sole distribution rights granted to a startup company or established non- or for-profit organizations

Representative relationships include

- 75 projects across campus
- broad participation by academic units including genome sciences, information school, pharmaceutics, communication, computer science and engineering, and medicine

Successful licensing projects include

- Drug Information Database (http://depts.washington.edu/didbase/)

- vBusview, software to track and display transit (http://www.its.washington.edu/projects/busview_overview.html)
- Medical training software, including startup activity (http://www.medtraining.org/mts)

Digital Ventures also provides Express Licensing for selected software and databases. Interested parties can download Express Licensing PDF forms, fill them out, and fax them directly to Digital Ventures. These nonexclusive prepackaged licenses provide a set of rights for use and an assessment of risk at a particular compensation level. These agreements have standard terms and conditions that allow for rapid, low-cost licensing by companies or individuals. The conditions and financial terms of Express Licenses apply only to those who download the UW Express License for that title, sign it "as is," and return it to Digital Ventures. Licensees can negotiate for modification to the rights for different compensation levels.

Policy and Strategic Initiatives

Policy and Strategic Initiatives develops outreach and educational programs and publications to communicate to the UW and external communities. Examples of these activities are listed below.

- *Seminars:* UW TechTransfer sponsors a series of informal talks on technology commercialization. These events provide an opportunity to learn how UW TechTransfer can help researchers identify commercial opportunities from their research, protect their ideas, and create value from innovations. These interactive, brown-bag sessions are designed for researchers, graduate students, and faculty and address topics such as the various forms of intellectual property, starting companies around technologies, managing conflicts of interest, and transferring research materials into or out of the lab.
- *Local marketing:* Twice each year, UW TechTransfer hosts an Innovation Forum to introduce the local venture community to opportunities for new company startups. UW TechTransfer also partners with the Northwest Entrepreneurial Network and Pacific Northwest National Laboratories to showcase UW innovations to local entrepreneurs.
- *Campuswide newsletter: Ingenuity* highlights new licenses and promotes the services of UW TechTransfer on campus.

- *Innovator Recognition event:* UW TechTransfer hosts an annual Innovator Recognition event, a special occasion honoring the wide-ranging achievements of UW researchers and innovators.

Policy and Strategic Initiatives also prepares the UW TechTransfer annual report, maintains the UW TechTransfer Web site (http://depts.washington.edu/techtran/), responds to surveys and requests for information, and advises the campus community on UW intellectual property policies, copyright law, and compliance with the Digital Millennium Copyright Act.

Finance and Business Operations

Finance and Business Operations manages all licensing revenue, legal expenditures and reimbursements, and ongoing contractual obligations. Additionally, this group disburses proceeds to inventors, developers, departments, schools, colleges, and UW research funds.

Conclusions and Comments

When I was asked to write about our office, the organizers of this volume asked me to address two specific questions. The first was on the manner that licensing professionals in our office are compensated, and the other was on the differences between a university-based technology transfer office vs. a foundation affiliated with the university.

The response to the first question is straightforward. Licensing professionals in UW TechTransfer Invention Licensing and Digital Ventures are compensated by salary only; we do not have an incentive compensation program.

The response to the second question is less direct. I assume that this question arose because of the UW's history and continued close working relationship with WRF and because of my experience as president of the Cornell Research Foundation at Cornell University. Since I've seen both sides, I can comment on the pros and cons of each.

A frequently stated rationale is that foundations are a preferred organizational structure and are freer to react to opportunities because they are removed from university bureaucracy. Another argument for the foundation is that they shield the university from liability in the event of a lawsuit. The second suggestion is a tenuous premise that is best

explored by someone who is an expert in this area of the law. Foundations have their own bureaucracy and governance. Some are streamlined and act in a very businesslike way and, as such, are models to emulate. However, not all foundations are nimble and quick to react. In contrast, some university-based offices have developed working models that are effective operating models.

Ultimately, we need to revisit the fundamentals—why we do what we do. The foundation exists to serve the university. To be effective, there needs to be a high degree of communication and collaboration in any structure. As licensing professionals, we often refer to technology transfer as a relationship-based business. The ability to work well with a wide range of people in a variety of roles is essential for success both at the individual and organizational level. Our interactions with faculty and the confidence that they have in our offices are critical for success. These key principles can be achieved by either structure.

From my point of view, there is nothing magical about the structure; it's the people in the office and the approach that they take to their work that matter. We operate in environments where there is a high degree of expectation for service, and an office that is part of the university or a foundation that has an arm's-length relationship can achieve this. Availability, visibility, and responsiveness are important elements for a successful operation, and, to achieve these, an office needs an adequate number of staff. It is hard for a foundation to maintain an adequate number of staff to meet the expectations for responsiveness, especially if it is income-oriented in its approach. There needs to be a balance of service and income in operations.

Managing Equity Obtained via Technology Licenses

Gregory W. Hauth

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This paper discusses the issues to consider when managing an equity position as part of a technology license agreement. Understanding those issues and how to manage them plays a crucial role in realizing a realistic return on equity (ROE). Failure to manage can result in significant value lost.

With concentrated, single-stock portfolios, investors must turn to ways to manage systematic and unsystematic risk. This paper looks at these single-stock risk-management issues.

Why Take an Equity Position?

Licensing institutions will often opt to take an equity position when available from their licensees. Numerous reasons exist and may include the following:

- Equity allows for additional upside revenue beyond the royalty or licensing fees.
- It may be seen as a risk premium to induce the licensor to license to a startup company licensee versus a more established licensor.
- Equity allows a licensee who is cash poor and equity rich to substitute an ownership position for a cash payment, e.g., for upfront licensing fees and/or for a reduced royalty rate.
- Equity allows the licensor to participate in the additional value a licensee obtains, either as a direct or indirect result of the license.

The discussion in this paper assumes that equity granted in a license agreement is not managed as part of a portfolio of stocks, but as a single-stock portfolio. That is, each position's returns and risk are managed individually and not aggregated with returns from other equity positions. In addition, it is assumed that many positions are large enough to be considered concentrated stock positions.

Modern portfolio theory and the capital asset pricing model posit that individual stocks carry systematic (market) risk and unsystematic (idiosyncratic) risk. In a properly constructed portfolio, you can diversify away most of the unsystematic risk. Then, the focus turns to managing a portfolio within the framework of systematic risk. However, with concentrated, single-stock portfolios, investors must turn to ways to manage systematic and unsystematic risk.

Private vs. Public Equity

First, let's distinguish between private and public equity. *Private equity* simply comprises ownership of companies that have no public market available. Sales of the equity can occur on a private transaction basis between two parties. One buyer may purchase all of the shares of another company, as in a merger or acquisition transaction. In this case, minority shareholders (such as university licensors) have little input, because the timing, price, and other transaction details are determined by the majority buyer and seller. In these cases, the minority equity holders have relatively easy decisions to make because they generally can only vote for the deal up or down.

Mergers or acquisitions (M&A) may convert a private equity position to a public equity position. For example, an acquisition may occur where the acquiring company is publicly held and pays for the acquisition with shares of its stock. Thus, the equity holders of the original private company swap their nonpublic shares for the publicly traded shares.

Obviously, an initial public offering (IPO) creates another opportunity for a privately held company to convert its shares to public equity.

The remainder of this paper assumes that technology licensors hold equity as minority shareholders. This paper also assumes that a technology licensor holds, or will hold, equity that will be tradable within a public market. Therefore, the timing and pricing decisions (sell or hold) rest solely with the equity holder and do not relate to larger M&A transactions with the rest of the company.

The Valuation Problem

Equity negotiated as part of a license agreement is very difficult to value since the licensee typically is a high-risk startup company with no marketable value and few tangible assets. Indeed, the license itself may represent the most valuable asset a startup company possesses. When a licensor accepts equity as part of a technology transfer transaction, the licensor usually attributes a low, or zero, cost basis to the initial equity position. Therefore, if the company succeeds in adding value to the equity position, the licensor believes it is immediately in a profitable position, with an unrealized gain. This inability to value the equity creates a complacency problem.

How many technology licensors determine the target internal rate of return (IRR) for their equity positions prior to entering into a license agreement? The percentage is probably low. One might argue that such a number cannot be calculated fairly, since the initial investment (or cash outlay) is thought to be zero. Prior costs (such as research and development) associated with the licensor for developing a new technology are generally not attributed to the licensee, so the equity position is not seen as an investment per se by the licensor. The licensor has no direct out-of-pocket financial investment in the license other than its own patenting expenses and administrative overhead. Therefore, any nonzero positive return provides a positive IRR and, similarly, a positive net present value.

The Problem of Selling

Technology licensors develop a unique psychology when managing equity derived from licenses. With no hard-dollar investment into the equity, there doesn't seem to be anything to lose; there's no capital at risk. And, with nothing to lose, the technology licensor may not strive as hard as other investors to capitalize on and take profits from the equity. While outside investors worry about their risk capital, ROI objectives, and the time value of money, technology licensors may be complacent about these same things. And questions arise: Who makes the decision to sell? At what price? When? Let's look at each of these factors.

Who Decides

In many cases, equity positions obtained from technology licenses are turned over to the licensor's chief investment officer or the treasurer. (Let's use treasurer for this example.) These people are generally very smart, financially savvy, and have a great deal of experience managing cash and investments for foundations and endowments. They certainly know the process for selling unrestricted, freely tradable securities. The treasurer, however, may have either no inclination or no experience in managing large, concentrated stock positions transferred to the organization by the technology licensing office. (These positions may even be referred to as orphan stocks.) The positions come to the treasurer with no cost basis, may be nonmarketable or may be marketable with restrictions, and may present substantial percentage ownership in one company. The securities may be restricted under SEC Rule 144, have lockup agreements, the institution may be deemed an insider or control person, and, therefore, subject to insider-trading restrictions, etc.

In other cases, the equity positions are managed by a committee of internal people comprised of technology transfer office (TTO) managers, the treasurer, and, possibly, other stakeholders (such as inventors, prominent faculty members, etc.).

Problems occur when the decision to sell or hold is managed without clear delegation of authority to act and without a clear desire to act. Whether authority rests with an individual or a body of people, if the decisions cannot be made in a timely manner, they may miss the market.

The Price to Sell

At what price should the equity be sold? The TTO may offer little direction, and the treasurer generally does not have the resources or analysts to determine a fair value for the company in question. Usually, small stock positions have little or no outside analytical coverage, so the Wall Street investment banking firms offer little help. What if the shares are sold at a point that's too low? Can the treasurer be criticized for acting prematurely? How can the treasurer know the best time to sell? He or she is too busy to time the market for a small stock position that may represent a fraction of a percent of the total assets he or she manages.

The treasurer may rightly believe that the liquidation of shares acquired via a technology license presents more work, and more internal liabilities, than it's worth. His or her best response is the easiest to execute: do nothing. The situation will often resolve itself—most startup companies will fail or the post-IPO price will wither to the point where the company is easily bought out or terminated. Ideally, the equity will be sold for cash as part of an M&A transaction, relieving the licensor of all pricing and timing decisions. Finally, for the small percentage of licensees that succeeds in the public market, the treasurer can deal with a more mature security position at that time (always at a later date).

In summary, in many cases, the TTO is expecting to get any reasonable ROE but has no clear goals about what that return should be or how best to obtain it. Meanwhile, neither the treasurer nor the larger institution has the time, resources, or inclination to devote to such orphan stock positions. Even worse, the treasurer may view any sales as creating new liabilities (such as insider-trading problems). Therefore, an approach based on doing nothing may be his or her best option. However, the small, newly minted stock is often a wasting asset as illustrated in the next section. Failure to act could squander its value.

When to Sell

The most straightforward strategy to manage public equity obtained via a technology license is to sell at the first opportunity following a liquidity event (such as an IPO). This seems amazingly simple and obvious, but it is not followed by a number of institutions. Many believe the price will go up following a liquidity event. Others have seen the price go down just as they are discussing the sale, so they will, therefore, hold on in hopes of a turnaround in the market. As mentioned above, with no frame of reference, such as financial analysis to determine a fair price, technology licensors default to the worst possible solution: do nothing out of a lack of information. What alternatives exist to the do-nothing strategy?

A study titled "The Expiration of IPO Share Lockups," published by Laura Casares Field and Gordon Hanka in the *Journal of Finance*[1], offers interesting insights into the sale of IPO stock. This study assumes that investors in a venture-backed company are subject to a lockup agreement. A lockup agreement is a contract put forth to existing private equity

shareholders in a firm that is about to go public. The investment bankers in charge of the underwriting for the firm usually require a lockup agreement as a condition of the underwriting, and standard practice calls for a 180-day lockup period following the date of the IPO. The lockup agreement prevents existing shareholders from selling their shares for a period of time so that new money raised in the IPO goes into the company, not to cashing out existing investors. (Some exceptions apply as specified in individual IPO prospectus documents.) Field and Hanka, therefore, focus their study on the unlock day rather than the IPO day because virtually none of the pre-IPO investors can sell on the IPO day.

They report that, "Around the unlock day, we find a permanent 40 percent increase in trading volume and a statistically prominent three-day abnormal return of -1.5 percent. Both of these effects are roughly *three times larger* in venture-backed firms compared to nonventure backed firms, and this "venture capital" effect grew stronger over our sample period." (Emphasis added.)

In other words, one of the best times to sell a position in an early-stage company is immediately following expiration of the IPO lockup (assuming this is the first opportunity to liquidate). It is even more important to do so if the firm is venture-backed, since venture capital firms will take their profits, immediately. VCs are among the very first sellers on the first day, the first minute that they can sell. They are not being disloyal to their venture-backed companies—indeed they took the risk in investing in the new companies in the first place. They are merely being true to their limited partners by taking profits as soon as possible.

This makes sense. VCs are not interested in holding cash or publicly traded securities after a liquidity event. Indeed, their partnership agreements often require them to distribute publicly traded shares or cash to their limited partners once a liquidity event has occurred. Finance theory expounds on this point too—investors should receive the returns as soon as possible because the investors can make better decisions with their money after the original investment has been liquidated. Technology licensors should follow this same process.

Note that this strategy does not involve a pricing decision, just a timing decision. VCs liquidate as soon as possible, independent of the current price. In a statistically significant number of cases, according to Field and Hanka, they would have lost value had they waited.

Recommended Approach for the Technology Licensor

From a psychological viewpoint, it's best to assume that every equity position received via a technology license represents a major hard-dollar investment by the licensor. Then, act accordingly, like other institutional investors. In other words, document in advance all decisions relating to the disposition of the equity, as much as possible, upfront.

This approach requires the institution to develop a set of strategies and policies to guide them in the management and sale of equity positions. This is not merely a set of policies to discuss how cash proceeds following the sale of equity may be distributed. This is more comprehensive and provides guidance from the first day a license is signed that attributes equity to the licensor.

The key guiding principle is the same as that used by an endowment's treasurer: act like a responsible fiduciary. This requires adherence to a basic principle that any endowment officer knows: develop an investment policy statement for the portfolio.

Develop a Liquidation Policy Statement

Foundations and endowments have investment policy statements (IPS) to guide their overall decisions for their portfolios. A typical IPS provides guidance about an endowment's goals, such as spending policies, targeted rates of return, etc. However, a technology licensor can certainly develop a modified IPS, such as a liquidation policy statement (LPS) to stipulate the sell discipline to be invoked for a security acquired through a license.

Taking the time to draft and execute an LPS for a single-stock portfolio may add significant value to the position. The LPS will serve as documentation for the treasurer, the TTO, and all stakeholders involved. By instituting it early in the process (when the equity has little or no value), it can be discussed and amended easily and obtain requisite approvals from all concerned parties.

Overall, an LPS guides the licensor so that all parties clearly know the sell discipline for XYZ Co. That is, the LPS invokes a documented manner and time to sell. The LPS should contain the following basic parameters:

- Preserve capital by providing protection against a decrease in the value of a stock; commit to a sell discipline.
- Diversify the exposure from a single-stock holding; commit to multiple single-stock risk-management strategies.
- Institute mechanisms to monitor results.

Let's explore these first two items in greater depth.

Sell Discipline

The licensor's sell-discipline should be no different than the VCs as discussed above. The equity licensor should simply take profits at the first opportunity or distribute the publicly held shares to the stakeholders as soon as possible. Then, if the institution wants to speculate with its own retained equity position (apart from those shares that would be distributed), it can do so. Certainly, exceptions to every rule exist. In my own experience working with the liquidation of venture-backed companies, following this simple rule provides a high ROE compared with strategies based on holding (and speculating with) the security after the IPO lockup expires.

Diversification: Including Other Single-Stock Risk-Management Strategies

Reasons may exist to deviate from the simple sell rule noted above. When an investor holds a concentrated stock position, he or she may choose to use a variety of strategies to manage the risk of holding that position. In a single-stock portfolio, diversification of assets is impossible. However, risk can be managed by diversifying among the strategies for managing the single stock.

Beyond the simple sell strategy, risk-management strategies may also include any or all of the following:

1. Hedging strategies
   a. Put option
   b. Equity collar
   c. Range forward sale
2. Liquidity strategy: prepaid forward sale
3. Speculate: hold shares for upside appreciation

Note that the first two strategies require a brokerage firm with sufficient expertise to act as the counterparty to establish these customized over-the-counter transactions, which are also known as *structured derivatives*.

An LPS might contemplate the use of multiple strategies. For example, an investor with 300,000 shares of stock may diversify this concentrated position as follows:

1. Commit to selling one-third of the position (100,000 shares) as soon as possible (within the boundaries of any lockup agreement, Rule 144, etc.).
2. Enter into a two- year, zero-cost, equity-collar contract for another one-third position.
3. Hold another one-third of the position as a speculative position, given that there is upside appreciation possible.

Certainly, an equity owner may combine these strategies in a variety of ways. This serves as only one example to manage current risk by liquidating a portion of the position, manage downside risk with a collar, and manage upside risk by retaining a portion for possible price appreciation.

Options

For more about options, hedging, and structured derivative strategies for concentrated stock positions, please contact the author at gregory.w.hauth@smithbarney.com.

Conclusion

Marketable equity obtained via technology license agreements can offer good returns to technology licensors if managed properly. Clear delegation of responsibility, a written liquidation policy statement, and strategies to control for risk in concentrated positions will preserve or accrue value to the position. The technology licensors must comply with contractual obligations (lockup agreements) and regulations (SEC rules) that make management difficult. Using liquidation strategies properly can help the technology licensor achieve a better return on equity than a do-nothing strategy.

The views expressed herein are those of the author and do not represent the views of the broker-dealer for whom he is employed, its officers, directors, or its other employees.

Notes

1. "The Expiration of IPO Share Lockups," Laura Casares Field and Gordon Hanka, *Journal of Finance*, 06/2000, p. 4.

Strategies for Managing Internal and External Constituencies

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The academic technology transfer professional stands at the nexus of a number of interested parties or constituencies, each of whom may interpret success somewhat or a great deal differently from one another. Of all the skills in the toolkit of the professional, managing interpersonal relationships is central. The professional strives to understand the needs of all parties, interpret them to one another, and find solutions that meet the mission and goals of the institution. At the same time, strong relationships are built with inventors, institutional leaders, and commercial interests. Each of these interested parties is a customer of the professional, some with a greater claim on his or her attention, but all requiring thoughtful response if the professional hopes to be successful.

What Is the Mission of the Office?

The first and essential task of every technology transfer director is to ensure that the technology transfer office is aligned with the goals and missions of the academic institution. Each member of the office must then ensure that he or she is supporting the mission in his or her daily activity. Whether the professional is the director or a member of the department, a clear understanding of what the institution wants of the office is essential. Technology transfer is now a recognized profession both within and outside the university community. However, misunderstanding of the purpose, goals, and outcomes of academic technology transfer persists.

As one of the deans of the profession, Howard Bremer, JD, Wisconsin Alumni Research Foundation, remarked in his address to the National Association of State Universities and Land Grant Colleges: "Of all the controversial subjects which have been addressed by members of Congress and discussed by newspaper editors and columnists over the years, none appears to be less understood than the allocation and disposition of rights to inven-

tions arising from government-funded research and development. In addition, the U.S. patent system has always seemed to be mysterious to the lay public as well as its duly elected representatives. In the words of Howard Markey, chief judge of the Court of Appeals for the Federal Circuit…"no institution has done so much for so many with so little public and judicial understanding as has the American patent system.' That dichotomy on disposition of rights to inventions and the lack of understanding of the operation and contribution of the patent system to the benefit of the public persists today."[1]

The prudent professional is careful to maintain complementary and related foci:

- The public mandate as first articulated by Vannevar Bush and later codified in Public Health Service regulations related to the award of extramural grants
- The mission of the academic institution within which the office operates
- The expectations of the different stakeholders within the institution, which may include faculty and researchers, administration, deans and department heads, legal and finance, university relations, alumni affairs, and the development department, as well as members of the board of trustees

Understanding Strengths and Weaknesses: What Kind of Team Have I Joined? What Is my Specific Role in the Plan?

Whether working in an established office or participating in the startup of a new effort, the professional should be aware of the strengths, weaknesses, opportunities, and threats of the office. Ideally, the director of the office has performed or is performing an analysis with the participation of as many of the stakeholders as possible. In obtaining their participation in this analysis, the technology transfer director ultimately can obtain their substantial agreement with office goals and the chosen operating model. This agreement is critical when difficult future decisions must be made that may demand tradeoffs among the stakeholders.

Strengths may include an experienced and well-seasoned staff; a long, positive history of interaction between the university and industry; an administration with reasonable expectations of the office as measured by national standards; good office systems; sufficient funds to invest in a robust patent portfolio, systems, and people. Weaknesses are the

reverse mirror of those strengths: inexperienced or poorly trained staff, an administration with unrealistic expectations, a divisive or negative history of interactions with industry, bad or nonexistent office systems and procedures, and insufficient funding. Opportunities may include close proximity and access to venture capital and entrepreneurial management and a supportive local business community with local assistance programs. A unique capability or program within the university may be in place with key potential partners as a basis for doing business. Star faculty can serve as the magnet for attracting important funding for research projects through research consortia and the creation of intellectual property. Board members may offer both connections and expertise. Threats include a risk-averse university or local environment and the absence of economic development infrastructure and assistance programs.

Working from an understanding of the mission of the institution, the interests of key stakeholders, and the environment within which the technology transfer office operates, broad goals can be established for the office. As noted above, maintaining strategic relevance to the mission of the larger institution requires that the director and other professionals in the office continue to check back with key stakeholders to ensure that the primary activities of the office match the expectations of the stakeholders. Regular meetings and reports also ensure an opportunity to educate stakeholders to the technology transfer process, engage them in the challenges facing the office, and arrive at mutually agreed-upon solutions for challenges. With this information in hand, the professional has a context in which to understand his or her function, role, and goals.

The Working Models: A Context for Managing the Relationship[2]

The majority of offices in the United States are versions of three predominate operating models: service, income, and economic development. In the service model, the emphasis is on service to faculty, not on the generation of income. In this model, each disclosure or case receives the same attention. While customer satisfaction is generally high in this model, the drawbacks of this model, which should be discussed with stakeholders during the environmental assessment period, is that significant income-earning opportunities are lost because all disclosures are treated with equal urgency. In addition, this office will require higher institutional subsidy to compensate for lost income.

The income model, as the name implies, emphasizes the generation of income over service. This demands an experienced staff with good understanding of the markets and industries to which technologies might be licensed. It requires a vigorous triage process to separate the potential hits from the losers. It has the potential to generate significant income, which will satisfy administration and those inventors whose technologies are successful. However, it is likely to result in a generally lower level of satisfaction overall from faculty, most of whose technology is not a blockbuster income producer.

The economic development model emphasizes the formation of companies, especially local companies around university technologies. It has the potential for significant long-term income through shares of equity. It tends to downplay straightforward licensing to established companies and requires significant skill sets in company startups. It is a long-term, higher-risk investment in the time and resources of the university. If successful, it permits the university to enjoy substantial public recognition for the creation of jobs and enhancement of the local economy. Because so few technologies can serve as the platforms upon which companies may be formed, measures of general faculty satisfaction are likely to be low.

Who Are these Customers or Stakeholders?

Technology transfer offices operate within private and public universities; large land-grant universities; and small, single-mission institutes all of which hold dearly the core values of the creation of knowledge within an atmosphere of free inquiry. However, each institution strikes its own unique balance of teaching, research, service, and economic development activities. Interviews with the key stakeholders inside and outside of the institution are essential to understanding how each interprets these functions. Asking the question of each stakeholder, how will you know the tech transfer operation is successful? can be used to discuss and measure expectations and set metrics for success. The director of the office has the institutional responsibility for assessing stakeholder expectations at the outset and communicating them to the tech transfer staff. However, each interaction or transaction with a stakeholder is an opportunity for the tech transfer professional to reestablish and come to agreement regarding expectations within the context of the mission of the office and the institution.

Ultimately, the successful technology transfer professional must arrive at an understanding of the mix of functions—service, production of income, and economic development—that suits the institution. The exercise of keen political acumen is essential. While it is doubtless true that the diversity of stakeholders assures that not all of them will be satisfied, the astute technology transfer director will leave as many stakeholders understanding and supporting, if not agreeing completely, with the focus of the office.

Who are some of these stakeholders or customers? Internally, they include:

- academic administration including the president, deans, department chairs
- individual researchers/inventors
- other administrative departments, especially grants administration and fundraising, legal, and finance
- board of directors

Externally, they include:

- companies that work in the various fields of invention disclosures
- local and national venture capitalists and investors
- local economic development officials
- local, state, and federal legislators

What Are my Customers' Expectations? How Do I Manage them?

Managing expectations begins within the technology transfer office itself. The office is, at its heart, a service organization. To be successful, the office must build and sustain a culture of customer focus. The office and each of its staff members must commit to becoming a learning organization, competent in all the disciplines of internal and external communication, sales, marketing, and interpersonal skills. The office must have a process and culture that sustains continuous examination of its own mental models and assumptions of what drives their own behavior as well as their customers'. It must constantly clarify and articulate a shared vision with its customers and practice collaborative team learning. The individual professional must be an active participant in that learning, maintaining a creative edge, and skilled in collaboration and inquiry.

As a service provider, customer expectations can pose a major challenge. That's because expectations grow, shrink, change shape, and change direction. They shift constantly, and they shift easily. How satisfied (or dissatisfied) customers are is determined by these expectations and the professional's performance in meeting them. Customers' level of satisfaction can be affected by changes in either their expectations or the technology transfer professional's performance. That means the professional has to pay attention to both.

And that's where things can get tricky, because how the professional perceives his or her performance may differ from how his or her customers perceive it. In fact, discrepancies between the professional's and the customers' perceptions would not be at all unusual. If customers view the office and/or the individual as unresponsive, then they are—in their eyes. Customer satisfaction is driven by their perceptions, not the professional's. Their perceptions are their reality, and any overlap between their view of the world and the professional's may be simply one of those delightful coincidences. A survey of inventors reported on at the 2005 AUTM Annual Meeting℠ by Robert Lowe, PhD, Carnegie Mellon University, revealed that no inventors felt their technology transfer office added anything to the success of their invention—clearly, a very broad perception gap.

Monitoring changes in customers' satisfaction level is critical to the communication process. Good communication should be repeated; ineffective or bad communication must be changed before it is given a chance to do real damage. The professional must guard against getting so wrapped up in delivering services that he or she loses sight of customers' expectations and how well they think he or she is meeting them. The professional is conscientious in observing what's going on in the customers' environment and his or her own that could affect satisfaction level.

The Elements of Good Communication: Building Trust

Even though they may be great project managers or team leaders or consultants, professionals at all levels communicate inadequately during times of uncertainty. By definition, the academic technology transfer office deals with novel, frequently unproven ideas with many levels of uncertainty related to commercialization. The process of evaluating, marketing, and successfully concluding a deal related to the technology is frequently a mys-

tery to customers and stakeholders outside the office, and the professional may not appreciate the fact that others are not familiar with the process and fail to recognize even the small steps they can take to help their customers or stakeholders maintain a level of comfort. In dealing with an unknown or unfamiliar process, most people have an intense need to know what is happening and how it will affect them. This is especially the case when the technology disclosure is viewed as the inventors' "baby," the path to the entrepreneur's success, or the answer to institutional revenue difficulties. Yet, so often, communication in the form of information, empathy, reassurance, and feedback is in short supply.

Even when the technology transfer professional does understand the information gap, many prefer not to take any action. Particularly for those professionals who have not had training in communications, they avoid communicating because doing so means dealing with those messy "people issues" (such as feelings, for example). As William Bridges notes in *Managing Transitions,* "[Professionals] are sometimes loathe to talk so openly, even arguing that it will 'stir up trouble' to acknowledge people's feelings." Of course, as Bridges emphasizes, it's *not* talking about these reactions that creates the problem.

The more difficult communication relates to unsuccessful commercialization. However, it is this circumstance that is even more important, indeed critical, to communicate well. The communication must be accomplished in a way that acknowledges and respects customers' reactions, while helping them to accept the change and adjust to it as expeditiously as possible. Thus, trust and respect for the professional and the office are built.

What Do Customers Want, Anyway?

Fortunately, what most customers or stakeholders want is exceedingly reasonable: to be treated with respect; to be listened to; and not to be bounced around, ignored, or treated like dummies. Both the product and the process are important to customers. The product refers to the solution, system, response, resolution, deliverable, or result. Whatever form the product takes, customers want it to work properly, to meet their needs, and to have that elusive quality of care. Customers may not keep coming back unless the professional also attends to the process. In fact, for many customers, the process is more important than the product. The process concerns how customers feel they've been treated. This is the human element of service.

People always seem to want to know *when.* For the professional managing many constituencies, establishing and maintaining standards of service are a valuable means to ensure satisfaction. The following illustrates standards that lead to customer satisfaction.

- *For acknowledging customers' voicemail messages:* "We will acknowledge messages to the support line within one hour of the call."
- *For responding to service requests:* "We will provide written feedback on the action we will take within three days of receipt of a service request."
- *For describing variations in service level:* "We will aim to resolve problems with products on the A list within eight hours and products on the B list within one week of receiving a request for assistance."

Time frames may differ. The issue is not the specific time frames, but whether service standards have been established and communicated. When customers complain about poor service, it's often because of an absence of service standards that let them know what they can reasonably expect.

For situations in which the time frame is not clear, the professional should consider establishing and offering a regular interval to report to stakeholders and customers. In fact, agreement on the frequency of reports should be part of the expectation setting at the outset. Following the timetable, even when there is nothing to report, builds trust that the issue hasn't dropped off the edge of the earth. Customers have indicated that they want:

- to be taken seriously
- knowledgeable help
- competent, efficient service
- friendliness
- anticipation of their needs
- to be kept informed
- explanations in their terms
- follow-through
- basic courtesies
- honesty

- to be informed of the options
- feedback
- not to be passed around
- professional service
- to be listened to (and heard)
- empathy
- dedicated attention
- respect

In reality, no office can afford not to have some combination of the models above. At all times, the professional must balance conflicting expectations and priorities. Thus, the professional must have significant communication skills and be proficient in using them in order to stay attuned to the various constituencies within the university community.

Resources Related to Managing Constituencies

To successfully meet a group task—especially with limited resources, equipment, or personnel—one must establish priorities. Establishing priorities helps foster effective and efficient relationships in the workplace and boosts productivity and worker satisfaction. The director or leader of the office will be called upon to set priorities, or at the very least, monitor priorities already set. The clarity with which this is done will impact the comfort level of the staff. This means the director must establish his or her own priorities, differentiate them to others in the office, and work with individual members of the office to establish individual priorities and differentiate them. This process clarifies individual roles and responsibilities within the group and lets everyone see how his or her individual responsibilities contribute to the success of the group.

Clarity about the overall vision for the future allows priorities to be set that have a higher potential for achieving the vision. Each professional and staff member in the office should expect to understand clearly what needs to be done and when, as well as the relationship between the priorities and the overall goals. If priorities are clearly stated and contribute to the overall vision and mission of the institution, the entire staff should be able to follow through even in the director's absence. This will make the professional and staff feel safe in their positions and roles because they can trust the commitment to helping them succeed.

Typically, university technology transfer offices operate as departments within the university, reporting to the provost, vice president of research, or vice president for finance. On occasion, as in the case at Cornell University, the Wisconsin Alumni Research Foundation, or Florida State University, offices are established as freestanding corporations of their own with obligations to commercialize technologies arising out of the parent university. This discussion will not go into the benefits and drawbacks of each of those models except to note that relationships to constituencies and priorities are influenced by the structure and placement of the office within the institution.

Tools to Help Manage Internal and External Constituencies

Software and Systems

Clear communication with customers and stakeholders requires that information be readily available and manageable by the professional. Today, there are several software systems on the market that may be selected to manage office operations but also ensure a mechanism for follow-up and communication. It is worth noting that the office manager and docket clerk should have a role in the selection of a system since these individuals will be working most closely with it. Time and funds should be set aside to provide sufficient training for all members of the office to ensure its most effective use. The office manager may be the person designated to set up protocols for use of the system to ensure consistent data input, setup, and manage system reports.

Another critical tool in the office is a triage system that weighs generally recognized criteria to come up with a total score for a disclosure. This score is then used to help make a decision regarding the effort and resources dedicated to a particular technology. A well-managed triage system can be a very effective mechanism for helping inventors and other stakeholders understand the multiple factors that contribute to deciding whether to move forward with the project or not. Hearing bad news is not nearly as devastating as the impression that a disclosure or opportunity was not fairly, competently, and expertly reviewed.

Advisers and other Resources

Good business decisions cannot be made in isolation. Just as the technology transfer director has assessed the environment and the strengths, weaknesses, opportunities, and

threats confronting the organization, so should that individual reach out to understand what is happening in other offices and what is evolving as best practice in the larger community.

Some of these resources are close to home: professionals within the office, selected members of the board of trustees, faculty. Business faculty and the inventors themselves can assist in providing perspective, market assessment, and a sense of the environment for any particular technology. Colleagues who manage similar offices are key resources in improving the operations of the office as well as specific deal construction. Some offices conduct the very useful practice of having colleagues from other offices visit and consult in overall office operations or specific skill sets, such as how to triage disclosures. This continuing quality improvement ensures that the office is regularly reenergized with the best ideas and that stakeholders remain satisfied with the office work product.

Consideration should be given to exposing office staff to a broad range of related training. General sales and marketing techniques, as well as principles of customer service, are widely applicable. One- or two-day courses are generally available in major cities around the country. Thought should be given to establishing a regular education process for all members of the office to introduce new skills and refresh old ones. Getting out of the office and meeting individuals from other industries is useful, energizing, and good for morale.

The Internet provides resources in the form of listservs such as techno-L (http://lists.ou.edu/archives/techno-l.html) that provide a forum for technology transfer professionals to exchange questions and information. General business newsletters, such as from McKinsey or Recombinant Capital, and other newsletters from a broad range of industry sources, as well as specific industry Web sites, such as GenomeWeb (http://www.genomeweb.com) or information technology Web sites, can be helpful in monitoring the general environment and understanding the practice of deal making and technology transfer at all stages of the innovation process.

Professional Associations

The Association of University Technology Managers (http://www.autm.net) is generally regarded as the premier organization for academic technology transfer managers. AUTM

offers profession specific courses, publishes a newsletter and journal, and conducts national and regional meetings that offer the academic technology transfer manager courses at all levels of experience and aspects of the profession.

Other academic professional organizations, such as the Society of Research Administrators (http:// www.srainternational.org), National Council of University Research Administrators (http:// www.ncura.edu), and National Association of State and Land Grant Universities and Colleges (http://www.nasulgc.org), can be useful to technology transfer professionals. The Licensing Executive Society (http:// www.usa-canada.les.org) is another organization useful to academic technology transfer professionals. Both AUTM and LES have members from academia as well as industry who can enormously enhance the academic technology transfer members' depth and understanding of the profession.

The Council on Governmental Relations (http://www.cogr.edu) and the Association of American Universities (http://www.aau.edu), as well as the American Association of Medical Colleges (http://www.aamc.org), are professional organizations that provide thoughtful material and suggestions for policy as they relate to the practice of technology transfer in academic institutions.

Each member of the technology transfer office should be encouraged to become members of one of these organizations, participate, and learn.

Marketing and Communications

The technology transfer professional must develop a capacity to speak to each constituency in a way that is important to that audience (think customer here).

University administrators, senior management, and the board of trustees have invested resources in the technology transfer office. Regular communication with this group to inform them of the office's successes, in the context of the larger environment, and to inform them of important policy and legislative issues, is critical. Managing the expectations of this group is essential. The typical university technology takes ten years to fifteen years to produce income, if it ever does. At Stanford, one of the "granddaddies" of uni-

versity technology licensing, only 31 cases have generated more than $1 million or more in cumulative royalties. One in 4,850 has been a big winner.[3]

In fact, experience tells us that, on average, it takes up to ten years for an institution to obtain a positive rate of return. Around the world, the cost of an effective technology transfer system is about 1 percent of research and development. An invention disclosure rate of $2 million to $2.3 million of research per invention disclosure is remarkably consistent across the United States and around the world.[4]

Faculties, especially inventors, need to know about the progress of the office in general and their invention in particular. Getting out to departmental meetings, holding seminars, sending newsletters, or inserting articles in the institution newsletter are good general mechanisms to maintain interest, encourage disclosures, and give report cards. Meeting with inventors, copying them on correspondence, and including them in meetings ensures their greater cooperation and continued disclosure.

It is important as well that the technology transfer office relate effectively with offices of public and legislative affairs in the institution. Public affairs offices can be very helpful in getting attention for successful deals. This media exposure elevates the profile of the office, smoothing the way for interactions with potential licensees and investors. The legislative affair officer in the institution is a key member of the team in ensuring that local, state, and federal policies continue to support the technology transfer agenda of the institution.

Outside the institution, the office must cultivate a presence in its cities and regions, as well as with their potential licensees. Academic technology transfer is widely seen as the engine of economic development. The challenge for most technology transfer offices is balancing the large numbers of meetings and events held any year to promote new business and startups with the routine tasks of the office. A careful selection needs to be made to ensure that the technology transfer office obtains the optimal value for its participation to support its goals. Technology transfer officers should attend and participate whenever possible in meetings dedicated to bringing together sellers and buyers of technology.

Measuring Success

The highest marks of success go to the technology transfer office that can successfully communicate the ways it contributes to the goals of the institution to which it is related. Telling the story, the effect of university research on the public good, and the results of public investment in the university research infrastructure, must be a central component of the office communication strategy. Numbers alone will not do it, and, in fact, can become distracting. Being able to tell the story of the movement of an idea from the laboratory or clinic, through development, into a startup or license leading to a product or service is powerful. As it has matured, the profession is recognizing that the best statistics are those in support of a story leading to public good.

For eleven years, AUTM has performed an annual survey of academic technology transfer. The technology transfer office must be able to measure the amount of research dollars coming into the institution; the disclosures received; patents filed for and issued; and licenses, options, and startups formed. These national standards then become the norm against which the office is measured. Some offices, especially in the early years when deals have not yet come to fruition, measure the number of contacts with faculty members as a method of establishing that they are reaching out as well as reassuring themselves that they are seeking the first fruits of research: disclosures.

Other measurements include research support negotiated related to a licensing or option deal and numbers of confidentiality, material transfer agreements, and consulting agreements reviewed. Other metrics may be established in concert with faculty and administration and may include a satisfaction survey.The discussion of what metrics to be used is an opportunity to set expectations and market the office. The office may want to consider publishing a yearly report: This provides an opportunity to present results, set them in a national and international context, honor inventors, and create a public image.

Every technology transfer office exists in a continuously changing environment requiring flexibility and continuous learning and improvement. New technologies and new approaches to solving scientific problems are constantly appearing. Local, state, and federal governments continue to seek new ways to make use of intellectual assets to improve the economy and create jobs. Faculty members come and go. Professional develop-

ment, as noted earlier, should be a central and ongoing component of the operation of each office. A budget should be allocated for each member of the office to attend at least one annual meeting, appropriate to his or her job, for job-skill enhancement. More established technology transfer offices are also a great resource for one-day seminars and/or operations audits. Ongoing formal and informal dialog with customers is essential to ensure their needs are being met.

It is difficult to imagine a more exciting business than a well-run academic technology transfer office at the nexus of scientific discovery, business, and law.

Notes

1. Howard Bremer, National Association of State Universities and Land Grant Colleges, Nov. 11, 2001, Washington, D.C.
2. With permission taken from a presentation by James A. Severson, PhD, on the structure and function of technology transfer offices.
3. Mary Watanabe, "Stanford Office of Technology Transfer," Presentation to AUTM, 2003.
4. Tony Heher, Presentation to the First Globelics Conference, Rio de Janeiro, November 2003.

Bibliography

Bridges, William. *Managing Transitions: Making the Most of Change.* New York: HarperCollins Publishers,1991.

Fraser, John. Florida State University Research Foundation Strategic Plan, January 1998.

Heher, A. D. "Return on Investment in Innovation: Implications for Institutions and National Agencies." Presentation to the First Globelics Conference on Innovation Systems and Development Strategies for the Third Millennium, Rio de Janeiro, Brazil, November 2003.

Karten, Naomi. "Managing Customer Expectations," at http://www.nkarten.com.

Severson, James A. "Structure and Function of Technology Transfer Offices." Presentation to the Association of University Technology Managers, 2000.

Sorenson, Jill. University of Chicago Office of Technology Management, Five-year Business Plan Summary, FY 2003-2008. Jan. 1, 2003.

Watanabe, Mary. "Stanford Office of Technology Licensing." Presentation to the Association of University Technology Managers, 2000.

Recruiting and Retention Strategies for Technology Managers

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The chapter "Strategies for Managing Internal and External Constituencies" by Patricia Weeks[1] describes well the process of understanding the mission, strengths, and weaknesses of the technology transfer office. The broader message of the chapter is the importance of taking a customer service-based approach in managing technology transfer offices and engagements. The underlying basis for Weeks' perspective is the need for people who can provide thoughtful responses to all stakeholders, and her analysis provides a measuring stick for which to evaluate everyone's role as part of an organizational team and guidance as to what skills are required to be effective as part of a technology transfer office team. This same analysis can be used in identifying the necessary attributes and skills required of a new hire when recruiting technology transfer personnel.

Building from both Weeks' work and the recruitment experience of the WestLink Innovation Network's Technology Commercialization Internship Program, this chapter presents a number of recruitment and retention strategies particularly relevant to the business of technology transfer.

The WestLink Technology Commercialization Internship Program is a two-year government-sponsored[2] training initiative developed to build a greater regional pool of technology commercialization expertise. Interns are recruited from a wide range of disciplines, levels of experience, and geography with a goal to build a cohesive team despite the team members' varied working environments and experiences throughout their participation in the internship program. Individual interns are deployed to each of three different placement host environments—a technology transfer office, a venture capital firm, and a technology company. At the same time, the interns are brought together intermittently over the course of the program for targeted training and networking opportunities. Therefore,

each intern has both an independent and group experience. But this unique and shared experience quickly binds the entire cohort as a team of colleagues. The interns provide each other with extensive support in shared learning, expertise, and experience on an ongoing basis via e-mail and an internal discussion board. The key to this success is strongly, if not uniquely, correlated to recruitment of the appropriate candidates for the team, the organization, and the candidates themselves.

This chapter begins with a look at the importance of analyzing skills and attributes of current staff members and new recruits when adding to, or, as in the case of WestLink, building an entirely new team. The chapter then goes on to provide guidelines for successful recruiting, including developing the interview process, interviewing, and making the final hire. Finally, the discussion concludes with employee-retention strategies.

The Importance of Being Honest: Knowing Who You're Looking For

Whether expanding your office staff or replacing an existing employee—attracting new talent is an investment in the success of your team. Even one team member can radically change a group dynamic; that sudden burst of positive enthusiasm or drain of cynical sarcasm *does* impact the productivity and effectiveness of that team. When beginning the recruitment process, it is important first to take inventory of the team you have now. What is working well? What is not? Is there a role or skill set missing from your team that could improve productivity or effectiveness? Now is the time to look carefully at the specific skills, attributes, experience, and level of responsibility needed for the position. There really is much more to consider than a good resume!

For example, every candidate selected for the WestLink program is considered relative to the skill sets and attributes he or she will bring to the existing fifteen- to twenty-person team. Similar math can work for teams of all sizes, even small offices with two or three staff members. For smaller offices, people external to your office should be considered in evaluating the group dynamic, such as people from accounting or legal departments, senior management and external consultants, advisers, accountants, and lawyers. These people all play a significant role in how work is accomplished on a daily basis and, as a result, contribute to the team dynamic.

Differentiation Between Skills and Attributes for Effective Technology Transfer

Skills are knowledge-based, developed from work experience and formal education, such as negotiating, contract writing, and time management. Attributes are traits inherent to the person's character, such as being outgoing, logical, or risk-averse. Skills can be taught, developed, coached, or transferred. However, attributes, such as honesty and trust, are difficult to instill.[2] They are the attributes that can either enhance or derail a particular individual's skill set. For example, a candidate may have invested considerable time and effort in developing strong verbal negotiation skills, but if he or she is not empathetic, his or her ability to read nonverbal feedback is limited and, hence, so are his other verbal negotiation skills.

However, as human resource consultants Robert Hogan and Joyce Hogan have found, certain otherwise positive attributes under normal circumstances can become distorted under situations of high stress and become negative attributes.[3] The Hogan Development Survey, a psychometric evaluation tool developed by the Hogans, assesses a candidate's tendency toward career-limiting behaviors or interpersonal problems that are difficult to determine as part of an interview. For example, someone who is enthusiastic, confident, and diligent can become volatile, arrogant, or a perfectionist under stressful circumstances.[4] These are the attributes that will strongly influence how an individual will perform as part of a team environment—particularly one that is required to deliver results under time or other resource constraints.

Skills and Attributes: Building Blocks for an Effective Team

At WestLink, the interns work in isolation from each other: in separate companies, cities, and, in many cases, thousands of miles away coming together one to three times a year to participate in training and networking. Yet even in the absence of direct contact, they still feel like a team: they interact via e-mail for problem-solving and moral support on an ongoing basis. This team dynamic is highly important in how information is shared and attitudes about the program develop and permeate. Ultimately, the team dynamic plays a large role in each member's perceived value and satisfaction with his or her work experi-

ence with WestLink. In essence, it is those lunchtime and coffee-room breaks, the weekly staff meetings, and overall shared experience that truly form the basis of a team—which, in turn, impacts productivity and satisfaction levels of employees. In particular, building teams is critically important in making progress with the breadth of stakeholder groups common in technology transfer.

An effective team also needs specific roles to be filled: leaders, implementers, people who follow up, risk analysts, team builders, and even the antagonist. Without someone in each of these roles, a team loses its balance and becomes too heavily pulled in one direction. Teams with blind followers, teams with no leadership, or teams without implementers miss opportunities and achieve fewer accomplishments.

So, what does an effective team look like? A perfectly engineered team would include:

- *Team players,* at least 75 percent of the group's members should be able to work well in a team. A team can absorb only so many members with weak or poorly developed team-playing skills. People without good teamwork skills are calculated risks. Before hiring someone without these skills, ask yourself the following questions: What other redeeming characteristics or skills does he or she bring to the team? Will more experience improve his or her teamwork skills or is the problem more than a simple lack of practice that limits his or her teamwork skills?
- *At least one person who can be a logical, process-oriented thinker* to provide order and structure.
- *At least one person who sees the big picture,* solves problems strategically, and asks, where are we going with this?
- *At least one person who can be the antagonist.* Too many antagonists and they can gel into a poison pill for a team, but, in small numbers, they are highly adept at ensuring teams manage multiple stakeholder interests, encourage effective communication and conflict-management skills, manage risks, and build strong business cases.
- *One or two people who are eternal optimists* and prefer to manage conflict through compromise and coalition building. These team members are invaluable at moving the group past a deadlock or seemingly unresolved conflict.

- *At least one leader* and no more than three people who have natural and underdeveloped leadership abilities. These junior leaders should be encouraged to further develop their leadership skills by acting as backup to the team lead, leading smaller breakout groups that report back to the larger team, or taking responsibility for specific team deliverables or implementation tasks. There will be many on the team who do not have the time or interest to take on these extra initiatives, so place them with those with leadership interests who can create the most value from these opportunities. When possible, it is prudent to allow time and resources for leadership coaching for this same group to ensure the skills they develop are effective ones.

When evaluating your team, consider the following questions:

- Which of these roles do the people in your office play?
- What is the distribution or balance of these roles on your team?
- What makes your team strong, that is, how well do the members cooperate and pursue consensus decision making?
- What is the team's collective weakness, for example, when seeking consensus, does decision making take longer than it should?

The answers to these questions will provide important insight into the skills and attributes needed from a future recruit and should lead to the development of a specific description of qualities to be investigated through the interview process.

In addition to assessing the dynamic of the current team before recruiting, it's also useful to consider why there is an opening in the first place, especially if turnover is high. Figure 1 gives some examples of questions to ask to assess team dynamics and the reasons for employee attrition.

By conducting this analysis beforehand, it is possible to identify what specific skills and attributes would best complement your team. For example, you may determine that your team is working together relatively well and effectively, handles disagreements methodically, and, overall, delivers quality results on time. However, you realize that the recommendations from those results are not being implemented. What does that say about the team?

Figure 1: Examples of Questions to Assess Team Dynamics and Employee Attrition

Investigative Questions about Team Dynamics	Investigative Questions about Employee Attrition
Does the team work together?	What is the total cost of a lost employee in this organization—direct, indirect, and opportunity costs? Is there a difference in these costs between junior-level and senior-level employees?
Is the team effective at making decisions?	Is employee attrition becoming a problem?
Does the team have a shared goal or vision?	Was there an exit interview conducted or did the employee who is leaving provide informal feedback prior to his or her departure? If yes, what was discussed?
How is conflict managed by the team?	Has there been an employee satisfaction survey conducted in your office or as part of the wider organization? If yes, what were the results?
Which roles are missing from the team?	What has been implemented to reduce employee attrition?

Does the team have too many senior staff members who have brought value to the team but are not directly responsible for implementing results. Or is the team lacking members with project-implementation skills? One way to find out is to ask the team members some targeted questions regarding the limitations of the team.

Relevant Skills and Attributes for Effective Technology Transfer Personnel

Weeks provides a number of examples of the necessary skills and attributes required for effective technology transfer personnel in her chapter. Additionally, the WestLink Advisory and Selection Committee also has deliberated on the necessary skills and attributes required to be effective at technology transfer and commercialization. Based on these combined perspectives, the following section discusses some of those key attributes.

Communication

The single most important skill for a highly effective technology transfer professional is the ability to communicate well. On a daily basis, technology transfer professionals interface with internal stakeholders including researchers, administrators, students, and co-workers, as well as many external stakeholders in industry, government, sister institutions, and investor forums. The basis of the relationship between the technology transfer office and each of the stakeholder groups is unique and, as such, the content and style of communication must be adjusted accordingly. It is as much the ability to navigate the subtleties of style, delivery, and timing over technical prowess that allows the professional to effectively weave into each distinct corporate culture. Regular and customized communication in the interstitial time and space between significant milestones on a client project allows the technology transfer project manager to manage expectations, and, thereby, achieve positive outcomes.

Creativity

Marketing challenges, awkward deal structuring, negotiating impasses, or communication stalemates find their resolution with creative problem solvers. Creativity is an important skill in technology transfer as each technology has its own entirely unique features, route to market, and personalities.

Customer Service

Technology transfer offices provide a service to their research institutions or university community. As service providers, technology transfer staff must possess a basic understanding and embrace the fundamental principles of providing customer service. They should ask themselves: What service am I providing? Have I provided it well? Is my customer satisfied? People with a customer-service attitude view their professional relationships from this vantage point, but these skills are also easy to learn and can be influenced by a corporate culture that stresses that customers are important and they need to be treated that way.

Facilitation

Great negotiation and conflict-management skills find their roots in the ability to facilitate groups and broker new ideas. Good facilitators work to find common ground and ensure all perspectives are heard. They take an objective approach to collecting information from stakeholders and use a rational methodology to sort and process information as relevant, not relevant, or critical to support group decision making. A number of project-management tools provide guidelines for how to effectively organize information pertaining to a project. However, one of the more effective tools is SMART Project Management, developed by Frances Hartman.[5] In his publication, *Don't Park Your Brain Outside,* Hartman describes methodologies for capturing and organizing information effectively. The basic premise is that all information is welcome, but it is categorized as relevant (key to the issue at hand), critical (pivotal to the issue at hand), or parking lot (point of interest, but outside the scope of the current issue or project). These kinds of tools can be invaluable to systematically organizing the inputs and outputs of group communication work.

At WestLink, the internship program exists to develop catalysts for commercializing technology. The intern's success as a catalyst lies heavily with the intern's ability to facilitate. Facilitation skills are particularly valuable for professionals who need to gain support from stakeholders over whom they do not have direct authority. They need to earn their support through genuine collaboration.

Multitasking

In any given day, most technology transfer professionals can review ten project files, field twenty phone calls, and face countless interruptions. Switching tasks is part of daily life in a technology transfer office, and these professionals must demonstrate progress on a portfolio of client files that could surpass more than 100. Multitasking is not a simple skill set, so it's a good idea to carefully screen for this skill while interviewing potential employees.

Diplomacy

Diplomats have a notorious reputation for leading a life of exotic luxury—entertaining international guests with tall glasses of champagne on a moonlit terrace late into the

evening. In actuality, diplomats have the very difficult responsibility of advocating on behalf of their home nation in good times and in bad; bridging language, political, and cultural barriers; and becoming expert brokers of well-placed information. In many cases, these are important skills for technology transfer professionals as well. They need to be able to determine what and how much information should go to which stakeholders; deliver difficult messages in an honest but positive manner; be sensitive to the political and cultural context of the stakeholder; consider the potential agendas of everyone involved to understand motives and broker successful deals—all while maintaining the professional reputation of the office, university, or research institution.

Technical Expertise

Without question, technology transfer professionals who are knowledgeable and experienced gain credibility with researchers. However, an impressive academic background is only one of many assets people need to be successful in technology transfer. Only someone who has mastered many of the other skills—such as diplomacy and customer service—can truly capitalize on a strong academic background.

Teamwork

Successfully sharing responsibilities—essentially working as a team—requires someone with strong communication and project-management skills, the ability to compromise, a healthy respect for other viewpoints and work styles, and, ultimately, trust in his or her fellow team members to deliver on their obligations. In addition to working as a team with others in the office, technology transfer staff must also be able to coordinate researchers, industrial partners, and investors—a job that requires a basic understanding and appreciation for teamwork. After all, deals are not closed by individuals, but by a group of people brought together by a common goal—a team!

Figure 2: Summary of Beneficial Skills, Attributes, and Related Experience for Technology Transfer Professionals

Examples of Skills for Technology Managers	Examples of Associated Attributes	Examples of Related Experience
Communication	Outgoing, good listener, strong command of required languages (written and spoken), empathy	Has successfully communicated with multiple stakeholder groups
Creativity	Participates in extracurricular activities, independent, self-motivated	Has problem solved as part of a technical or project-based initiative
Customer service/salesmanship	Friendly, honest, invests in others, goal-oriented, perceptive	Has worked in customer service, in a sales environment (retail and restaurant experience count)
Facilitation	Patient, identifies objectives clearly, can role play, strong command of required languages	Has taken on leadership roles and led group decision making
Multitasking	Self-directed, able to prioritize	Has worked in an environment that required managing multiple priorities
Diplomacy/political acumen	Can role play, empathetic, good listener, strong command of required languages	Has formally represented a cause or organization through a transition, change, or challenge
Technical expertise	Analytical, active learner	Has education and applied experience in the required area of technical expertise
Teamwork skills	Cooperative, able to put the goals of team before personal agendas	Has worked in a team environment where the team members were jointly responsible for the deliverables

The Hiring Process: It All Begins with a Well-Defined Job Description

Once an investment has been made in identifying any gaps in the current team and determining the necessary skills and attributes necessary to fill those gaps, there will be enough background information to develop an appropriate job description. A job description should provide enough guidance that a qualified individual could reasonably walk away and begin working on that job. Job descriptions should be current and distinguish roles and responsibilities from one team member to another. The job description should also

describe the skills needed to fulfill the duties for the position. Invest time in developing the job description and seek input from other team members to ensure all the necessary responsibilities are included. Encourage existing staff to keep their job descriptions current, and include them as part of the discussion in annual performance reviews. This time investment will ensure a more accurate alignment between the job and the employee —current or prospective.[6] Examples of responsibilities included in the job descriptions of technology transfer personnel include the following:

- Meet with (specified industry) clients and conduct technical review of intellectual property.
- Manage client communications with... (list specific stakeholder groups and organizations).
- Communicate client-management process to clients and effectively manage their expectations in relation to those processes.
- Maintain and develop existing and new industry partnerships and relationships.

Developing the Interview Protocol

Given the list of necessary skills and attributes, it is then possible to develop appropriate interview questions to identify candidates' skills, attributes, and experiences in the specified areas. Begin by weighting each of the skill sets required for the position based on its importance. For example, those skills that are beneficial to the position or organization but not critical to immediate roles and responsibilities might get a 1. Skills that are important and, if not already well-developed, must be included in the training plan would get a 2; and, finally, those skills that are critical and mandatory to perform responsibilities of the position would get a 3. Then develop questions to assess each of those skill sets.

Questions should be open-ended and allow the candidate to demonstrate his or her abilities in the subject area. Develop questions that encourage the candidate to draw upon his or her experiences and accomplishments to demonstrate his or her capabilities. An example of a question like this might be: Tell us about a time when you had to communicate difficult news to a customer or client, what did you do to prepare yourself and what were the results? Develop at least one question for each of the skill sets deemed important for the position and, in some cases, two or three for critically important skill sets such as communication. Finally, test your questions to ensure they are easily understood and that the total number of questions does not exceed the overall time limit for the interview.

Conducting Interviews

Interview teams should consist of at least three people who come from different operational areas of the organization. Diversifying the interview team will bring different interpretations of the candidate and responses from each of the distinct vantage points. The net result is a more holistic review of the candidate. Allow time to brief the interview team beforehand on the job description for the position and the required skills and attributes, and make sure they are comfortable with the interview questions. Encourage the interview team to follow the protocol closely to ensure that each candidate has comparatively the same interview experience.

Interview Scoring

Create a scale for the interviewers to rank the candidates responses; for example, 5 to 0, with 5 being the ideal response and 0 indicating no knowledge or experience. (It is sometimes helpful to include overqualified people in the 0 response category if being overqualified means they would not thrive in the position.) Provide each interviewer with a scorecard for each candidate to collect and tally individual responses. A weighted score can be calculated for each response by multiplying the interviewer's ranking by the weight for that question that had been assigned earlier. These cumulated scores can be used to compare the responses of one candidate to another and as a general guideline and reminder of the interview team's perception of that candidate. (Tip: Don't include these weighting factors on the interview scorecards, keeping these weighting factors confidential from the interview panel will minimize interviewer bias.)

It is impossible to use interview scoring as an exact measuring tool as it does not represent a captured score of a possible finite total. Interview scores capture the interviewer's impression of the candidate, and many things, including time of day, temperature of the room, mental focus, or other factors, can influence that impression. Interviewing and selecting prospective employees is very much an art not a science. Despite the logical approach to guiding thought processes in recruiting and evaluating candidates, outcomes are always biased and measure moving targets. Some individuals consistently interview well, while others chronically poorly. In both cases, the interview itself may not be an effective indicator of on-the-job performance.[7]

Closing the Deal

Reference checks are often overlooked or seen as an unnecessary delay in the hiring process. However, without verifying the candidate's information, you are playing Russian Roulette—sometimes it will work out and sometimes it won't. However, it's only common sense that the provided references are people who will give the potential candidate a glowing reference, so have a say in who those references are. Ask for a reference from a particular organization on the candidate's resume or define a specific type of relationship such as a team member, senior executive, or maybe even someone the candidate fired. Be creative and take control of this process to ensure you receive the most accurate assessment of your potential hire.

Another great way to extract maximum value from reference checking is to ask tough questions of the references (while remaining friendly, of course.) If you can, build rapport with the reference and encourage him or her to share experiences. Develop open-ended questions, and ask specifically about the particular skill sets or attributes that are important to your position, for example: Tell me about a time when Bill had to manage an internal conflict and how he did it? Be open with the reference; explain that it is in the best interest of the candidate and the organization that a good match is made. Ask for his or her input on personal development or training program for the new recruit.

Once a decision has been made to hire a candidate, the final step is the letter of offer. Often employers assume this is a final offer and take offense to any efforts to negotiate terms, particularly for more junior positions. However, from another viewpoint, negotiation indicates that the candidate is seriously considering the investment he or she is making into your organization. Candidates who feel cheated walking through the door do not have a strong probability of success with that organization.

Self-screening is an important aspect of candidate selection. For positions with little flexibility on terms, it is worthwhile to ensure those terms are clearly communicated upfront with the candidate because many will find that the terms do not match well with their employment requirements. In that case, they have done the work for you by eliminating themselves from the competition.

Retention Strategies

After all the time and effort involved in finding the right person for your team, the last thing you want to see is a resignation notice. But, the reality is that 1 in 4 employees in the high-tech industry are looking for a new job.[8]

And retention issues are costly. Aside from the direct costs of advertising, recruiting, interviewing, and checking references, the indirect costs are much higher.[9] While the position is vacant, there is lost productivity, ongoing projects fall by the wayside, and stakeholder relationships erode. This loss of productivity continues while the new hire embarks on a steep learning curve to master the new position—a process that can take up to a year before productivity returns to normal levels. Not to mention the accumulated production loss of co-workers who spend their time bringing the new guy up to speed.

In a relationship-based industry such as technology transfer, severed relationships as a result of attrition present the greatest cost of all. For example, it can take many months to build a relationship of trust and respect with a researcher, and yet all it would take is one lost employee to bring that relationship to ground zero. Or worse, into a deficit as the researcher feels the importance of his or her work also has been eroded. Rebuilding trust and dialogue and establishing mutual respect take an investment that far surpasses the time needed to simply communicate project details.

Therefore, it makes financial sense to work toward reducing attrition by developing and maintaining positive work environments for employees. The following section provides an overview of the key factors that contribute to reducing attrition by creating a positive work environment.

Positive Work Environments

Creating a positive work environment will go a long way toward keeping attrition to a minimum. But creating a great place to work takes work. What follows are some of the basic components of a positive work environment.

Clearly Defined Roles and Responsibilities

As organizations change, the work that keeps them going also must change. Yet, too often, job descriptions are developed and then never revisited leaving new opportunities without champions and resources inappropriately allocated. On an annual basis, new projects or initiatives should be assessed relative to ongoing responsibilities with people, time, and dollars shifted accordingly.

Job Satisfaction

Employees need challenging and meaningful work. You've hired great people, now stand back and allow them to really shine. Job satisfaction comes from team members knowing their contributions matter and make a difference. It also comes from the opportunity to continually learn and enhance skills. Therefore, offer and encourage all employees—no matter which stage of their career they are in—to participate in workshops, seminars, and other training vehicles to keep them interested, engaged, and current. Challenge them and let them impress you and your clients!

Respect

Build a culture of mutual respect. Respect boundaries, time, commitments, workloads, differences, and contributions. This seems like common sense, but often, in the rush to get things done, are forgotten.

Equality and Fairness

With the increase in globalization and the use of the Internet, we are continually exposed to different cultures, value systems, and lifestyle philosophies. Learning to respect and accept these differences is an ongoing challenge. Workplaces are uniquely positioned to lead the charge in building environments that embrace equality and fairness as they very quickly realize the payback of a team that is working well. In addition, importing talent has become a key strategy for meeting workplace needs for highly qualified people; retaining them may yet prove to be the limiting factor as to the effectiveness of this strategy. Therefore, it's well-worth the investment to offer programs that support diversity such as cultural awareness, English as a second language, and conflict management. In addition,

develop, communicate, and implement equitable and fair promotion policies. Family-friendly policies, such as flextime and part-time schedules for both men and women, also go along way toward earning commitment from employees.

Effective Management

Another key retention strategy is to make sure that people in management positions are capable, strong leaders who empower their staff. Managers need to provide good guidance and build problem-solving skills in their employees because leaders who endorse mutual support and respect are the building blocks of effective teams. Above all, it is important that management teams lead by example and champion their employees.

Formalized Performance Reviews

Formalized performance reviews provide objective feedback and point employees to the areas where they can grow and develop. Performance reviews steer employees to future promotion opportunities and give them personalized goals they can work toward over the course of their daily activities. That makes their work just as much about them as the organization. The result is staff members who own their work, responsibilities, and outcomes.

Employee Satisfaction Surveys

Employee satisfaction surveys are a courageous journey for employers that are really serious about employee retention. They provide invaluable feedback on what is being done well and where the organization should focus attention for future initiatives, as well as a benchmark for future organizational growth—it is great to see the progress and results over time!

Training

High-tech sector skills expire quickly. New techniques, processes, and concepts are continually evolving, and no one is more aware of that than high-tech sector employees. They want the opportunity to continue to hone their skills, stay current, and contribute to their employers in an optimal fashion.

Performance-Based Incentives

Performance-based incentives acknowledge employee contributions. However, they should be well-thought-out and commensurate with the level of the contribution. Performance-based incentives can quickly lose their effectiveness without a well-designed program.

Closing Comments

Human resource management is an art, not a science. Nevertheless, managers need to take an integrated approach to human resource management by playing an active role in understanding what team resources are needed. Relying on an external resource to wholly perform recruitment activities, ignoring the context of the existing team, or glossing over the full range of the subtle characteristics employees need to do their jobs successfully can produce at best mediocre results—at worst, it can prove disastrous. As decision makers become more aware of team dynamics and how those observations can be used to improve recruitment results, they can effectively drive the recruitment process and guide contributions from external human resource personnel.

Even for the experienced recruiter, processes traditionally used to measure and evaluate people provide only part of the total picture. As human beings, by our very nature, we grow, change, and evolve over time in no predictable pathway with no formulated outcomes. There is no fail-safe formula or standard job description. Instead, it is really about building a team where the individual attributes and skill sets complement each other.

One of the most valuable lessons a manager can learn is to accept that there will always be intrinsic differences among and between staff members. Therefore, it comes down to the manager's ability to encourage mutual respect and facilitate teamwork to achieve high employee retention through conscious development of a rewarding and effective work environment.

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Notes

1. See Patricia Weeks, "Strategies for Managing Internal and External Constituencies," in *AUTM Technology Transfer Practice Manual,* 3rd ed. (Northbrook, IL: Association of University Technology Managers, 2006), Vol. 2, Pt. 1, Ch 3.
2. WestLink is funded by the federal and four provincial governments. Funding agents include Western Economic Diversification, Natural Science and Engineering Research Council, Government of Manitoba, Government of Saskatchewan, Government of Alberta, and the Government of British Columbia.
3. Alison Coleman, "Curb your enthusiasm," *Director 57* (June 2004): 56–59.
4. Ibid. Coleman and author also both reference http://www.performanceprograms.com.
5. Frances Hartman, *Don't Park Your Brain Outside: A Practical Guide to Improving Shareholder Value with SMART Management* (Newtown Square, PA: Project Management Institute Inc., 2000).
6. Bennie L. Garcia and Brian H. Kleiner, "How to Hire Employees Effectively," *Management Research News* 24 (2001): 35–42.
7. Ibid.
8. PriceWaterhouseCoopers and ComputerWorld Canada, *Competing for High-Tech Talent: A Survey of What Employees Really Want,* 1999.
9. PriceWaterhouseCoopers, New Zealand Human Resource Services Team, "How to Retain Top Talent in a Competitive Market," *HR Insights* (March 2005): 2–3.

Professional Development and Advancement for Licensing Staff

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Creating professionally capable licensing staff with the expertise and knowledge to meet the goals of the technology transfer office should not be left solely to a skills-training-as-needed approach. A well-developed professional-development program, along with an opportunity for advancement, will provide management with capable employees eager to participate in the achievement of the goals of the office. A well-executed program will also help curb employee turnover.

While this chapter provides several ideas on licensing staff training and career-path development, your personal program will be dependant on available resources and the mission and goals of your office. But be creative; even if you are a one-person office, training should be part of your planning process.

Why Devote Time to Professional Development and Advancement Opportunities?

So why does management typically spend little time on professional development and career advancement? Maybe it is the belief by most managers (89 percent)[1] that the reason employees leave is for more money. The reality is that only 12 percent[2] of employees actually do leave for more money. The majority (80-90 percent)[3] leave because of the current job, manager, culture, or work environment.

A survey conducted by the Saratoga Institute[4] asked employees who terminated why they left. The No. 1 reason was limited career growth or promotional opportunity (16 percent), No. 2 was lack of respect from or support by a supervisor (13 percent), and coming in at No. 12 was training (3 percent). When asked, "what did the company do poorly?" the

No. 1 reason was poor management with a variety of issues identified, No. 2 was lack of career growth and advancement opportunity, No. 3 was poor communication, and No. 7 was lack of training.

From this survey, training itself seems to be at least adequate. Simply training an employee with a set of knowledge-based skills, however, is not sufficient. Without a system of training focused on professional development, the employee will see little opportunity for career growth and perceive a lack of respect from or support by a supervisor, Nos. 1 and 2 in the survey.

Retention is not the only reason to devote time to professional development of staff. An empowered and engaged staff is more productive, better equipped to immediately address problems, thereby preventing their escalation, and creates a professional staff your "customers" are eager to contact.

Most technology transfer licensing staff manage heavy caseloads that affect several stakeholders. Management needs to provide the staff with the skills and tools to prioritize and manage caseloads and the pressures asserted on the staff by the stakeholders. Staff members need to know that actions they take or messages they give will be supported by management.

For example, the office may have a policy that a good defense is the best offense in approaching potential difficult situations. In that case, if license negotiations begin with Big Donor Co., there may be an expectation that individuals outside the office but within the organization be notified of interactions with Big Donor Co. The timing and method of that notification may also be important, for example, should notification occur at the time negotiations start or only if there are problems? Providing the necessary training to the staff conveys to the employee that management expects that they will be able to handle these situations. But the methods used to conduct that training will impact how well the information is conveyed and received: as a set of rules to follow or tools to empower the employee in pursuit of professional development. The latter promotes respect for the individual and demonstrates support by management.

Coaching as a Style of Training for Professional Development

Ongoing training is mandatory to ensure a competent technology transfer staff. The skills required in the profession are constantly changing: the laws governing the activities and operations, and, of course, the science that produces the technologies. The chapter in this manual called "Recruiting and Retention Strategies for Technology Managers" by Leah Nelson Guay, provides a good overview of the skill sets required of a technology transfer professional. However, providing skills-only training to employees is not enough.

A good professional-development training program will be a dynamic ongoing program to introduce new and creative ways of managing responsibilities, discuss new and proposed changes in law and policy, discuss institutional culture and changes, and obtain feedback from employees. How you approach the training will make a difference in the competencies and job satisfaction of the individual.

The No. 1 cause of performance problems in 60 percent of companies is poor or insufficient feedback from supervisors.[5] The model of coaching as a training process provides the follow-through, the feedback, and mentoring needed to overcome performance and job satisfaction problems. Utilizing the coaching method sends the message to employees that you value them enough to assure that they are empowered with the knowledge and tools to succeed.

The coaching model will have the following objectives above and beyond the learning of skills[6]:

- Inspire employees through a common vision.
- Empower employees to be more self-responsible, decreasing the need for control and oversight and developing mutual respect and proactive problem solving.
- Instill in the employee the understanding that he or she makes a contribution to the office and has an ownership interest in the success of the office.
- Encourage the strengths of the individual and recognize individual talents.

To create inspired and empowered employees, accountability should be clear and incorporated in the coaching process. An annual performance review should hold no surprises.

If coaching is your approach to training, performance feedback will be continuous, and concerns about accountability can be clarified immediately.

Using the example for a technology transfer office given previously, training for the skills for good communication is critical for the interactions between Big Donor Co. and the technology transfer office, i.e., how does the licensing associate properly manage expectations of the company? The employee may have good conflict-management skills developed through experiences in other technology transfer offices, the skills may be intuitive to the individual, or the employee may gain these skills through the training process in the current office. Regardless, to properly manage conflicts, the employee needs to know the expectations of management. If the individual is to identify and report critical situations for the benefit of the stakeholders, he or she needs to be trained to identify those situations. Setting up a set of rules is not possible, consequently, the coaching method of training will result in an employee better equipped to manage unusual situations.

There should be enough oversight by management in the training process so that coaching can occur as often as possible in real time. During the first phase of training and coaching, management will likely want the employee to take more of an observational role. It is very easy to avoid using the coaching method in this first phase. Management will be busy conducting the usual day-to-day activity and may assume that the observing-staff is interpreting management's actions correctly. That very well may not be the case.

Coaching requires one-on-one follow-up discussions about the actions taken or not taken. These one-on-one interactions give management the chance to discuss the goals and philosophy of the office and the university and how they affect recent activity. Instilling this broader understanding in the employee gives the message that you respect him or her and expect that he or she will be able to use this knowledge as he or she assumes more responsibility. When handling a problem that may have been mitigated by early intervention of one of the staff or notification to management, management needs to ask itself if it was lack of coaching, had this employee been empowered with the needed tools?

Tools and Resources for Professional Development

Following are categorical listings of professional development tools, resources, and activities that are worth considering. Many of these suggestions may be simplified or expanded to fit your budget and goals.

Institutional Operations and Culture

- Conduct discussions on the culture of the institution such as the mission and goals of the institution and the departments and centers on campus, the institution's strategic plan and how the technology transfer office fits into the plan, how technology transfer cultures differ among institutions, the perspectives of the many stakeholders of technology transfer within your institutional community.
- Provide a forum to exchange information about changes and new initiatives on campus that might impact the office, this activity will have additional impact if those initiating the change or new initiative can also be involved.
- Arrange for tours of the institution's centers and labs (not necessarily in the technical area of expertise of each licensing staff) to provide a broader understanding of the institution.
- Encourage employees to participate on relevant institutional committees.
- Arrange for informal informational meetings with the staff of other offices that impact the technology transfer office operations, such as sponsored programs.

Professional Organizations

- Provide time and payment for membership in and attendance to professional technology transfer meetings such as the Association of University Technology Managers (http://www.autm.net/), Licensing Executive Society International (http://www.lesi.org/), Council on Governmental Relations (http://www.cogr.edu/), National Council of University Research Administrators (http://www.ncura.edu/), and Technology Transfer Society (http://www.t2society.org/).
- Encourage membership in professional scientific and business organizations.
- Encourage membership and attendance at local and state organizational meetings.

Professional Skills and Operational Improvement

- Provide time off to take scientific, technical, or business courses from the institution.
- Encourage attendance at off-site educational forums:
  - AUTM and LES provide educational programs for all levels of experience.
  - Center for Professional Advancement provides hundreds of courses in more than twenty areas of applied industrial technologies (http://www.cfpa.com/index.asp).
  - World Intellectual Property Organization provides general and specialized training for professionals in the field of intellectual property (http://www.wipo.int/academy).
- Hold discussions or conduct surveys with inventors, licensees, or other stakeholders on customer satisfaction.
- Provide a forum for staff to share information about recent licensing transactions to share experiences such as creative approaches used to resolve difficult negotiations.
- Find a forum for updates on legal cases and legislation.

One forum that enables the staff to set aside time to concentrate on professional development is a retreat. A retreat may be a few hours or a day or two and is best held away from the office to help avoid interruptions. Topics should be timely and relevant to your office.

Following are some suggested topics and activities for a retreat:

- Invite an established startup-company executive to discuss key problems the company has managed and how interaction with the technology transfer office might have been helpful.
- Invite an attorney to discuss specific intellectual property issues, contract language, and recent legislation.
- Discuss the development of the institution's strategic plan and the role of the technology transfer office.
- Have licensing staff members discuss their most creative negotiation situation during the past year.
- Invite the office of sponsored programs (or equivalent) to discuss key topics.
- Discuss valuation using examples of recent licenses.
- Provide a training session on negotiations.
- Review export control.

Developing a Career Advancement Plan

As noted earlier, the main reason employees leave is the lack of promotional opportunity. A plan for advancement of licensing staff will also have benefits when searching for new employees as well as retention of current employees.

At Iowa State University, the first step in developing a career path for licensing associates was a review of the current licensing staff position descriptions and a discussion with human resources personnel. It was important to make human resources part of the plan to avoid any surprises for the technology transfer office or human resources.

Other universities were contacted to discuss their approach to promotional opportunities for licensing staff. Criteria among those interviewed fell within number of years of experience in marketing, licensing, negotiating contracts, and patent prosecution as well as experience related to scientific research and business development. For most of the universities interviewed, experience within the current office was also a criterion for advancement to the top end of the promotional scale. Another criterion was the level of difficulty of licensing cases successfully handled by the licensing personnel. Definitions were developed to describe the types of licenses that would fall into three categories: standard, nonstandard, and complex.

With the input from human resources and the survey of other universities, a list of the criteria for a new hire was first developed, then the identification of progressive responsibilities, duties, and expected experiences was charted. Based upon expectations of management and human resources, these criteria of responsibilities, duties, and experience were progressively expanded to arrive at three levels of licensing staff.

A table describing the plan developed for the promotion of licensing staff at Iowa State University is provided as Appendix A and includes the definitions used to categorize the levels of complexity of licensing cases to be successfully managed. Advancement to the next level of performance is dependent on a satisfactory performance of each of the responsibilities identified in the current level.

Appendix B is the criteria for complex agreements developed by Stanford. Thanks go to Sally Hines at Stanford for providing the criteria for use in this chapter.

Conclusion

Begin at the beginning...and go on till you come to the end: then stop.
Lewis Caroll, *Alice's Adventures in Wonderland.*

So, begin at the beginning and plan for the employee's professional development and advancement. Use the coaching method of training to give the employees the appropriate tools to be successful, and provide continuous feedback to let employees know how they are doing and to reinforce the goals and mission of the office and institution, and I would not expect an ending.

Notes

1. Leigh Branham, *7 Hidden Reasons Employees Leave* (New York: AMACOM, American Management Association, 2005).
2. Ibid.
3. Ibid.
4. Ibid.
5. Ibid
6. Coachinc.com, http://www.coachinc.com, 2002.

Bibliography

Leigh Branham, *7 Hidden Reasons Employees Leave* (New York: AMACOM, American Management Association, 2005).

Cynder Niemela and Rachael Lewis, *Leading High Impact Teams: The Coach Approach to Peak Performance* (Sausalito, CA: High Impact Publishing, 2002).

Perry Zeus and Suzanne Skiffington, *The Complete Guide to Coaching at Work* (Sydney: McGraw-Hill Book Co. Australia Pty Ltd., 2000).

Perry Zeus and Suzanne Skiffington, *Behavioral Coaching: How to Build Sustainable Personal and Organizational Strength* (Sydney: McGraw-Hill Book Co. Australia Pty Ltd., 2003).

Appendix A: Promotional Path for Licensing Associates at Iowa State University

	Licensing Associate I (P16)	Licensing Associate II (P17)	Licensing Manager (P18)
Salary range	$ - $	$ - $	$ - $
Education and experience	BS + four years industry or intellectual property commercialization experience or MBA and two years experience	BS + six years industry or intellectual property commercialization experience or MBA and four years experience. two years of experience must be in university intellectual property commercialization and independently, successfully negotiated ten nonstandard agreements	BS + eight years industry or intellectual property commercialization experience or MBA and six years experience. four years of experience must be in university intellectual property commercialization and independently, successfully negotiated ten nonstandard agreements and assisted in at least three complex license agreements
Responsibility	review and evaluate disclosed technologies perform in-depth market analysis identify potential licensees market technologies to industry	review and evaluate disclosed technologies perform in-depth market analysis identify potential licensees market technologies to industry	review and evaluate disclosed technologies perform in-depth market analysis identify potential licensees market technologies to industry
	participate in development of license strategies and license terms	recommend licensing strategies and license terms	recommend license strategy and license terms for complex agreements; develop and implement license strategy and license terms for standard and nonstandard agreements
	within one year, independently draft and negotiate standard agreements and nonstandard commercialization agreements where modifications are within established patterns with supervision, negotiate nonstandard agreements	draft and negotiate standard and nonstandard agreements	draft and negotiate standard and nonstandard agreements
	participate in negotiation of complex agreements	participate in negotiation of complex agreements	lead the preparation and negotiation of complex agreements
	participate in monitoring licenses and industrial relationships	monitor licenses and industrial relationships from a portfolio of licenses; assist in litigation activity	manage licenses and industrial relationships from a portfolio of licenses; participate in litigation activity

Classification of Agreements

Standard agreements: confidentiality agreements, software testing agreements, and option and license agreements with previously approved language

Nonstandard agreements: material transfer agreements, and options and licenses requiring negotiation within established patterns

Complex agreements:
1. Involves negotiating an agreement with a startup's venture capital personnel;
2. Requires a high level of creativity, attention and exceptional good judgment to handle a complex strategy due to one or more of the following: development of multiple fields of use, multiple licenses, several patents involved, or a platform technology with the potential for multiple products;
3. Involved in litigation or strong potential for litigation;
4. The case has the potential to generate $3 million to $5 million in royalty.

Appendix B

Stanford University

June 13, 2000

Complex Case

Complex cases have one or more of the following attributes:

1. Requires exceptional good judgment and special attention because of the following: exceptional number of patent applications/patents involved, the level of royalty revenue (potential or actual), and/or the number of licensees involved.
2. Involved in litigation in which Stanford is either responsible or intimately involved and where Stanford's involvement presents a significant liability or revenue opportunity for Stanford.
3. Have new and complex intellectual property issues involved in the licensing such that creative solutions must be developed.
4. The case has either the potential to generate $3-$5 million or cost $1 million (in litigation costs or claims against Stanford) or have a major impact to OTL's licensing program.

Examples of complex cases include:

1. *Sondius program:* The technology consists of a portfolio of patents, trademarks, copyrighted works; licensees include a startup, major corporation, and other companies and the licensed fields of use are varied; the revenue potential is considered significant; Stanford invested significant resources into the development of the technology; the potential of litigation is relatively high.
2. *ARIM portfolio:* Involves twenty patents and copyrighted technologies licensed exclusively and nonexclusively to many companies; licensing strategy is to make the technology broadly available while encouraging investment in the technology.
3. *Incyte license:* Stanford is involved in a significant dispute with a company that is closely tied to Stanford; the issues resolve around inventor disputes, interferences, sponsored project issues, settlement discussions.
4. *Phycobiliprotein:* Complicated license strategy (exclusive license to ABI and BD, converting the ABI license to a nonexclusive; sued Coulter, generating over $3 million per year in royalties with the extensive management and monitoring of the licensees because the chain of distribution is often unclear; auditing; each license is separately and individually negotiated.

The licensing associate must have demonstrated exceptional good judgment, breadth of knowledge of patents, copyrights, and trademarks and the ability to independently resolve complex issues and deal with unusually difficult situations. The associate must use exceptional creativity in structuring win-win licenses in difficult and complex cases. Typically, complex cases present issues that have not been dealt with in the past and, therefore, require particularly creative solutions.

Administration of Large and Small Technology Transfer Offices

Robin Rasor and Page Heller

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The objective of this chapter is to discuss the differences, and similarities, encountered in setting up and administering a small technology transfer office vs. a large one. For the purposes of this chapter, we will consider small offices to have less than three full-time employees (FTEs) devoted to licensing and less than a total of five FTEs including support staff.

In discussing these two types of offices, we will consider the inputs (such as mission, objectives, budget, research, and tools) required for managing the offices, along with aspects of how to organize the offices. In addition, we will consider expected outputs (such as revenues, service, and economic development) and how they impact the organization.

It's About the Mission

Naturally, the size of the office is almost exclusively based on the budget. Generally, the size of the technology transfer office correlates with the research base or overall faculty size of a university. The more you have to work with, the larger your office is going to be. However, an office setup should not be based solely on this relationship. The way an office is funded and subsequently budgeted should be firmly founded on the mission and overall objective of the university. Universities that recognize the transfer of knowledge in their overall mission statements have elevated the role of technology transfer in their objectives and often provide a higher level of support, both budgetary and administratively.

For example, the Massachusetts Institute of Technology's mission statement includes: "The Institute is committed to generating, disseminating, and *preserving knowledge, and to working with others to bring this knowledge to bear on the world's great challenges."* [authors' italics]

The University of Michigan's mission statement includes: "The mission . . . is to serve the people of Michigan and the world through preeminence in creating, communicating, *preserving and applying knowledge,* art, and academic values..."

Johns Hopkins University's mission is: ". . . to educate its students and cultivate their capacity for life-long learning, to foster independent and original research, *and to bring the benefits of discovery to the world."*

The mission is important not only at the highest level of the university but also in terms of determining how the office will be financed and structured and how it will operate day-to-day. This may sound obvious, but we have found that technology transfer offices are sometimes formed without a mission in mind or with a mission that doesn't consider all that's involved. Important questions include:

- Is the office expected to be self-supporting?
- Is service to faculty and staff more important than financial returns?
- Is the office responsible for nonrevenue generating activities such as material transfer agreements (MTA), sponsored research agreements, entrepreneurial activities, etc.?
- Is public service to the community part of the office's mission?

Unfortunately, it is not uncommon to have different units at a university believe in different missions for the technology transfer office; whatever its stated mission. A vice president of research, dean, chief financial officer, department chair, and faculty member may each have varying views and expectations for the technology transfer office, while only some of these groups may provide financial or administrative support to the office. Community leaders may also weigh in on expectations for the office and how it interacts at the local and state level.

It becomes the director's job to identify all of the stated (and unstated) missions for the office, make sense of them, and operate the office accordingly. It is, of course, paramount to do this when opening an office, but equally as important to periodically revisit the mission, even after years of operation. The mission may change with changing administrators and with a changing external environment.

To meet the mission's goals, one must have specific objectives in mind. Listed below are common objectives for technology transfer offices. This list is not meant to be all-inclusive, nor is it in order of importance, but rather is offered to stimulate thoughts on how you may come up with your own list.

Many of the items on the list conflict with one another. For instance, if the office is to be self-sufficient, then service to the faculty cannot be the most important criterion as an objective. To be self-sufficient, one will need to work within constraints of resources and say no to a faculty member more often than under a service criterion. Of course, service can be a lower, and subordinate, objective in such a case.

Common objectives:

- Provide the best return on investment.
- Become self-sufficient in X number of years.
- Increase research expenditures through industry funding.
- Reward, retain, and recruit faculty.
- Transfer technology for public benefit.
- Economic development (job creation).
- Facilitate startup company creation.

Objectives should state the desired position or perception of the office. It is important that the greater institutional administration agrees with the chosen perception. Many resources outside this manual are available to discuss the process of defining mission, objectives, and then how to follow objectives with measurable goals. Such a discussion is outside the scope of this chapter.

Each objective will have a set of measurable goals that define metrics that may be used by its constituents to judge the office. For instance, if the office's primary mission is to provide a return on investment, then a measure of revenues relative to the sum of patent expenses and operating costs might be appropriate. If the mission is primarily to transfer technology for public benefit, you may wish to focus on the number of license agreements with less concern for the amount of revenues those license agreements generate. As yet another example, if the primary mission is faculty service, then you may wish to track faculty complaints and compliments.

Later in this chapter, we will briefly discuss a number of office models based on varying missions and objectives.

How Is the Office Supported Financially?

Once the university determines where technology transfer fits within its overall mission, how it financially supports the office will follow. It is important to recognize that technology transfer office budgets are generally divided into two main areas: patent budget and salaries. It is not unusual for the patent budget to be treated separately from the overall salary and administration budget for the office.

Many technology transfer offices (or components thereof) are funded either in part or entirely from royalty revenues, while others are supported through general funds. Some tech transfer offices depend on contributions from university units such as colleges, so-called experiment stations, even departments or individual faculty accounts, although department and faculty accounts are almost exclusively for patent costs, while larger units may contribute all or part of personnel salaries.

Whether the university expects the office to be self-supporting varies greatly from university to university. From our experience, most university technology transfer offices are expected to be self-supporting in some form (for example, bringing in enough money to pay for all or most of the patent budget), even when not stated directly.

Most fail to be self-supporting. To understand why, consider the following. Venture capitalists plan on revenues that pay for their fund management and give the investors a

healthy return from about 1 of 100 deals that come across their desk. In a university environment, we deal with technologies that are much earlier-stage and don't have a business plan. Thus, our success rate may be an order of magnitude less than a venture capitalist.

Establishing self-sufficiency as a goal will result in differences in royalty distribution policies—namely, if the university expects the office to be self-supporting, a portion of the royalty revenues must go directly to support the office and only the resulting net revenues will be distributed (that is, a percentage of all revenues is taken off the top, prior to distribution).

It is our opinion that a university tech transfer office should never have self-sufficiency as a goal. Instead, the goals should be established around success metrics in licensing technologies and creating startups. As demonstrated by the *AUTM Licensing Survey™*, where less than 1 percent of licenses bring in $1 million or more in royalties, it is often unrealistic to expect an office to be self-sufficient. Those few offices that are self-sufficient typically have one technology that has brought in a great deal of revenues.

Some offices, in particular those at public institutions, may receive funding from state agencies either directly or through grants targeted toward specific activities, for example, business formation in the state.

Reporting Location

While many tech transfer offices are a division or department of the university's research function, some universities house their technology transfer office outside of the university in a foundation (e.g., Wisconsin Alumni Research Foundation) or a for-profit related entity (e.g., Arizona State's AzTech Inc.). A few universities also support satellite offices dedicated to specific schools or colleges (e.g., Harvard's Medical School Office and Michigan's Engineering Satellite Office). An office may divide duties between a university office and a for-profit corporation, like Baylor College of Medicine Licensing Group, responsible for technology licensing, and BCM Technologies Inc., responsible for venture development.

Don't Forget the Faculty Research

As we said above, universities with sizeable research expenditures generally will have larger offices, although there are exceptions. Regardless of the budget of the office and the quality of the licensing and support staff, without great research (and, we firmly believe, faculty interest in technology transfer), the technology transfer office will have nothing to protect, market, and license.

The overall research expenditures only provide a clue, however, to the available disclosures or resources to the office. Some universities expend large amounts of research dollars in social research, history, the arts, and other areas that traditionally do not result in significant numbers of commercially valuable disclosures. Other universities with relatively small research expenditures may have larger number of disclosures because their research is directed toward more narrow or applied research areas, as opposed to broad, basic research.

It's important to understand one's university and its research base and faculty capabilities so one may organize the office to capitalize on this very important input. Obviously, if the university focuses on medical research, the office's licensing personnel should have a background in life sciences, while a land-grant university with strong agricultural and engineering research should have licensing personnel with the corresponding backgrounds.

Office Personnel

Technology transfer staff can be divided into the following general categories:

- licensing staff
- legal staff
- business development staff
- patent support staff
- accounting staff
- other (MTA, students, outreach, marketing, etc.)

Obviously, the size and budget of the office will determine whether the office employs people in some or all of these categories.

Licensing Staff

Licensing personnel are the backbone of the office. If an office has only one person in technology transfer, it must be a licensing person.

Overall, it is the job of licensing personnel to identify matches between industry needs and available technologies. Depending on the size of the office, licensing staff may be responsible for all predisclosure discussions with inventors, working with patent counsel on protection strategy, marketing, negotiating licenses, and maintaining postlicense accounts. This approach is often referred to as *cradle to grave*. In small offices, licensing staff may also be responsible for nonrevenue generating duties, such as MTAs.

In larger offices, licensing staff may be more specialized, allowing the staff to focus on only one or two aspects of the licensing process. For example, one group may be responsible for determining patent strategy and coordination with patent counsel, while others will be responsible for marketing and licensing of disclosures.

The most desirable licensing person has a balance of three important aspects: a technical background, a business background, and some knowledge of applicable law. The technical background enables the individual to communicate with faculty and understand the inventions. The business background is necessary to speak easily with industry and brings the knowledge of how to close a licensing deal. The knowledge of law helps in making sense of the intellectual property terms and the other contractual conditions.

Legal Staff

The role of university legal counsel as it relates to the technology transfer function varies widely from university to university and is not based on the size of the office. The two most important issues to be decided upon creating an office are: (1) will the office have dedicated legal staff (either physically on site or based at the general counsel's office) and (2) who will have signature/approval authority and oversight for agreements negotiated by the technology transfer office. In this discussion, the legal staff is typically most knowledgeable in contract law and has some knowledge of intellectual property law.

We believe having legal staff located on site or dedicated to the technology transfer office is a real advantage. When licensing and legal staff can work together on all aspects of the licensing process, both parties gain an understanding of the process, issues, and can develop practices for acceptable agreement parameters. This coordinated effort not only results in a more consistent approach to agreements, but may also speed up the negotiation, approval, and signature process. Several offices have also used their legal staff (or licensing staff if they have passed the patent bar) to file limited numbers of patent applications in house.

Other valuable uses of legal staff include: development of agreement templates, management of litigation, assistance with patent strategy, interpretation and development of policies, and a wide variety of problem-solving relating to the technology transfer function (such as inventorship reviews and controlling/monitoring outside counsel). In-house legal staff may also file copyright and trademark registrations where appropriate.

Because of the variety of technologies created at universities, almost all universities employ outside firms for their patent work. In this way, they may select outside counsel familiar with the technology area. As more universities become involved with faculty startups, legal counsel familiar with equity agreements and corporate transactions also can be very valuable to the technology transfer office.

Universities without dedicated legal staff may be required to use outside counsel that can be expensive and may result in the office only asking for legal help on big agreements. Alternatively, the office may be required to obtain legal advice from university attorneys not well-versed in intellectual property and the business risks associated with negotiating and entering into license agreements.

Some universities require that legal counsel review and sign off on all agreements. Generally, this will add time to the overall agreement-approval process and may create friction between the technology transfer office and the general counsel's office. In these instances, it is important for the offices to work well together and to have consistent and clear guidelines for agreement parameters.

Business Development Staff

Universities (both public and private) have become more interested in promoting the commercialization of university technologies through startup companies that may provide direct benefits to the community and to the state. How the office (or university as a whole) assists faculty entrepreneurs in creating startup companies varies greatly, however. While startups have the potential to produce significant opportunities for the inventors, the university, and the surrounding community, such projects involve more work and are riskier than a traditional license to an existing, capitalized company.

Some offices have in-house business-development staff dedicated to working with faculty as they consider startup opportunities for their technology. These staff members may provide assistance in a number of activities including: business planning, market analysis, identification of venture financing or other investments, regulatory planning, management recruiting, and other business formation activities. Generally, business-development staff do not negotiate licenses or interact with patent counsel, so it is important that they interact with the licensing staff to ensure a consistent commercialization approach to a particular technology or technology portfolio.

Legal Support Staff

Legal support staff have responsibilities similar to paralegals or administrative assistants in patent law firms. Their principal function is to maintain and manage all information relating to patents and disclosures. For example, they typically will manage the office's database by inputting all new disclosures and information on patents (application date, serial numbers, office action status, law firm, etc.).

In addition, legal support staff will manage all government reporting (for instance, the National Institute of Health's database (iEdison) and any foundation- or state-required reporting), and all associated paperwork (titles, assignments, declarations, etc.). Depending on the office, legal support staff may also interact directly with licensees and outside counsel on relatively routine patent maintenance issues such as selection of countries going to national phase, restriction requirements, payment of annuities, etc.

In offices large enough to support this function, legal support staff provide an invaluable role by enabling the licensing staff to focus on marketing and license negotiations.

Accounting

No matter what the size of the office, it is important to have at least one dedicated staff member to handle accounting, even if borrowed from another office. This position is responsible for receiving (and sometimes reviewing) bills from outside patent counsel (and other vendors, such as consultants) and recording the data and billing licensees. Collection is an important and time-consuming aspect of this function. Licensees, in particular, small or startup companies, often will pay the university last in their lineup of bills, if at all. An office's accounts receivables can expand rapidly if the accounting personnel cannot keep up with monitoring the office's accounts.

In addition to collections and billing, the accounting function is responsible for receiving royalties and for distributions to inventors, departments, colleges, and other administrative units. Inaccurate or slow distribution of royalties to inventors can be disastrous to an office's reputation and ability to expand its reach to new inventors.

The accounting function also will work with the office administration (and/or legal support staff) for periodic reporting of metrics used by the office to measure success, such as number of inventions disclosed, number of license agreements closed, royalty income, and research funding that is intellectual property induced. Timely reporting of office metrics provides useful information to all university (and outside) stakeholders.

Other Staff or Student Assistance

Some offices employ one or two staff solely to manage and complete incoming and outgoing MTAs. Negotiating terms in MTAs, assisting faculty, organizing large numbers (often hundreds per year) of transactions, and dealing with colleagues at industry and other universities provides experience that can then be used in future licensing endeavors; thus, these are good positions in which to teach those interested in becoming licensing associates.

Many universities employ students (either paid student workers or as unpaid interns) to assist in a variety of endeavors. Student staff may be undergraduate as well as graduate students in the sciences or from a university's business school. Examples of common uses for students are: market research, outreach to faculty, and creation of marketing documents (nonconfidential disclosures, Web-site brochures, etc.). They are also useful for special projects, like characterizing research specialties or surveying constituents.

Today, many graduate-level students are interested in participating directly in the entrepreneurial aspect of technology transfer. At Michigan, the TechStart Internship Program provides internships to graduate students from the business school, engineering, medicine, law, and school of information. In this program, approximately one dozen students work in small, multidisciplinary teams on technology transfer projects, with input from the technology transfer staff, faculty inventors, and industry mentors. The TechStart program has its own office space and has funding from the technology transfer office, the business school's Zell-Lurie Institute for Entrepreneurial Studies and the Michigan Economic Development Corp.

At Texas A&M University, teams of four or five MBA students compete each year in a Technology Transfer Challenge. The MBA Technology Transfer Challenge encompasses one week each year in which all the first-year students of Mays Business School MBA program compete in the development of commercialization assessments for technology disclosures supplied by the technology licensing office.

Student teams undergo brief training exercises and draw prescreened Texas A&M System technology disclosures (nonenabling) out of a hat. Their challenge is to, in approximately eight days, develop commercialization assessments for the technologies and prepare a formal presentation on their assessments. On the morning of the challenge, one-hundred to one-hundred-fifty judges arrive on campus, drawn widely from the entrepreneurial and corporate business communities. The winning team receives a cash prize of $3,000.

These are innovative ways to involve students for educational purposes and still may get a work product that the technology transfer office can use.

Other Inputs

Although the majority of an office's budget is spent on salaries and patents, other inputs can be quite helpful to the large or small office. Perhaps the most important is an electronic database used to track disclosures, patents, and accounts.

Unlike ten years ago when offices had to pay to create and program their own databases (or maintain accounts by hand), a number of commercial databases are now available that have been designed specifically for technology transfer offices. Generally, these databases require an upfront payment and then an annual maintenance fee. Some may be modified to suit the particular office's needs.

Other tools that can help an office include subscriber market-research databases, miscellaneous journal subscriptions, and venture/investment databases.

Office Models

As discussed at the beginning of this chapter, prior to staffing and organizing an office, the overall mission and objective must be defined. There are three main models for tech transfer offices:

- revenue generating/self-supporting
- service model
- focus on business development

Of course, most offices employ on a combination of all three of the above, but usually one of the three is the focus and results in the main strategic direction for the office and its staff.

Revenue Generating/Self-Supporting

The financial success of some technology transfer offices in the late 1990s and early 2000s was not lost on university administrators across the United States. A few offices that brought in tens of millions of dollars created expectations in many universities (by faculty and administrators) that all it would take to obtain similar revenue would be to startup a technology transfer office and start collecting royalties.

Of course, the *AUTM Licensing Survey* has shown that not only are very few licenses bringing in millions, but the majority of offices that bring in significant royalties have also been in business for many years. Statistically, only 1 invention in 8,000 reported brings revenues of more than $20 million annually (known in the industry as a *home-run hit).* That said, it is not unusual for an office to have revenue generation as an important metric for measurement of its success.

If, in fact, revenue generation is a principal objective of the office, the licensing staff will have an incentive to select and focus their efforts on disclosures that appear to have the largest market and near-term commercial potential, while spending less time on disclosures with smaller markets. Because many successful inventions come from serial inventors, the licensing staff may also focus on providing service to the minority of faculty with a successful track record.

If the office is required to be self-supporting, it will be common to have disclosures reviewed and, at the outset, those deemed to have less revenue potential closed or offered for reassignment back to the inventors. Licensing staff will primarily be measured on the revenue generated by the office as a whole and by the number of agreements generated from their disclosure portfolio.

In addition, certain service aspects of technology transfer (assisting with MTAs, questions on intellectual property, copyrights, etc.) will generally be treated with less importance by the licensing staff.

In this model, the revenue-distribution policy likely will provide a percentage of all revenue to the office (often 15 percent to 33 percent off the top) or provide for the office of research (or main reporting unit) to maintain a percentage of all revenues for support of the office. The office will manage its patent expenses to a strict budget based on expected revenues. Often these offices will also be dependent on obtaining partial support for patent expenses from faculty accounts, departments, and other university units.

An interesting alternative to this income-based model is one that measures additional research funding as supplemental to royalty income. This model focuses on formulating

new university-industry relations and uses as a measure of success any sponsored research in which intellectual property is a major factor. This is referred to as intellectual property-induced research funding.

Service Model

If service to the faculty (and, in some cases, community) is the principal objective of the office, the focus for the staff will be to review all disclosures on an equal basis with an attempt to market and license all that have some commercial potential. In these offices, research tools (cell lines, vectors, plasmids, etc.) that bring in thousands or tens of thousands are considered just as important as the rare therapeutic compound that has the potential of bringing in millions of royalty revenue.

Licensing staff in these offices will be measured not only on the number of agreements, but also on numbers of disclosures coming into the office, numbers of faculty (in particular first-time inventors) they work with as well as number of complaints (and kudos) received from faculty and administrators. It is not uncommon to find licensing associates working on a license agreement that bears no financial terms in this type of office; for example, a license for open-source software.

Royalty distribution policies for these offices may still require a percentage of royalties in support of the office, but often only in support of the patent budget, while staff salaries are paid from the general fund or from the annual budget of the reporting unit.

This model promotes the retention and recruitment of faculty. It assists in bringing in and keeping talented and entrepreneurial professors and researchers.

Business Development

A focus on business development will require a slightly different mix of staff. In particular, staff with entrepreneurial experience will need to be available and highly visible to the faculty inventors. Staff will also work closely with the local venture/investment community (if there is one) and maintain relationships with local entrepreneurs, consultants, and other service providers (accountants, lawyers, etc.) that are familiar with the needs of startup companies.

But, you can't launch a new venture without a license to the technology, so the business-development personnel must be in addition to the licensing professionals found in the other office models. This office is likely to work on a smaller number of deals than any other, but devote a great deal of time to each.

In universities where business development is the prime objective, the technology transfer office may be located outside of the university or may involve a separate entity that focuses on developing university technologies that can be used to create new companies. The inherent arms-length relationship between the two groups lends itself to better management of potential conflicts of interest.

Small vs. Large Offices

While all of the above information applies to both small and large offices, small offices will be constrained by their budgets. The office may be started with a grant or budget from the vice president for research.

Small offices often are very creative in terms of finding resources, both financial resources and personnel resources from other university offices. It may be possible to attract an endowment from an alumnus that is a successful entrepreneur, for instance. Or, one might find a private entity that would provide upfront capital for patents in return for a very small return from all revenues generated by those patents. Another creative method would be a pay-as-you-go approach, where a department or college pays a certain amount for supporting each disclosure coming from that entity.

A small office may be able to use other university units to provide other support. For example, the university's fiscal office may be able to track revenues and cut checks for patent expenses and distributions of income. They may be able to help with annual budgets for operations and related reporting. However, it is not likely that they will be familiar with invoicing for royalties and monitoring license-agreement compliance. Even in a small office, it is best to have one person who can work closely with the fiscal office, but perform additional duties such as invoicing, collecting and distributing royalty income, and

patent-expense reimbursements. Thus, this person should have bookkeeping skills and have good phone communications skills.

Naturally, the small office should have at least one licensing person who can carry a project from disclosure of invention to closing a license agreement. Commercial assessment could be handled by one of any number of private-service companies that offer such assessments for a fee. If, in fact, the office has budget for only one licensing person, this person will need to be a technology generalist, able to work on a variety of both life- and physical-science disclosures. This person may also be the director and will be required to represent the office internally as well as to the outside community.

In small offices, decisions on patenting may be made either with assistance from outside counsel or by patent committees formed in the university units providing the majority of disclosures.

In contrast, large offices have the luxury of being able to hire a variety of licensing and other support staff as previously outlined. The office may be able to delineate different marketing and licensing strategies by technology area. For example, marketing life-science technologies may work better with a functional or categorical division of labor, while physical-science projects may not fit as easily into categories and require a cradle-to-grave approach.

Life-science projects can be segmented and categorized into a dozen or so areas. Each area has a growing, but limited number of companies that serve it. An office may compartmentalize licensing people in the life sciences by having one person to perform assessment, another marketing, and a third contract negotiations, for instance.

Since markets for many physical-science technologies are very mature, the market has segmented to a great extent. Thus, the intellectual property manager must learn a new market, served by a new set of companies, for almost every invention. Therefore, a cradle-to-grave strategy may work better for these technologies, where an invention is matched with the person closest in discipline. Each manager in this model takes his or her project from assessment to the closing of the deal.

In large offices, the licensing staff can be served by a matrix of support services handling patent prosecution and maintenance, fiscal services, and contract-compliance issues. An office manager might oversee the infrastructure needed for these operations. In addition, the director will play a much more political role than his or her counterpart in a small office.

In Summary

Whether considering opening an office or reviewing an existing office, the mission will guide the funding and staffing. It is paramount to have a clear mission, in particular, one that doesn't have conflicting goals and objectives.

Certain basic skills are necessary to conduct technology transfer: licensing, legal, business development, patent support, and accounting. A small office can leverage many existing resources to conduct the functions, whereas a large office can specialize.

There is no one or right way to form or operate an office. With an organized and thoughtful approach, one may create a structure that best suits one's university.

Data Management

Connie Cleary and Mike Bohlmann

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Introduction

How do you store, track, and retrieve all the information that comes into and goes out of a technology transfer office? What information is critical to the proper functioning of the office and the business operation? What information should you store and track, and what information is a noncritical piece to the operation of the office? What technology transfer processes are managed by the system? These are some of the questions you will be asking yourself as you embark on your journey to find the best data management system to fit your particular needs.

This chapter looks at the process and examines what is needed to have the most accurate and timely information available to the staff in a technology transfer operation so that they can make intelligent decisions.

Finally, no matter how small or large an office, best practices should be maintained for all. It is a must to define realistic, attainable goals for the office and then prioritize those goals. The focus of this chapter will be to provide guidelines for good data management for technology transfer offices

Getting Started

Offices vary in size, and many staff members fill multiple roles within the operational structure of the technology transfer process. It will be a time-consuming process to identify and create a solution to manage your data, so it is important to have buy-in from your end-users that a new solution is necessary. Having the buy-in from your end-users will make it easier to make them a part of the process to identify and implement a data man-

agement system. If the end-users cannot see how the new system will benefit them directly in their jobs, they will be resistant to the migration process and using the final product. Making success out of a project with little support and enthusiasm from the end-users will be difficult or even impossible. This is not a one-person process, and it will take many months or even years to accomplish.

The biggest factor for most offices in choosing a new system to manage their data is the budget. Data management systems for technology transfer offices vary in price from free to hundreds of thousands of dollars. So, before your staff falls in love with a product, you should determine how much money you have to spend. Most vendors are willing to give a ballpark figure for how much their system will cost to purchase, implement, and maintain. However, before you ask for a preliminary approval on a budget for the project, add at least 50 percent more to that cost. Until you are able to speak with vendors at length about your wants and needs, they will not be able to give you a fully accurate price, and, rather than risk pricing themselves out of the process, vendors are likely to give a ballpark figure that is actually lower than what they expect the project could potentially cost. Most systems available will also require a recurring annual cost, so be sure to include that cost in your office budget.

Once you have the budget for your project established, you can move on to identifying the exact needs for your project's success.

System Acquisition and Migration

Solicit the help of information technology (IT) personnel at your institution, and ask that they serve on a committee to assist in the data management requirements and organization of the office. This is especially important if there are budget constraints limiting your ability to purchase a commercial data management system. Information management personnel can assist in deciding how robust a system your office requires and if you can design a homegrown version that serves your purpose. These professionals are especially important in providing input in areas of compatibility, university or institution system requirements, conversion of legacy systems, and security requirements. Together with business professionals, the goals of the office can be defined and reviewed.

Most technology transfer operations need to track the disclosures they receive, the patent applications they manage, the agreements they make, the contacts they have, and the flow of money related to the patents and agreements they manage. If you already have processes and procedures defined for disclosures, patents, agreements, contact management, and finance, you can more easily identify the key needs for a system to manage that information.

The organization's technology transfer office likely has at least one person who is an expert in each of these areas. It is vital to involve these experts in identifying and evaluating your choice of systems. Each should spend some hands-on time with the system you are evaluating to determine whether it will meet the needs of the office. If you are building a system from scratch, these same experts should work with the developers to determine the requirements of the software.

Your functional-area experts will be vital as well if you wish to use this opportunity to clean up data before migrating it into the new system. These experts will likely already know what weaknesses exist in your system, and they can help identify what problems exist that would be good candidates to clean up before migration. Some problems may be more easily solved by the new system, especially if the new system is based on a more advanced database.

Many commercial applications are available in several price ranges to accommodate each technology transfer operation, from the smallest to the largest. It is vital that you very carefully evaluate each of these programs in areas such as user friendliness; ability to grow with the office; stability of the software; price add ons; and reliability of the vendor to provide services such as support, conversion, and customization. Frequently, the cost to license a piece of software may be initially small, but other costs, such as conversion of pre-existing data into the new system or annual licensing and support, may really add up. Furthermore, the costs of customization can be substantial, and it is very common to have consultants paid on an hourly basis rather than on a final job basis. Therefore, caution is the caveat here.

Another area of concern is the use of resources that must be applied to assisting in the conversion. Office staff will have to be allocated to the project in areas such as file and field definitions, testing of the database, and meetings to discuss the integration of the system into your current business model. Other areas to explore are training of staff and whether fees would be involved for additional days of training.

System and Process Administration

TTOs are staffed with personnel who possess a myriad of skills, each at a differing level. Each job is important to the success of the office because each job represents a different aspect of the technology transfer process. A technology manager is important in the licensing of technology. A compliance specialist is important in monitoring a license and its compliance with federal regulations. A business manager is important in the accounts payable and receivable aspect of the office. A patent coordinator makes sure that proper procedure is followed to protect the inventions patentability and filing status. Additional staff makes certain that all paperwork is properly filed and stored for future reference, as well as for organizational and governmental policy compliance. But the data entry clerk may be one of the most important staff members because he or she is responsible for entering the data that the office personnel track daily.

It is extremely important that detailed written descriptions of each part of the data management process exist and are frequently updated so that the data management process is well-understood, even by the newest members of the team.

Communication

Each office must develop processes that streamline the operation and make data more easily obtainable. The use of living documentation that is maintained by users and administrators can help a great deal in making sure the system is used to its fullest. Maintaining this documentation can be done with simple word processing documents or with a more-advanced method such as with a *wiki*.

A wiki is a collaboratively created Web site that is edited from within the Web browser. For example, the office keeps a copy of the manual for the data management system on an internal Web site. Part of that manual details how to add a new patent application to

the system. Because there are likely business processes that go along with entering the information in the database, you would edit the page talking about entering patent information to include who is responsible for filing the paper documents, how to decide what law firms or lawyers to link to the patent, and who checks to make sure the application is complete. In this way, your process documentation becomes merged with the software documentation giving the user a one-stop place to see how to complete a task. Wikis are good ways to store and maintain textual information for your entire office.

Ongoing communications by training and mentoring within the office provides a smoothly operating unit. It provides the opportunity for building a team that is thoroughly knowledgeable about the office functions. Quarterly meetings to discuss issues and confusion with the data management system will help to make sure that problems are addressed before they compound over time. If there is no one person or persons in charge of the data management system, it might be good to meet more often to further alleviate any problems that might arise.

Entering Data

Accurate data are crucial to the office's survival. It lets staff know what is going on in each of the important areas of the technology transfer process. Financial transactions, benchmarking performance, and productivity are all tracked by way of important pieces of data that are entered and stored in the database. Standard operating procedures for each data entry task should be defined and written in an easy-to-understand format that is accessible by all members of the staff. There is nothing worse than an office having to stop the flow of work because one member of the staff has left or is unavailable for a prolonged period of time. An electronic operational notebook is a good way to define each step of the process. In addition, more than one person should be trained in each task to avoid the paralysis that occurs when someone leaves the office. Cross training always pays off.

Staff should be given instruction on how to enter data, which fields need to be entered, and what kind of information should be stored. The process is not usually intuitive, and a good process for training staff is one of the most worthwhile investments you can make in having a top-notch operation. Additionally, someone who understands why he or she is

performing the process should perform the functions of the data entry position. It is always valuable to train the staff so they understand why the information is important and why the data must be correct. In other words, this function is only one part of the total picture and is integral to how staff can access information. Remember the GIGO caveat: garbage in = garbage out.

Maintaining Good Data

Anyone who works with a large amount of data can tell you of mistakes in the data. For example, a contact's name might be entered as John Smith, Jon Smith, and John W. Smith: all for the same person. It is not a simple task to keep things formatted the same or consistently entered into the system. Usually, one place to start is to make one person responsible for entering new data in each area. For example, you might have one person responsible for adding new companies to your system, another person responsible for adding new invention disclosures to your system, and another person responsible for entering new agreements into your system. People can have multiple roles, but it helps to have only one person entering data to keep things consistent.

The best way to keep your data clean and well-formatted is to have a documented process or set of formats. In this process, you should define things such as what abbreviations are allowed, how users should search the system to check if information they wish to enter already exists, and what an authoritative source of information is. Knowing what source of information is authoritative is good when you need to verify its accuracy. You will likely want to have the signed paper copy of an agreement as the source of information related to that agreement.

Storing Data

There are several different storage techniques such as file cabinets, file servers, and databases. The old standby of having office filing cabinets is the oldest method to store data and may also be the most inefficient: whenever you file an important document, it seems to become lost in the files. If you have multiple people accessing the files, the problem becomes worse. Storing hard copies also takes up a lot of space—often a hard thing to find in many organizations.

Keeping information on file servers helps keep things organized, but it can be difficult to find information when you do not know which specific document you need to retrieve the information you want. Databases offer an opportunity to keep your information organized, as well as make it easy to search.

The storage of electronic data can be in an all-encompassing database that contains financial, patent, licensing, contact, and technology information or it can be partially kept in a homegrown or commercial database with links to other files that capture the remainder of the information. The higher end database system will also let you store text documents, spreadsheets, and other files directly in the database and link them to your other data. So rather than going to the paper file to view a license, you can look at a digitally scanned version of the license from within the system.

In addition to the electronic storage, you may want to define whether the information is stored in a global network drive that will be equally accessible to the staff or contains security levels for the ability to read and/or write to the files. Storing information on a global network drive is like saving documents on your C: drive on a Windows-based computer except that it can be made available to your entire office.

Depending on your organization, there may be policies you must follow in regard to how long you store historical information. Some organizations may even require that some information be destroyed after a given amount of time. Be sure you are aware of how these policies might impact how you structure your data management system.

Retrieving Data

When it comes to viewing information in your system, there are generally two different ways to go about it. You might be seeking a specific piece of information about a patent application or an agreement or something else that is very granular. You might also use the system to generate summary reports for AUTM internal periodic reporting or something more ad hoc. In order to be effective, your system needs to be able to accomplish either of these tasks.

Searching for a granular piece of information is something that all of your users are likely to do at one point or another. The user should be able to enter keywords, dates, or numbers to find the piece of information needed. For example, one of your technology managers may be trying to find information on a technology related to cancer treatments to approach a potential licensee. The technology manager should be able to simply enter cancer into the system and get back a list of all the technologies having something to do with cancer.

Besides looking for a very narrow set of information, you will want to be able to generate information reports from your system. Reports give you summary information such as a list of inventions received from the chemistry department or statistics on the number of patents generated in FY04 by each department or how much licensing revenue has been earned from technologies with NIH funding. Reporting can obviously vary from simple to complex, and you must decide what level of reporting needs to be available, both to the average end-user and to computer-savvy staff members.

The best way to address both audiences is to determine a set of commonly used reports and then provide an avenue for more advanced users to create ad-hoc reports. You likely need to have reports that show the inventions disclosed in a given time period, the licenses signed in a given time period, and the patents filed and issued in a given time period. These are all reports that every technology transfer office will likely need at some point or another. These reports should be created in a way that the everyday user can easily find and view them.

There are a variety of ways to provide ad-hoc reporting functionality. Some systems may provide a means built into them, while most require the purchase of additional software. Some ad-hoc reporting is possible with tools such as Microsoft Excel and Microsoft Access, while more advanced features are available in packages such as Crystal Reports. The product you choose will depend on your budget and the needs you have for a reporting system. Depending on how often you generate reports and the variety of those reports, you can decide what reporting solution is best for your office. If you have technical staff members, it can be easier to create custom reports as time goes on. However, if you do not have technical staff members, other staff members would have to be trained on how to do such work.

Backup

There are two purposes for backups: disaster recovery and archiving. Disaster recovery will get you up and running if your entire system is somehow destroyed, but it can also be used to recover accidentally deleted information. For disaster recovery, it is good practice to perform full backups once per week and differential backups every night. Differential backups only save the pieces of information that have changed since the last time you performed a backup of any type. For archiving, keep an offsite location to store your backups on a periodic basis. Having one backup on site that is a month old, one off site that is six months old, and one off site that is a year old is a good model to follow. In this way, you can prevent the loss of all data should there be some sort of disaster that destroys your system. Check with your organization for its data retention policies to see if you need to maintain backup archives for a longer period of time. To find the right hardware and software to use for backing up your data, work with your computer hardware vendor or your organization's IT staff.

Security

There are multiple levels at which security is important. These levels are at the end-user, in communication between end-user and server, and on the server. You want to be sure you have as few weak links in the chain as possible.

It is vital to determine what classes of information you have, who needs access to each of those classes, and what type of access those groups of users need. You probably do not need to have all your users able to edit patent information, and you likely have users who need to be able to access and edit all information in the system. When you configure the permissions for your electronic files, keep all those details in mind.

Make sure you have a good standard for passwords and that your users follow them. Be sure that your users are not just throwing their unwanted printouts into your office's general trash receptacles. Inform your users that leaving their computer unattended could make the system vulnerable. Be aware of government policy and export regulations to make certain that information is properly protected. Look at electronic access as the same as the keys to your offices and file cabinets. If you do not want someone to have access to something, make sure that it is locked with the keys in the hands of the right people.

Depending on your infrastructure, you may have data going across the Internet or other public networks. Even if your system does not use public networks, it is still wise to make sure that your information is safe when it is transmitted from the server to the end-user. To secure your system, you might use technologies or systems to encrypt the communication between server and end-user to prevent network-style eavesdropping.

The last critical point of security is the server where your data are housed. Just as you keep your end-user computers up to date with the latest software updates and patches, you must to do the same on your server. Disable unused services and delete default accounts that do have not a strong password.

By talking to your organization's IT staff, whether they be internal to your department or organization-wide, you can work to determine the best methods to secure your data system against data theft and other malicious activities.

Summary

There are a lot of pieces to having a data management system that will not only store accurate, current information, but will also be a tool to help your technology transfer office operate more efficiently and effectively. The challenges are many for every organization, whether you have two or fifty staff members. You may find that you need dedicated technical staff to administer the system as well as to assist other users with their needs.

In every case, your best resource may be the people in similarly sized technology transfer offices and other AUTM members. Find some peer institutions and make contacts there to talk about the systems and processes they are using. This chapter is a good guide for every organization, but there is invaluable anecdotal and experiential information to be had from other people. Networking with your technology transfer counterparts is a great resource for finding what works and what does not work.

Beyond Negotiations: Agreement Monitoring

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Introduction

The execution of a license agreement is the beginning of a long-term relationship to the mutual benefit of both parties. The success of this relationship depends upon the understanding of the parties as evidenced by the written agreement. The monitoring of the agreement is the process of understanding and enforcing the terms of the written agreement such that the goals envisioned by the parties are attained. Goals for public institutions usually include public benefits, such as the availability of novel goods and services, and income to the university and its scientists.

Unfortunately, the process of agreement monitoring is often given a low priority when offices are understaffed or place a higher priority on using limited resources for deal making resulting in insufficient resources for agreement monitoring. This is a difficult position. Diligent agreement monitoring is good business practice and should be emphasized or, at least, not ignored. A well-conceived and implemented monitoring program is vital to assuring that the technology is being developed and that royalties and fees are paid. While the monitoring of all types of agreements should be routine, this chapter offers guidance on the monitoring of patent license agreements.

Reading the Agreement

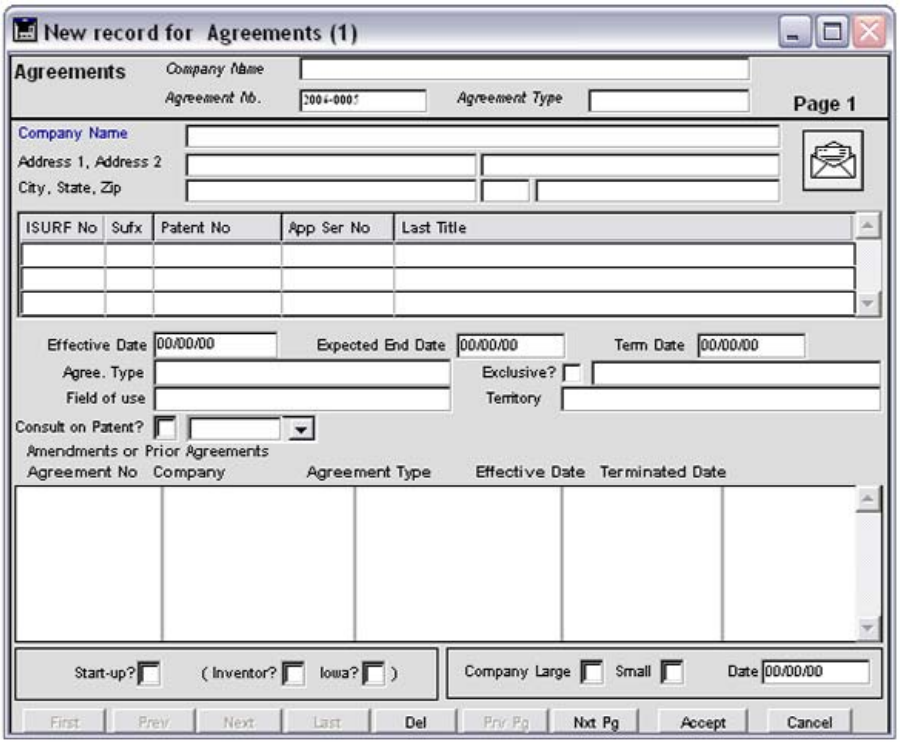
A license is an agreement in which the owner allows use of its intellectual property in exchange for consideration, generally in the form of royalties and fees. Effective monitoring of the license begins by a thorough reading of the agreement to understand what the licensor is giving and what it is receiving in return. A good system to follow is to begin by reviewing the grants and consideration clauses. The grant section describes what is being provided to the licensee in the form of intellectual property rights. The consideration section describes what compensation the licensee is providing in exchange for its right to

use the intellectual property. Particular attention should be paid to other sections of the agreement including definitions, payment and report due dates, termination provisions, as well as all obligations of the technology licensing office (TLO) to the licensee.

Tracking License Compliance

Electronic agreements-management databases are critical to effective agreement monitoring as they allow staff to track events and obligations. Some offices use commercially available databases, while others chose to develop proprietary systems. An agreement-tracking form may be used to summarize the agreement for the purpose of tracking the obligations of the licensee and provides means for the licensor to follow up on the critical dates. An example of a tracking form is shown in figure 1. Critical elements of an agreement-tracking system employing an agreement-management database are discussed below.

Figure 1: New Agreement Input Forms



New record for Agreements (1)

Agreements — Company Name — Agreement No. 2004-0001 — Agreement Type — Page 2

Agreement Language

Section	Section Title	Description	Amended?	Amend Date

General/Main Contact Name, Phone — Assign Main
Reimbursement Contact Name, Phone — Assign Reimburse
Prosecution Contact Name, Phone — Assign Prosecution

Follow-up Dates

Date	What's Due	Ref	Description	Done?

First | Prev | Next | Last | Del | Prv Pg | Nxt Pg | Accept | Cancel

New record for Agreements (1)

Agreements — Company Name — Agreement No. 2004-0001 — Agreement Type — Page 3

First Sale

Sale Date	ISURF Numbe	Product Name

Agreements Maintenance Correspondence — Prt Corr

Author	Date	Correspondence

First | Prev | Next | Last | Del | Prv Pg | Nxt Pg | Accept | Cancel

Contact Information

In the database, record the various individuals with responsibility for particular aspects of the license. Within any given company, different individuals are often responsible for royalty reporting, development reports, and patent prosecution. Generally, the license lists one agreement contact person. A phone call to the contact may be necessary to determine the individuals to be contacted regarding royalty reporting, patent-cost reimbursement, and development reports. The database should include the names and addresses, as well as phone, e-mail, and facsimile numbers, for all relevant contacts.

Type of Agreement

Indicate the type of agreement, i.e., license, option, testing, research, etc., and the type of license grant, i.e., exclusive, nonexclusive, field exclusive, etc.

Relevant Dates

List expected end date and effective date.

Agreement Status

Indicate if the agreement is active, expired, or terminated.

Licensed Intellectual Property

Include a list of the intellectual property covered under the agreement including the licensed patent and patent application numbers.

Reporting Obligations

Briefly describe the reporting and payment obligations for each of the due dates. This part of the database should be designed so that all obligations can be queried and accessed by due date. A regular monthly scan of the due dates for all active agreements should identify the reports and payments due. Past-due reports should be automatically flagged also. A robust system will prompt managers to check for particular milestones or other relevant information during a designated period. Since every licensee relationship is different, inclusion of a comments field in the database can be useful.

Correspondence

Post or link relevant correspondence to the agreement.

Amendments

Develop a system to track all amendments to the license. Most agreements are amended from time to time, and tracking these changes is essential to properly monitor the agreement.

Obtaining Reports and Payments

Obtaining reports is simplified if the license agreement is unambiguous and can be clearly interpreted. Well-constructed agreement terms accurately define the information to be provided and specify the exact due dates by employing date-certain language. To determine when reports and payments are due or past due, the license portfolio should be reviewed on at least a monthly basis. Upon execution of each new license agreement, it may be helpful to the licensee for the TLO to inform the licensee of the due dates for development, royalty, or other reports that will be due. At this time, it is also good practice to provide the contact information of the TLO agreement's administrator, if different from the person who negotiated the license. Issues relating to obtaining reports are discussed below.

Reminder Notices

It is sometimes helpful to provide reminder letters to licensees, prior to the due dates. Reminders are particularly helpful for newly executed agreements. Sending reminder notices may prompt the licensee to review the license and assign reporting duties to the appropriate parties.

Late Reports

Following up with licensees on late reports and payments can be time-intensive. In most cases, the reports will be provided after discussing the matter with the licensee. Understanding the issues related to the late reports and being flexible in resolving problems related to reporting is often necessary to preserve the relationship. If the licensee is not responsive, sending a notice of default may be appropriate. Since failure to cure a default can lead to termination of the license, it is important to send the notice to the party identified in the notices section of the agreement and to follow the protocol outlined under

that section. You may also want to have the letter reviewed by counsel, particularly if you suspect that termination of the license is likely.

Late Payments

As with late reports, collecting on past-due amounts often requires flexibility, especially with smaller companies. For small companies, cash flow can make it difficult to pay large invoices for patent-cost reimbursement or even to pay royalties and fees. Discussions with the company are necessary to resolve the payment issues, and rescheduling payments may be appropriate. Most license agreements provide for late-payment penalties; assessing such penalties often results in more timely payments.

Reviewing Royalty Reports

Records and payments provided by the licensee must be reviewed to make sure all payments including fees, minimum royalties, and earned royalties are paid and that the information provided in the reports is accurate. If earned royalties are being paid, a report detailing the calculation of royalties should be provided. In reviewing the reports, be particularly attentive to problems. Table 1 lists certain red flags that could alert you to a problem. Earned royalty reports should be completed by containing all of the information required under the agreement. A sample royalty reporting form is shown in figure 2. Several issues related to reviewing reports are discussed below.

Table 1: Royalty Monitoring Red Flags

- Reports are inaccurate, incomplete, or lack detail
- Reporting periods are skipped
- Late reports and/or late payments
- Royalty contact person is unresponsive
- Payments during the same reporting period decline from year to year
- Any change in the way royalties are reported or calculated
- Earned royalties never exceed the minimum
- Change in ownership of the company
- Change in reporting contact person
- Change in address or phone numbers without notice
- Licensed products are advertised but not included on royalty reports
- Sublicensing income not reported
- Checks that do not clear the bank

Figure 2: Sample Royalty Reporting Form

Licensee name:

Reporting period:

Date of report:

Royalty Reporting Form

Product (list products by name)	No. units sold	Invoiced price per unit	Gross sales	Allowable deductions (attach itemized detail)	Net sales
Product name					
Product name					
Product name					
Product name					
Total					

Total net sales	$
Royalty rate	
Royalty due	$

Total royalty due: $_____

Report prepared by:

Title:

Date:

Please send royalty reports and payments to:

Licensor name:

Address:

Insufficient Royalty Calculation Information

When royalties are based on sales, the TLO should require itemized reporting of the sales amounts and applicable deductions and require that the licensee show the details of the royalty calculation. When royalties are calculated based on other parameters, such as units or usage, these parameters should be reported. A well-documented royalty report showing how the royalties are calculated helps determine if royalties are being calculated as provided under the agreement. Well-documented royalty reports provide important information for an auditor, if an audit of the licensee is performed at a later date. To assist the licensee in reporting all the relevant information, it may be necessary to provide an example of a report to the licensee, as the party responsible for completing the report may not have been aware of what was required under the license.

Mathematical Errors

All computations should be reviewed for accuracy. Any discrepancies should be discussed with the licensee, and any appropriate adjustments should be made and result in accurate reporting and payments. Cases of overpayment should also be discussed under the circumstances, a credit to the next royalty payment may be necessary.

Calculation Errors

Review the report for correct calculation of fees and royalties including the basis for royalty determinations, which is often net sale. Deductions should be itemized as per the definition used in the license. Watch for any vague or unauthorized deductions. Questionable deductions should be discussed with the licensee.

Indecipherable Reports

Royalty reports that are unclear are not informative. A discussion with the licensee may help clarify the information required under the license. In some cases, the royalty reporting form may not have been appropriately designed. Revisions to the form could help clarify reporting.

Figure 3: Sample Development Plan

Licensee name:

Report date:

Technology title:

Development Plan

Development plan of the scope outlined below shall be submitted to TLO by licensee upon execution of this agreement. In general, the plan should provide TLO with a descriptive summary of the activities that licensee believes are necessary to make products available for sale in the commercial marketplace. Estimated start and finish dates or time lines should be included where appropriate.

I. Development program (describe steps to be undertaken and the time required)
   - A. Describe development activities
   - B. Provide development time line
   - C. List governmental submissions require

II. Describe market approach

III. Competitive information
   - A. Potential competitors
   - B. Potential competitive devices/compositions
   - C. Known competitor's plans, developments, technical achievements
   - D. Anticipated date of product launch

Total length: approximately 2-3 pages

Please send development plan to:

Licensor name:

Address:

Figure 4: Sample Development Report

Licensee name:

Report date:

Technology title:

Development Report

A. Date development plan initiated and time period covered by this report

B. Development report (4-8 paragraphs)

1. Activities completed since last report including the object and parameters of the development, when initiated, when completed and the results
2. Activities currently under investigation, i.e., ongoing activities including object and parameters of such activities, when initiated, and projected date of completion

C. Future development activities (4-8 paragraphs)

1. Activities to be undertaken before next report including, but not limited to, the type and object of any studies conducted and their projected starting and completion dates
2. Estimated total development time remaining before a product will be commercialized

D. Changes to initial development plan (2-4 paragraphs)

1. Reasons for change
2. Variables that may cause additional changes

E. Items to be provided if applicable:

1. Information relating to product that has become publicly available, e.g., published articles, competing products, patents, etc.
2. Development work being performed by third parties other than licensee to include name of third party, reasons for use of third party, planned future uses of third parties including reasons why and type of work
3. Update of competitive information trends in industry, government compliance (if applicable), and market plan

Please send development report to:

Licensor name:

Address:

Reviewing Development Reports

At about the time a license is signed, the TLO should require the licensee to submit a product-development plan outlining the steps it will take to bring a licensed product to market (see figure 3). It is important to note that many business plans designed for investors may not have adequate information describing the particular steps to be undertaken by the licensee in the development of products. Development plans should specifically describe the product-development activities to be undertaken and a time line for completing these activities. Any government approvals should be noted as well as time lines for completing other necessary activities that may have an effect on the commercialization of products under the license. After the license is executed, the licensee should provide development reports showing the progress made by the licensee in meeting the goals set forth in the development plan (see figure 4). Both development plans and reports should be reviewed by an individual within the TLO who is familiar with the licensee's business plan and/or with the inventor as appropriate. Unreasonable delays or frequent changes in the focus of the development plan may indicate that the licensee is experiencing difficulties that could lead to business failure. This may be particularly true for small firms. Lack of progress may also indicate the licensee is no longer emphasizing development of products under the license. In either case, discussion with the licensee is necessary to determine if the licensee is likely to be able to perform under the license. If not, then consideration should be given to termination of the license.

Constructing Effective License Agreements

It is an unfortunate reality at some institutions that the licensing officer who negotiated the agreement may not remain at the TLO long enough to discover if the results are as envisioned by the licensing officer. As a result, the officer responsible for monitoring the license may not be the individual who negotiated and arranged for the execution of the agreement. A licensing officer responsible for reviewing an agreement without benefit of the author's input may require assistance in interpreting certain terms. One of the best training tools available for a licensing officer is to participate in the agreement-monitoring process. Many of the difficult issues that surface in license monitoring relate directly to the license language. Drafting license agreements is beyond the scope of this chapter, but it is worthwhile highlighting areas that are critical to effective monitoring.

Defining Terms

Define terms clearly and carefully, so that they can be accurately interpreted by someone not familiar with the intent of the parties. Unless defined otherwise, the standard understanding of the word will be used by the courts in interpreting the intent of the parties. Definitions of particular importance are listed below.

Licensed Product

Licensed product is often disputed during audits. Since the definition of licensed product is the basis for the royalty calculation, the term should be carefully constructed. Avoid using vague terms. Be specific in defining the licensed product and relate that definition to the patent being licensed, for example, consider incorporating the following term into the agreement, "*Licensed Products* are products that employ or are in any way produced by the practice of an invention claimed in the Licensed Patents or that would otherwise constitute infringement of any claims of the Licensed Patents."

First Sale

Agreements often use *first sale* to a customer as a trigger date. Without auditing a licensee, it can be difficult to determine when the first customer was invoiced. Under certain circumstances, relying on the licensee to report that date may be unrealistic. A suggested alternative is to define first sale as the end of the quarter in which sales reach a certain dollar amount, e.g., $100,000.

Royalty Calculations

Specifically identify the method by which royalties are calculated. Keep the method as simple as possible. Royalties should be readily documented and easily determined. The invoiced price of the licensed product is the standard basis for royalty calculations. Avoid basing royalties on a percentage of gross profit or cost or on any other method that is subject to change based on the licensee's cost-accounting allocations. Base royalty calculations on invoiced amounts rather than amounts collected.

Royalty Deductions

What deductions are appropriate—returns, shipping costs, installation fees? What about promotional products that are not invoiced? What about combination products? If the licensee requests that deductions be made, it is important to understand the basis for the request. Only agree to deductions that are reasonable and make good business sense.

Reporting Periods

Quarterly reporting based on a January 1 to December 31 calendar year is recommended. More frequent reporting generally is not practical and places a burden on the licensor and licensee. Annual reporting may leave too much time between reporting periods, and irregularities may not be recognized in a timely fashion.

Make Obligations Date Certain

Date-certain obligations are readily monitored, for example, a report "due on or no later than December 31, 2010," is easier to follow up on than a report "due 30 days after completion of a study." When it is likely that an agreed-upon deadline will not be met, it is reasonable to expect the licensee to contact the TLO and explain the delay. If the reason for the delay is acceptable to the TLO, the agreement may be amended to reflect the new deadline.

Describe What You Expect to Receive in Your Reports

With the exception of very small companies, the individuals completing the reports usually will not be the same as those negotiating the agreement. Advise the licensee what is expected in the report to the licensor. Consider including examples of royalty and development reporting forms as exhibits to the license.

Special Issues for Startup Companies

Startup companies often present a management challenge for the TLO. Entrepreneurs managing startups wear many hats and can be difficult to contact. In some cases, responsibility for the license is delegated to a staff member unfamiliar with the agreement. In such cases, well-structured reporting forms can help the TLO clarify and communicate

effectively with the startup. A willingness on the part of the licensor to renegotiate terms or modify provisions based on the changing business environment may be necessary. Any arrangement to change the terms of an agreement should be carefully documented. While formal amendments are often executed by the parties, less formal agreements for rescheduling payment or reports can be effectively managed by a letter from the TLO indicating its acceptance of the change.

In some situations, conflicting objectives of various parties within the university can make it difficult for a TLO to manage its licenses effectively. While such conflicts are not limited to startup companies, the potential for conflict is greater for startups with close ties to the university. For example, a TLO may be in a position where it is extends deadlines or waives payments with little justification. This can place the TLO in a difficult financial position or prevent it from seeking other licensing opportunities. Ultimately, the commercial opportunity may be lost.

Third-Party Audits

Auditing is a management tool that is discussed in detail in another section of this manual, however, it is instructive to highlight the below listed considerations in this section.

- While auditing is important, it should be considered after other remedies have been sought and should not be a substitute for effective agreement management.
- Auditing every licensee is generally not practical due to the costs and resources required.
- License agreements generally specify a document-retention period of usually five years. As a result, audits conducted after the retention period may not allow for the inspection of all documents.
- Good agreement monitoring and regular communication with the licensee can help guide the licensee in developing an internal accounting system resulting in accurate reporting.

Bankruptcy

While many license agreements include a clause terminating the license if the licensee files for bankruptcy, most legal experts agree that this provision affords little protection to the licensor. Once a licensee files for bankruptcy, an automatic stay is imposed, which

prohibits any termination of the license. In addition, the trustee has the power to void transactions with the licensor entered into ninety days before the filing of the bankruptcy petition. The potential adverse effects of a bankruptcy filing on the licensor make it important for the TLO to monitor the financial status of its licensees and to act quickly to restructure the agreement when problems arise. To preserve some rights for the licensor, the TLO may be successful in negotiating changes to the agreement. Such changes could include reducing the license grant from exclusive to nonexclusive or restricting the field or territory. In any event, by addressing problems before a bankruptcy petition is filed, the TLO may be successful in reducing the uncertainties associated with bankruptcy.

Visiting Licensees

By visiting the licensee, the TLO shows its interest in the company. The visit may also allow the TLO to gain valuable insights into the licensee's business as well as the industry as a whole. Visiting a licensee is a valuable opportunity to further establish the business relationship. While face-to-face meetings at the licensee's place of business can be an effective approach to solving problems, a visit without a particular agenda can also be instructive. In meetings, company officers often share information about their businesses that they have not considered sharing with the TLO or were too busy to communicate. Such information can include updates on research projects and strategic alliances, new distribution or marketing channels, and other information. Licensees are usually very interested in showcasing their operations.

Conclusion

The time and effort required to monitor agreement compliance is a significant investment of TLO resources. Regular contact with the licensee can provide timely information to the TLO and makes it easier for the licensee to communicate issues affecting the license, such as cash-flow problems, potential infringement, new sublicenses, or other matters. By establishing and managing an agreement-monitoring program, the TLO helps to ensure that licensees fulfill their obligations and that the technology commercialization and financial goals of the institution are met.

Notes

George H. Keller, Steven M. Ferguson, and Percy Pan, "Monitoring of Biomedical License Agreements: A Practical Guide" NIH, *Pharm Dev Regul* (1) 3: (2003) 191-203.

Avoiding the Avalanche: Records Management Techniques for Improving Workflow in Technology Transfer Offices

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Introduction (a.k.a. You Realize How Important Good Records Management Is When You Don't Have It)

It's late in the day and you just received a frantic phone call informing you that a final deadline occurs today—you must make an immediate decision! Okay, you're a trained professional—you can handle this. You go to where the file is supposed to be, but much to your dismay, it's not there. A cry for help goes out to the whole office. Everyone is enlisted in a mad scramble to find the file. After what seems like an eternity, the file is found propping up the short leg of a desk. What a relief! Now you think you can make an informed decision—until you discover that the file is empty! It's times like these that technology transfer (TT) professionals are reminded that high-quality records management (RM) is essential to efficient operation of any office.

The National Institutes of Health Office of Technology Transfer (NIH-OTT) is responsible for evaluating, patenting, marketing, and licensing inventions made by NIH and Federal Drug Administration (FDA) scientists. Our RM challenges have been relatively large, in part, because NIH-OTT manages records totaling about four million pages. While almost half of these have been scanned into electronic form, paper records are still kept in a large number of folders (more than 17,000 folders). During recent years, the NIH-OTT has created and implemented ambitious improvements to previously utilized RM techniques. These improvements have greatly facilitated the workflow of TT operations and have made substantial contributions to NIH-OTT's increased productivity (during fiscal year 2004, NIH-OTT received 403 new invention disclosures, filed 396 U.S. patent applications, had 122 U.S. patents issued, 276 licenses executed, and received royalties of

approximately $56.3 million). Other TT offices, especially those like NIH-OTT that handle a large volume of records, may find the following techniques helpful in having consistently high-quality RM.

Improved Organizational Systems for Incoming Mail and Folders

Color-Coded Multisection Folders for Ease of Filing and Retrieval (a.k.a. We Put a lot of Thought into our Folders)

While this seems very basic, the attributes of file folders can have a big impact on their ease of use. Different types of folders may be employed for each different population of records. Choosing the color of folders to clearly distinguish one type from another ensures that folders are filed into the correct population of records (i.e., when only yellow folders are stored in one spot, and only green folders are stored in another spot, it eliminates misfilings into the wrong population of records). Classification folders in a variety of colors are produced by many manufactures and are readily available from office-supply retailers.

Organization of papers within a folder may be facilitated by creating document categories (e.g., categories based on the documents' recipient, sender, type, chronological grouping, milestone, etc.), then using folders that have one section for each of these categories. Categories should be clearly defined and mutually exclusive so that a quick inspection of a paper reveals to which type of folder and category (and, hence, folder section) it belongs. Table 1 shows the color and number of sections for several types of folders that NIH-OTT uses.

Table 1

Folder Type*	Folder Color	Number of Sections
Invention report	Color changes each year	1
U.S. provisional patent applications	Salmon	3
U.S. utility patent applications	Bright blue	6
Patent Cooperation Treaty applications	Gray green	6
Foreign patent applications	Pussywillow gray	6
License applications	Dark green	6
Marketing	Yellow	6

**Invention report folders are letter-size. All other types of folders are legal-size.*

Table 2 shows, for three types of folders, the categories of documents that are filed into each section.

Table 2

Folder Type	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6
Invention reports	All papers					
U.S. provisional patent applications (salmon)	Invention report and correspondence with inventor and institutes	Documents completed at application filing	Correspondence between law firm and OTT			
U.S. utility patent applications (bright blue)	Correspondence between law firm and USPTO	Documents completed at application filing	References	References	Invention report and correspondence with inventors and institutes	Correspondence between law firm and OTT

With so many types of folders and sections, it could be laborious discerning into which section a particular document should be filed. However, making this information available in the form of a handy miniature booklet makes it more convenient to use, which encourages staff to use it more frequently. The point being that, in addition to creating an organizational tool, it can be highly advantageous to have it in a form that is easy to use.

Using Off-the-Shelf Folders rather than Custom Preprinted Folders (a.k.a. Sometimes it Is Better to Buy off the Rack)

It is common practice for offices to buy custom-made folders preprinted with blanks on the front and back (e.g., a blank for docket number, a blank for inventor's name, etc.) and then hand-write information into each of the blanks on every folder. These preprinted folders can be relatively expensive because of fees for creating the printing plate (typically about $100) plus a charge for printing each folder. While the fee for creating the printing plate may be touted as a one-time initial fee, with each new order of folders, there may well be some need to improve the printing-plate and, consequently, another $100 charge

is incurred. Using preprinted folders also suffers from the disadvantages of incorrect information or illegible handwriting being written into the blanks and information changing, which makes the writing on the folders outdated. Consequently, folders may have to be thrown away, a new folder prepared, and the contents moved to the new folder.

Such unnecessary consumption of time and money may be avoided by purchasing blank, off-the-shelf folders, printing identifying information (e.g., by making a screen print) from a docketing system or database (NIH-OTT uses TechTracS from Knowledge Sharing System LLC) onto a 8 1/2 x 11-inch, self-adhesive label, then adhering the label onto the front of the folder. Compared to writing information on the folder, this avoids problems with errors in transcribing information since the information comes directly from the docketing system or database, illegible handwriting since the information is produced from a printer, and, information becoming outdated since an updated label may periodically be printed and applied over the outdated label. Blank, off-the-shelf folders can cost only half as much as custom-made preprinted folders.

One-Piece Color-Coded Labels on Folder End-Tab Facilitates Identification, Filing, and Retrieval

To clearly differentiate one folder from another within a population of folders, and to facilitate filing and finding folders, one-piece, self-adhesive, custom-designed, color-coded labels may be applied to the end-tabs of all folders. Label-printing software may be employed (which uses a PC and either an ink-jet or laser printer) to produce labels according to predetermined designs. For example, one label design may be used for patent folders, another label design for license folders, etc. Label designs may be customized to suit a wide variety of user needs. For example, labels may include numbers, text, graphics, logos, color-coded indexes, key information coded into bar codes, etc. One example of this type of labeling software is NetLabels from GBS Corp.

Because most offices have a unique number for each folder, such as a docket number, license application number, etc., and store many folders on open shelving, the end-tab label designs may focus on maximizing the visual clues that help with filing and finding folders. For example, when folders are lined up side by side, the end-tab labels may produce a visual indexing system via bands of color. For example, along the top of a row

of folders, the labels may have a horizontal band of green, then, just below that band, the labels may have a horizontal band of red, and below that, a band of blue, and so on. Such a design makes it very easy to avoid, or identify, misfiled folders because they don't match the pattern of color bands of the adjacent folders. Labels of this type also eliminate the need for out-cards because it's so easy to ascertain where a folder should be filed that there is no need to use an out-card to mark where a folder belongs.

It's very common to see color-coded labels on the end-tabs of folders, for example, in physicians' offices. However, frequently, these are not one-piece labels (that cover the entire folder-tab), but rather are made up of several smaller labels, that is, each character/number is a separate self-adhesive label of a unique color. These separate smaller labels are commonly called *rolled labels* because they are sold as rolls of labels. Rolled labels may suffer from disadvantages such as these small labels peel off or are damaged far more easily/frequently than one-piece labels, and it may be difficult to keep track of the inventory of so many individual labels. Consequently, an office may frequently run out of the most commonly used letters/numbers but still have to store a plethora of rolls of infrequently used letters/numbers. Frequent ordering can make using rolled labels far more time-consuming and expensive. Additionally, they present a storage problem because everyone who applies labels has to store a collection of rolls of labels for each letter/number that he or she might need—typically, in a TT office, each of these collections could include more than twenty rolls of labels.

Immediately Filing Incoming Mail into a Folder (a.k.a. No Loose Papers Means no Lost Papers

One of the most effective RM techniques that may be implemented is also one of the simplest. In most large TT offices, all incoming official mail is handled in a mailroom, where it is sorted, date stamped, and filed into a folder. If the folder into which a piece of mail belongs is not readily available to the mailroom staff (e.g., the folder is not in the central file room [CFR]), it may seem most expedient to give the mail to the licensing specialist so as not to delay its delivery. However, because some licensing specialists prefer to store folders in their offices, they will receive a large volume of loose mail. In practice, such loose mail may not be filed into the folder—but may instead mysteriously

find its way to a floor, or shelf, or cardboard box with the expectation that it will be filed tomorrow. Tomorrow never comes! The solution? When incoming mail that needs to be filed into a folder (other than advertisements or general notices) is received, it should, almost without exception, be filed into the folder before it leaves the mailroom—even if the mailroom staff has to search for the folder and bring it to the mailroom. A note may be attached to the outside of the folder indicating what was filed, and the folder put into the licensing specialist's in-box.

This procedure can make a dramatic difference in the completeness of files and save hundreds of hours each year in not having to look for lost papers or having campaigns to file batches of accumulated loose papers. Also, it may give staff members an incentive to return folders to the CFR, because they know that they will receive their mail more quickly if the folder is stored in the CFR. In those rare circumstances where the mailroom staff cannot find a folder within a reasonable period of time (depending on the urgency of the mail), a photocopy of the mail may be given to the licensing specialist for his or her action, while the original is retained in the mailroom until the folder is located so the original can be filed. Simple, but effective!

Incoming Mail Has Critical Information where it's Easy to Find

Many TT offices contract with law firms for patent prosecution and related services or have other contractors with whom they correspond frequently. Consequently, they receive a large volume of mail from these contractors every day. Typically, every person in a TT office who deals with this mail must sift through the text to try to find information needed for its processing (What folder should it be filed into? What do I docket?) or for formulating a response (What action is needed? What is the due date?). Also, critical information may sometimes be inadvertently omitted from the mail.

These problems may be avoided by examining several samples of such correspondence, and, in light of typical issues and program requirements, determining what categories of information are needed for processing and responding to the mail. The contractors may then begin each piece of mail with a list of the information for each of these categories. For example, the following categories of information are typical of what might be listed

at the beginning of mail from a law firm providing patent prosecution services:

- relevant patent application number, country/region, and filing date
- NIH-OTT's docket number (of a specified format)
- law firm's docket number
- immediate parent application (to help identify the correct case)
- inventors
- title of the invention
- action that the law firm is requesting
- requested (i.e., preferred) response date
- deadline date (e.g., statutory deadline for response)
- number of the work-order number (if any) under which this work was produced

Thus, a law firm could begin every piece of mail with the aforementioned information numbered from one to ten for easy reference. Such a listing may also work well because it prompts the contractor to supply information that he or she would not have provided otherwise. Also, for a few key pieces of information needed for docketing, law firms may provide the information as bar codes. These bar codes can be read directly into docketing systems using a laser-wand rather than entering them by hand. This makes entry of critically important data much faster and more accurate by eliminating transcription errors.

While this may seem to be a minor procedural change, it can produce remarkable results. Papers may be routed far more quickly, and the licensing specialists can easily ascertain what needs to be done and when it needs to be completed. Also, the contracting law firms may benefit because they do not have to receive as many questions about information that needs clarification or that they omitted.

Moving toward a Paperless Office: Almost Two Million Pages Scanned into Electronic Form

Scanned Records Provide Faster and Easier Access, Improved Indexing, and Reduced Storage Costs

Scanning documents into electronic form has become so commonplace that its advantages are well-known and readily apparent. NIH-OTT has attached the scanned records to

the docketing system, which makes them available to everyone in the office. It can be quite an adjustment for office staff to let go of paper. But once they have experienced accessing any of tens of thousands of documents in a matter of seconds without getting up from their chair, they grow to appreciate the advantages. Scanned images attached to TechTracS cannot be deleted or edited by the users, so they cannot be lost or their contents adulterated. TechTracS is a very powerful electronic-filing system because it permits scanned documents to be attached to any record in almost any screen/table. For example, the scanned image of a patent can be attached to the TechTracS patent screen that pertains to that specific patent. Consequently, the document may be accessed and viewed with its corresponding docketed data. The majority of the scanned documents are also indexed into the categories of documents described in the above section "Color-Coded Multisection Folders for Ease of Filing and Retrieval (a.k.a. We Put a lot of Thought into our Folders)," thus, permitting a desired document to be found very quickly. Having documents in electronic form reduces costs in several ways. First, less labor is expended searching for folders. Second, less labor is required to access records. Third, charges for archival storage may be lower because many of the records that had been archived can be destroyed after they are scanned. Lastly, office staff can spend less time archiving, tracking, and retrieving archival records.

Over the past two years, NIH-OTT has scanned almost two million pages into electronic form and then disposed of the majority of the paper documents. Such an undertaking can be a logistical nightmare and an opportunity for disaster. A scanning program should only be undertaken after a great deal of research and planning. In addition to the obvious questions—What hardware and software best suits my needs? How do I make the scanned images available to everyone who needs them?—there are also many less obvious questions: How should the scanned images be indexed? What file format is best? What scanning resolution optimizes image quality without making file sizes too large? There are many potential pitfalls—so it's best to work with someone who has experience in this area.

PDF Image Plus with Optical Character Recognition (OCR) Provides both a Photographic View of Documents and Recognition of Characters

NIH-OTT selected the PDF Image Plus format for scanned records. One component of this format is PDF (portable document format). PDF permits viewing and printing of a

file exactly as it was designed, without the need for the same application or fonts used to create it. PDF has come into common use for electronic distribution that faithfully preserves the look and feel of the original document complete with layout, fonts, colors, and images. PDF files typically have smaller file sizes because they are compressed (this reduces required storage space and file transfer time). Also, PDF files may be viewed and printed using free Adobe Acrobat Reader software. PDF is extremely useful with legal documents because it captures a photograph-like image of each page and, therefore, faithfully reproduces signatures, date-stamping, and hand-written notes. The second part of PDF Image Plus is OCR, which recognizes each character (i.e., it *knows* what each letter/number/symbol is). An example of software that may be used for OCR is ABBYY FineReader from ABBYY Software Ltd. Using PDF alone requires less work; however, using PDF Image Plus permits searching documents by word or phrase (e.g., documents may be opened in Adobe and the standard Adobe search function used). While searching has the obvious benefit of finding the portions of a document that might be of particular interest, it also has the benefit that, if used across a population of electronic files, it can locate any misfiles (i.e., electronic files that are not properly indexed/filed).

Tracking Folder Locations Using Radio Frequency Identification (RFID)

An RFID Tag Containing a Unique Identifier Can Distinguish Each Folder

An RFID tag (e.g., in the form of a self-adhesive patch) may be attached to each folder to allow it to be identified electronically. These tags consist of a computer microchip programmed with a unique identifier, connected to an antenna that is typically in the form of a coil. Passive RFID tags do not contain a power source, such as a battery. Rather, they employ an antenna that receives a signal from an RFID reader (a.k.a., a transceiver) and conveys the signal to the microchip. The microchip then sends back out to the reader a signal representative of the unique identifier programmed into the microchip. RFID tags may be preprogrammed with unique random numbers (these typically cost a little over $1 each). Because these numbers are random (i.e., they do not connote a specific meaning), the user has to rely on a database to correlate each specific number to its corresponding folder. Alternatively, RFID tags can be programmed with a self-explanatory identifier (such as a docket number, patent application serial number, etc.), and other information.

RFID Tag and Location Data May Be Read Quickly and Easily Using a Transceiver-PDA and the Data Downloaded, Stored, and Viewed in Folder-Location Tracking Software

RFID tags may be used to track folder locations using a three-step process. First, an RFID reader connected to a personal digital assistant (PDA) is used to read a location-designation. Second, the transceiver is used to read the RFID tags of the folders in that location. Third, the location and RFID data are downloaded from the PDA into folder-location tracking software. For example, each shelf in a CFR may have a unique location-designation assigned to it and be labeled with a bar code of that location-designation (while in theory, an RFID tag could used to designate each shelf, RFID tags do not work well when applied to metal, consequently, it is recommended that a bar code be used instead). The transceiver is used to read the bar code, then read the RFID tags of the files on that shelf (this only requires a few seconds and can easily be done at a distance of up to one foot), then the data are downloaded from the PDA into folder-location tracking software that associates that location-designation with all of the folders corresponding to the RFID tags read. An example of such software is Opus 32 from Thoroughbred Technologies Inc.

Advantages of RFID: No Line of Sight or Contact Required

Bar-code labels attached to each of the folders may be used, via an analogous process, to track folder locations. However they suffer from the disadvantage that the bar-code reader requires a line of sight to each bar-code label. This slows the reading process greatly, because folders often have to be re-positioned to expose the label or to provide proper orientation to the reader. Also, bar codes frequently do not read on the first try—so two or three attempts are often required. It may also be difficult to print bar-code labels on site of sufficient quality to be read easily, and, as would be expected, bar-code labels frequently peel off the folders or are damaged. It used to require about twenty-four to thirty-two hours to read all the folders in our CFR (about 8,000 folders) when we used bar codes. By contrast, the same operation using RFID tags takes only four to five hours.

Conclusion

The RM techniques described here clearly illustrate that effective RM may have a significant impact on the efficiency with which a TT office operates. Many of the aforementioned RM procedures/systems may be implemented at little or no cost, but still significantly improve the quality of RM. Even the techniques that *do* require significant effort or investment can yield improvements to operations and morale that make such expenditures well worthwhile.

Note: Products are mentioned only for the convenience of the reader and for purposes of illustration. Readers should make their own independent evaluation as to whether these products, or other equivalents/alternatives, meet their specific needs.

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Monitoring License Agreement Financial Compliance and Auditing

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Licensors and licensees alike spend enormous amounts of time negotiating license agreements for intellectual property. This investment of time will hopefully result in a license agreement that is clear and palatable to both parties. After the agreement is signed, however, the license is often put in a file drawer, never to be looked at again except when problems arise. Why don't licensors spend the same amount of time and effort in license monitoring as they do in securing the license agreement? After all, in a typical business transaction, parties do not rely on trust alone to document the exchange of goods and services. For example, payment amounts often are compared against invoices, shipping logs, or other documents from an accounting system.

However, sometimes in licensing, due to a lack of resources or based on a concern that a monitoring program will send the wrong message, there is a lack of financial monitoring. License agreements can be complex, with the actual royalty calculation based on variable data from many sources. In addition, the licensee staff members who are responsible for royalty calculations and monitoring compliance with the license agreement usually are not the same people who negotiated the license agreement. Further, the university office staff members who are responsible for monitoring compliance may be unfamiliar with the license terms.

These facts alone signal the need for a monitoring program. The development of a systematic license-monitoring and compliance program sends a clear message to the marketplace that such a program has become a normal and routine part of your licensing practice. (It also sends a message that the university is treating this as a business.) Just as sales customers are not angered by payment-to-invoice verification, licensees will not be angered by similar examination of royalty streams (and other payment obligations and actions required by the license agreement).

Consider this: did the give and take of the negotiating process force you to sign your most recent deal for a little less than you originally wanted? If your license-monitoring procedures are lax, then the gap between what you wanted and what you are getting is going to widen. Several ways to minimize the likelihood that your licensees will be offended by an audit are to give them early notice, make audits routine rather than in response to a suspected problem, and make it clear that you audit all licenses of a certain size or type.

Many people think financial license monitoring is limited to royalty audits. However, there is a great deal more to a compliance program. This chapter will discuss these topics, including language of your agreement, desk audits, royalty audits, and, most importantly, communicating with your licensees.

The Language of the Agreement

A specific and well-written license agreement is the true underpinning of accurate and timely royalty payments. In any given license, the definition of *net sales* is perhaps the most important definition along with *field of use.* However, many licenses lack specificity about the essential components of the royalty calculation. It is this ambiguity that causes the most trouble for the parties when a dispute arises regarding the amounts owed under the terms of the license. The factors that go into a royalty calculation must be carefully and clearly defined.

For example, if there are different royalty rates for different products, is it absolutely clear what those rates are? It should be clear if the definition for *licensed products* is based strictly on issued (or pending) patent claims or a broader, more inclusive *use of the technology.* The agreement should state exactly how to calculate the royalty if the product being sold is a combination of licensed products and other components that fall outside the scope of the license agreement. Antistacking clauses, calculations, and any credits should be clearly defined.

The determination of net sales should be specifically defined. Many large companies compute net sales by applying a standardized percentage, determined by company-wide experience, against gross sales. If itemizing the gross to net deductions, the license

agreement should specify what specific deductions from gross sales are allowable and state that these deductions must actually be given (rather than estimated or accrued) to be appropriately deducted.

Another example of potential ambiguity in the license agreement involves the use of transfer prices to related entities. This often occurs in large corporations when one entity must purchase components from another entity or product is sold from one division to another and an artificial price is set. This price, called *a transfer price,* is for internal use only and has no bearing on the cost of the product in the marketplace. License agreement language should specifically prohibit transfer prices in determining net sales for royalty calculations.

Example language to avoid this could be: "If LICENSEE makes any SALES to any party affiliated with LICENSEE, or in any way directly or indirectly related to or under the common control with LICENSEE, the Royalties payable to University shall be computed on the basis of the regular price charged to third parties."

In addition to precise definitions, you must require your licensee to include certain specific information in its royalty report. At the very minimum, the royalty report should contain:

- product description (product number or SKU)
- number of units sold by licensee and sublicensees
- gross sales amount
- deductions from gross to net sales for the licensed products (if applicable)
- country in which the product was sold (if applicable)
- foreign currency (if applicable)
- conversion rate to U.S. dollars method and source (if applicable)
- net sales amount
- applicable royalty rates
- royalty amount due
- advances or credits paid to date that are being deducted

The more detailed and complete the reporting, the easier the verification process for the licensor. If the product has been sublicensed, then all required information from the licensee should also be required from the sublicensee.

When drafting the royalty calculation in the license agreement and designing the form and content of the royalty reports, you should utilize as much of the information and standardized reports from the licensee's accounting systems as possible. This lightens the reporting burden on the licensee, and it also minimizes errors because a new report is not being created solely for royalty reporting.

For example, suppose your licensee's normal business practice is to convert its foreign sales to dollars at the end of each month using the average exchange rate for that month as reported in the *Wall Street Journal.* Structure the foreign-currency conversion section of the license to require the same process for conversion. This saves the licensee time, will eliminate potential clerical errors, and will also be easier during the royalty-audit procedure for the auditors to determine whether the foreign-currency conversion was calculated correctly. Therefore, as you are negotiating your agreement, spend some time familiarizing yourself with the systems and reporting processes utilized by your licensee; it will be time well-spent.

One creative way to avoid reporting errors that has been proposed is to add a clause in the license agreement that allows an independent party to set up a royalty-reporting system for the licensee. This system would coordinate the terms of the license agreement with the internal data systems and processes in place at the licensee, thereby immediately clarifying how sales of each licensed product are to be accounted for in the royalty report. The licensor would also receive information detailing, for example, any subsidiaries of the licensee that may be involved in selling the licensed products, as well as how these subsidiaries report sales and revenue to the parent company. The relatively small upfront investment in a royalty-reporting system pays off in the long run for both licensor and licensee. The fee associated with this can be shared by both parties or treated as a minimal upfront fee by the licensee.

The license agreement must also provide that the licensor be permitted to monitor the accuracy of the information being furnished by the licensee. This provision is typically referred to as the *audit clause.* The audit clause should provide, at a minimum, language providing for the right to audit the licensee and provisions that the licensor receive immediate payment of understated royalties or fees and interest on such royalties or fees. It should also include an obligation that the licensee pay the cost of the audit if an understatement exceeding some threshold (often 5 to 10 percent of total royalties paid) is found. This clause should also detail record-retention requirements by the licensee.

Sample language could be: "LICENSEE shall keep, and shall require SUBLICENSEES to keep, true and accurate records containing data reasonably required for the computation and verification of payments due under this Agreement. LICENSEE shall, and it shall require all SUBLICENSEES to: (a) open such records for inspection upon reasonable notice during business hours by either UNIVERSITY auditor(s) or an independent certified accountant selected by UNIVERSITY, for the purpose of verifying the amount of payments due; and (b) retain such records for six (6) years from date of origination.

"The terms of this Article shall survive any termination of this Agreement. UNIVERSITY is responsible for all expenses of such inspection, except that if any inspection reveals an underpayment greater than five percent (5%) of royalties or other consideration due UNIVERSITY, then LICENSEE shall pay all expenses of that inspection and the amount of the underpayment and interest thereon calculated at the prime rate plus 2% as published by the *Wall Street Journal,* compounded daily, to UNIVERSITY within twenty-one (21) days of written notice thereof. LICENSEE shall also reimburse UNIVERSITY for reasonable expenses required to collect the amount underpaid."

Desk Audits

In general, an efficiently monitored license agreement is less likely to have significant royalty-reporting errors. Desk audits are the first step in a well-planned monitoring program. Each royalty report that is received is compared to the prior period's report to determine how sales and royalties have increased or decreased. This analysis is then compared to publicly available information on the licensee to ensure the royalty reports

are consistent with the licensee's sales trends on a product segment or a company-wide basis. The reported numbers are then compared to industry trends.

For example, if the licensed patent is used by the licensee in components for cellular phones, look at sales of phones on a marketwide basis to see if they are increasing or decreasing along with your licensee's sales. Your inventors can be invaluable sources of information because they often continue to interact with the licensee or colleagues in academia or industry who may know about your licensee's activities.

Another desk-audit procedure is the comparison of the licensee's published price lists against the royalty statements. The published lists should roughly equate to the sale prices that are included on the royalty statements. The licensor's staff should also take time during the desk audit to understand how the licensed product is bundled with other products. This helps the licensor understand whether the allocation of the selling price among the bundled items is a fair allocation. It is much easier to investigate this type of issue the first time it appears on the royalty report rather than years later.

Finally, the desk audit should ensure that licensees are contacted after every payment. This initiative assures that the licensor-licensee relationship remains strong with a high level of accurate royalty reporting.

A consistently performed desk-audit program has numerous benefits. Such a program allows the licensor to discover problems in the early stages, thus saving all parties time and money. It also gives your licensee notice that you enforce the terms of your licenses as a normal course of business. Therefore, when and if problems do arise, you will have already established open lines of communication with your licensee, and resolution of the problems may occur more easily.

This component of the license-monitoring system can be done internally by the licensor or outsourced to a reputable firm that specializes in this area. Many university offices do not have the necessary resources for routine desk audits. If this is the case, a cost-benefit analysis should be considered to justify obtaining these resources. In the meantime, a priority system should be put into place to assure that those licenses with the highest risk of noncompliance be subjected to these procedures more often than those with lower risks.

When Desk Audits Lead to Royalty Audits

Royalty audits should be a normal part of your licensing business, and you should notify your licensee that you will audit its royalty payments at least every three years. This correspondence alone may increase the likelihood of compliance without having to actually perform the audit. In addition to these regularly scheduled audits, you may need to audit some of your licensee more often if you discover that a licensee is not complying with the terms of an agreement or if there are questions concerning the royalty report. It is to be expected that this will happen at some point, because the individuals in charge of preparing royalty reports and making royalty payments were probably not on the negotiating team. Also, as time goes by, it is inevitable that circumstances change. You need to be aware of the red flags that may indicate your need to move beyond the desk audit and regularly scheduled royalty-audit programs for certain licensees.

Any royalty report that contains insufficient required details should immediately pique the licensor's interest, particularly if the license requires that certain information be included in the report. Unfortunately, it is often the case that a licensor will accept a report that consists of one number: the royalty amount. This is ridiculously incomplete, but because there is also a check included with that report, many licensors are happy to accept it. In addition, if the licensee is unable to answer questions about how the royalty is calculated, the licensor should be on alert.

Another red flag that is seemingly obvious, but that can go undetected in the day-to-day frenzy of the workplace, is a royalty report that comes later and later during each reporting period. If it is arriving at the licensor's office two weeks late, the licensee is likely procrastinating on putting the report together. Ask yourself why, and you are beginning the effective monitoring of your license.

What if the ownership changes at your licensee? Maybe your original license agreement has been acquired by a larger company with more manufacturing resources and distribution networks? It stands to reason that a larger company would be able to sell more of the licensed products, but if the reporting systems of the two companies are slow to be combined, you may not be receiving royalties on all of the sales of the relevant products.

Other red flags that may be raised by the licensee are: opening of a new manufacturing facility, financial difficulty, launching new products, selling old products in new territories, changes in accounting systems, and significant changes in product sales that aren't revealed in the public reports.

When these red flags pop up, you should consider an audit. If, as previously discussed, you have an established program of auditing every three years with desk audits on each royalty report, simply move the problem licensee up in the schedule so that the licensee will be audited sooner. Because you have established open lines of communication with all your licensees, everyone will understand that royalty audits are not designed to single out "bad" licensees and punish them. Rather, your licensees know that you, as a fiscally prudent licensor, perform these audits as part of your regular course of business.

Performance of the Royalty Audit

The word *audit* is a defined term in the accounting profession whereby the books and records of an entity are examined to determine whether its financial statements are prepared in accordance with generally accepted accounting principles. A royalty audit has a much more narrow focus. Simply put, a royalty audit confirms compliance with the terms of the license by testing payments, research milestones, or any other obligations that can be tested by an independent party. If the audit uncovers noncompliance, the auditors then quantify the amount of past royalties due to the licensor.

A consistently performed audit program allows the licensor to be proactive rather than reactive. Your audit program will be part of a strategic effort to ensure compliance with the terms of your agreement and demonstrate that you are willing to protect your rights. Audits can actually help your licensees as well by uncovering and fixing problems in their financial accounting systems.

When you are auditing your licensees, selection of an auditor is important. The auditor should be someone who has experience with royalty auditing, as opposed to financial statement auditing. In addition, the licensor should feel that the auditor will perform his or her work in a professional manner and represent the licensor in a positive way. It is very important for the auditor to understand that the licensor's relationship with the

licensee is an important business relationship. Therefore, choose an auditor whose conduct will enhance, rather than hurt, the alliance between the parties to the license.

The audit itself is generally performed in three phases:

- preparatory work completed off site
- site visit
- wrap-up work and delivery of the audit report

Royalty Audit Phase One: Preparatory Work

The licensor should first write and call the licensee to provide notice that the audit clause is going to be invoked. Again, if there has been good communication with the licensee since the inception of the license, the audit notification is easier because the licensee knows that auditing is a regular function of the licensor's program.

Prior to visiting the licensee's facility, the auditor should review all royalty reports and other information that has been received by the licensor. The auditor should also review the license and discuss the licensed technology with the licensor (and the inventor, if possible) to better understand the technology. The auditor must understand which of the licensee's current products utilize the licensed technology and are subject to royalty payments. This review allows the auditor to prepare questions for the licensee and have them answered prior to visiting the licensee's site so that time on site can be utilized as effectively as possible.

The auditor should also prepare an information request for additional materials from the licensee so that the auditors can familiarize themselves with the licensee's accounting system, financial reports, organizational chart, product line, and other relevant materials. The licensor should be sure to provide the auditor with contact information for a representative of the licensee that can assist during the site visit. Your auditor should not have to spend time during the visit looking around for someone to answer questions.

Royalty Audit Phase Two: Site Visit

The site visit will necessarily be limited in time so the auditor should plan his or her visit so that he or she can be as efficient as possible. The importance of a site visit should not be underappreciated. A site visit is critical as it allows the auditor to uncover many things that may have gone undetected. There is little substitution for face-to-face communication. The auditor should spend time on site working to reconcile the documents received from the licensee to the royalty reports.

The auditor should also gain an understanding of the licensee's accounting and reporting system so that the licensor can understand what types of reports can be generated from the system. Along with this understanding should be an understanding of the financial reporting, production, and sales-recognition processes. This will also help with the desk-audit process in the future.

The auditor should keep good records of all the people he or she talks to and be as persuasive as possible in getting staff members to talk to them. Finally, your auditor should represent you in a professional manner and be able to do his or her job at the licensee's site with minimal disruption to the licensee's business.

Royalty Audit Phase Three: Wrap-Up Work

In this final phase, the auditors take the information gathered during the site visit and apply it to the calculations so that the correct royalty payments can be determined. It is often discovered during this phase that there are new products sold by the licensee that may not be included in the royalty calculation. Due to the complex nature of many licensed technologies, the auditor is not the best person to determine whether a product being sold by the licensee falls within the scope of a license agreement.

However, the auditor can include such products in his or her calculations, and a technical expert can review the products at a later date to see if they should be included. This type of situation is more common in patent and copyrighted licenses as opposed to other intellectual property licenses, due to the fact that it is more difficult to determine whether a patent is included in a product or if a product is a derivative of a copyrighted program than it is to see whether a trademarked action hero is printed on a tee shirt.

During the wrap-up work, the licensor should take steps to prevent future reporting problems. One way to help eliminate unintended reporting problems is to implement a royalty-reporting system as discussed earlier in this chapter. Again, outside consultants can be called on to prepare these types of overview packages. During this phase, you will also begin negotiations to collect any underpayment uncovered by the auditors. Licensors should develop a systematic process for immediate follow up and settlement of the auditor's findings so that any negotiations with licensees over disputed payments do not continue for extended periods of time.

Auditor Selection and Costs

The costs of an individual audit can vary dramatically based on the complexity of the license as well as the number of physical locations that need to be visited. Universities are often tempted to use internal auditors to perform this function. While this may seem to be an economic alternative, if the university auditors do not have the appropriate experience, the university may lose its chance to recover the royalties it is due. Most license agreements only allow for one audit of a specific period, therefore, if you choose the wrong auditor, you may forfeit your audit rights.

The auditor selection should be heavily weighted to an auditor who has performed similar services. Also, make sure that the auditor you interview is the specific person who will be performing the work and not a figurehead. There are numerous audit and consulting firms with royalty-auditing capabilities with varying price structures such as fixed costs, hourly fees, contingency relationships, or a hybrid approach. A reputable auditor will review the license with you prior to being engaged to assist you in the cost-benefit analysis.

Communicating with Your Licensee

The common thread woven into all components of a license-monitoring program is communication with your licensee. This communication should take place throughout the life of the license whether or not problems arise. Upon initiation of the monitoring program, send a letter of introduction to all of your licensees so that each one is aware of the program and no one feels singled out for scrutiny. You should call your licensee contact after you receive a royalty report to let he or she know you received it and to thank him or her for sending it in a timely fashion as well as discussing any new developments of

the licensee. Call your licensee after a desk-audit procedure uncovers a problem with the way the calculation is being performed. This communication can only improve your licensing relationship.

Conclusion: Benefits of a Sound Monitoring Program

Establishing a monitoring program is a necessary part of licensing. Audits should be performed early in the licensing relationship so that both parties can eliminate potential ambiguities of the contract without having a financial dispute present to cloud judgment or minimize recovery due to settlement negotiations. When there appears to be a problem with the way the contract is being interpreted, contact your licensee or call in your auditors and take care of it immediately.

The irony is that delaying, while often intended to save money or the licensee's feelings, will almost always cost a considerable amount more than if the audit was performed earlier.

Working with Patent Counsel and Managing the Patenting Process

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Introduction

A primary mission of research institutions is to create knowledge through research and to transfer that knowledge to others through publications and teaching. When such knowledge has commercial applications, it is the responsibility of the technology transfer office to identify its value, convert it into a manageable form—intellectual property—and transfer it to industry where it can be developed into products and services that will ultimately benefit the general public. Technology transfer offices rely on patents as the primary form of intellectual property for capturing the value of such useful knowledge in the form of inventions and transferring that value to industry through licensing.

Obtaining a patent for a novel technology is a significant investment for universities. Patent protection for a single technology can easily cost $15,000 to $20,000 for just U.S. rights and more than $100,000 to secure rights in just a few foreign countries. Universities make these investments *(a)* because it is necessary for the technology transfer process—companies typically will not invest in the commercialization of a technology unless they will have a period of exclusivity for marketing their product under the protection of a patent—and *(b)* because some patents have the potential to be worth millions of dollars in future licensing revenues. It is not unusual for the investment in patents to be the single greatest expense for a technology transfer office and far exceed an office's operating expenses.

Securing and Working with External Patent Counsel

Due to the critical nature and significance of the investment in patents, technology transfer offices must pay particular attention to managing the patenting process. This involves selecting appropriate patent counsel, reviewing applications before they are filed, and monitoring prosecution to ensure that the full scope of the disclosed invention is captured in the final patent and that the costs of securing the patent are within a reasonable range. Moreover, the process for obtaining a patent is complex; it usually involves external patent counsel, takes a number of years, and involves many deadlines and a variety of documents. Technology transfer offices must allocate a significant amount of their internal resources to this process, including managing patent-related documentation and accounting for all related expenses.

Checklist/Summary

Things to consider when selecting patent counsel:

- Technical expertise
- Legal experience
- Quality of customer service (if used previously)
- Conflicts check complete
- Size of the firm
- Location
- International practice
- One-firm-versus-many strategy

Selecting Patent Counsel

The person who ultimately has the greatest impact on the quality of a patent, other than the inventor, is the patent attorney, who is responsible for drafting the initial application and leading the prosecution. Finding and selecting the appropriate attorney and law firm is the first step in the patenting process.

Obtaining the name of a patent attorney can be very easy. Law firms make an effort to market their services by attending and sponsoring networking events and often directly contact technology transfer offices to solicit business. Typically, the problem is not getting the name of a patent attorney; rather, it is selecting the appropriate attorney from the many attorneys that you find or that might contact you. If, however, you are at a loss for an attorney's name, the U.S. Patent Office (http://www.uspto.gov) lists all attorneys and agents registered to file and prosecute patent applications. That being said, the best way to find an attorney is to ask your general counsel, other technology transfer offices, or other attorneys whom they would recommend.

Once you have identified a number of attorneys that seem qualified, the next step is to request information about the attorneys and their firms so you can assess whether or not each attorney and firm are an appropriate match for you, your technology, and your inventor. There are several criteria to use when considering an attorney.

Technical Expertise

The first thing to consider is the attorney's technical background. You want to have an attorney who can easily understand the invention that will be described in the patent application. For some inventions, this is more critical than others. A good understanding of the science related to the invention will help the attorney better interact with your inventor and he or she will have a better understanding of how to broaden the claims and make good arguments for broader claims with the examiner. Furthermore, you do not want to pay an attorney for the time it takes to educate himself or herself on the background of the related science if you can find an attorney who is already well-versed in the scientific discipline of your invention.

Legal Experience

Legal experience is another factor to consider, especially when working with a sole practitioner or very small firm. In larger firms, less-experienced attorneys can rely on the counsel of more senior attorneys. In fact, a senior attorney will typically review the work of less-experienced attorneys before documentation is submitted to the patent office. The scope of the final patent is often a function of how well claims are drafted, the strength of arguments made in response to office actions, and the strategy pursued during prosecution; and experience is a key factor in performing these functions well.

Customer Service

It is important to work with attorneys who provide good customer service to your inventors and to your office. Patent attorneys are often perceived by inventors as an extension of your office, so any negative interactions between an attorney and your inventor will reflect poorly upon your office. You also want an attorney who is responsive to you and your inventor, keeps you well-informed regarding the status of the case, and provides you

with advice and recommendations for prosecution that enable you to make informed decisions. If you are not satisfied with the service that you are receiving from your patent attorney, do not hesitate to transfer the case to another attorney or law firm.

Conflicts Check

When you indicate that you would like to engage a new law firm to file a patent application, the law firm will perform a conflicts check to ensure that it is not already representing a client in a way that could be perceived to be a conflict with representation of your institution. In the event that a conflict is identified, the law firm will so notify you and specify that it is unable to represent your institution. In some cases, however, when the conflict can be appropriately managed, the law firm will agree to represent you provided that you agree to waive any liability associated with the conflict. For cases in which the conflict is significant, you will be required to find representation from another law firm.

Selecting a Law Firm

Since the patent attorney is typically part of a larger firm, it is necessary to take into account the nature of the law firm and consider a general strategy for selecting law firms.

Small Versus Large Firm

Size is one criterion that should be considered when selecting a law firm. As described above, larger firms typically have more support infrastructure to assist their attorneys. They also offer a wide range of expertise due to the large number of attorneys employed, so you might be able to use one firm for a variety of applications. Smaller firms that specialize in one technical area, also referred to as *boutique firms,* should be considered if your invention is in their area of expertise. Boutique firms often offer a higher level of experience that you would find in a large, more general firm (within a specific technical area), but also offer some of the benefits of a smaller firm such as flexibility and lower cost. Smaller firms are often looking for new business to grow, so they might be willing to make special deals that could save you money. Another thing to consider when selecting a law firm is the breadth of services that you want from the firm. Larger firms tend to have specializations in a variety of areas such as interference work, infringement actions,

and license negotiations that might not be offered by smaller firms. If you feel that you might need these services, you might want to consider working with a larger firm.

Location

Another criterion to consider when selecting a law firm is its location. While it is not necessary for patent attorneys to have face-to-face meetings with your inventor, such meetings can be more productive than telephone conversations and e-mail correspondence. At times, patent attorneys request meetings with patent examiners to resolve issues quickly and in an efficient manner rather than continue through additional iterations of office actions and responses. For this reason, many firms have branches strategically located in Washington, D.C., and Northern Virginia around the U.S. Patent Office. Since it is expensive to pay attorneys to travel, selecting a firm that is close to you or to the U.S. Patent Office could improve the efficiency of filing and prosecution of an application and save you money.

International Connections

Should you anticipate filing in foreign countries, you should consider a firm with a strong international practice. When you work with your firm to file international patent applications, e.g., at the national phase of the PCT (Patent Cooperation Treaty), your firm will work with a foreign associate for the country in which you want to file. Since your firm will be using a foreign firm to represent your interests, you should ask your law firm about its foreign associate firms. The foreign firm will be representing your interests in the patent application in the foreign country, so you should ensure that its attorneys are well-qualified to do so.

As an aside, you should understand that foreign countries often have a very different patenting process relative to the United States. Make sure that you are informed of the process in the foreign countries in which you file to ensure that you can make appropriate decisions about the foreign prosecution.

One Versus Many Firms

There are various strategies for engaging law firms. One strategy is to minimize the number of law firms used for your patent portfolio. With more business being sent to fewer firms, you become a more important customer for those firms and often have more leverage when it comes to demanding flexibility, discounts, and service. If you are using fewer firms, you should consider larger firms that have a wide range of technical expertise for the variety of inventions for which you might want to have a patent application filed. The opposite approach is to use a larger number of firms placing more weight on finding the ideal attorney for a specific technology; provided, however, if your portfolio gets large, it can be difficult to manage the approval processes and associated administrative tasks for working with a large number of firms.

Engaging an Attorney/Law Firm

Once an appropriate attorney and his or her law firm have been identified, the next step is to engage, or hire, the new attorney to draft and prosecute an application. For some institutions, especially state or federal institutions, hiring a patent attorney is the same as hiring any service provider, and purchasing rules require that a bid process be performed. There are pitfalls to selecting an attorney solely by lowest cost, which is often how the bidding process is won, so you need to ensure that you are not sacrificing quality for a little less cost. Less-experienced attorneys might be cheaper, but their work might not be as good. On the other hand, experienced attorneys could quote you a price for an application and then use that quote as a constraint for the amount of time that they will devote to the application. In both cases, you could make a significant investment in a patent that does not achieve the quality that you desire. Many university systems have a mechanism by which you can make a *sole source* justification, thereby avoiding the pitfalls of a bidding process. In addition to purchasing considerations, some institutions must have new attorneys or their law firms approved by their general counsel or attorney general before a new attorney or law firm may be engaged. It is important to understand the contracting process at your institution before you contact a law firm.

Engagement Letter

Asking the attorney that you have selected to draft an application can at times be as easy as picking up the phone, especially when the law firm or attorney is one that you have used in the past or one with which you already have a pre-established relationship. While this is the easiest way to engage an attorney, it could limit the control that you have over the process. It is better to have a clear understanding how your institution and the firm will work together. This understanding is often documented in an *engagement letter.* When you hire a law firm for the first time, it is likely that the law firm will ask you to sign an engagement letter prior to doing any work. These letter agreements are often fairly standard, but they typically do not include details that address the specific interests or requirements of your institution. While not required, you might want to consider using your own letter of engagement regardless of whether or not the law firm asks you to sign one or modifying the attorney's letter to ensure that it appropriately addresses any issues that you might have.

Checklist for Engaging an Attorney

- Engagement letter *complete*
- Documented instructions for patent attorney sent
- Budget estimate
- Prior art search requested (Yes or No)
- Inventorship determination requested (Yes or No)
- Deadline for draft application provided
- Information/documents provided

There are a number of things that you should consider incorporating into your engagement letters including requirements for budget estimates, details about invoicing, and the role of the inventor in the application and prosecution processes.

Requirement for a Budget Estimate

It is a good idea to agree upfront on estimates for the anticipated costs for drafting new applications and to include this requirement in an engagement letter. The cost of a new application will depend on a variety of things including the nature of the technology and the amount and quality of the information that will be provided to the attorney. If you know what would be considered a reasonable cost for filing a patent application in a specific technology area, you might want to propose a specific budget to have an application

drafted and then ask if the attorney can agree to draft it for that price. It is also prudent to include a clause in the engagement letter that requires the attorney to obtain your approval prior to exceeding the estimate by more than 5 percent. If an attorney cannot agree to an estimate that you feel is reasonable, consider finding another attorney who can give you a reasonable price. As previously stated, while it is important to keep in mind the costs of the patent, it is important not to sacrifice quality for a slightly lower cost.

Invoicing Procedures

Information about billing and terms for payment are typically addressed in engagement letters provided by law firms, but you might have specific requirements that are not addressed in a law firm's letter. For this reason, you should state any such requirements in the engagement letter that you send to an attorney or have it included in the law firm's letter. You should require that invoices contain sufficient detail so you can determine if you are being charged appropriately. Such detail should include a description of the work performed, the name of the attorneys or other individuals performing the work, their billing rates, and a listing of all fees and charges included. With this information, you can review invoices to ensure that you are not charged twice for the same thing and that the time spent for each task is reasonable. Experience with reviewing invoices will help you to determine what is considered *reasonable.* You will also see how much time was spent by the attorney you hired compared with other attorneys or technical advisers who might have assisted with the application. If your office uses an invention reference or patent docket number, you should require that all invoices include your reference. This will save time with processing the invoices once they are received by your office.

Role of the Inventor

At times, confusion about the inventor's role in the application and prosecution process can create problems; therefore, it is necessary to clarify the roles of the inventor and the technology transfer office in the engagement letter. During the application process and during prosecution, it will be necessary for the patent attorney to have discussions directly with the inventor. This is the most efficient way to ensure that the patent is comprehensive and accurate. This could, however, lead to problems if the technology transfer office is not kept informed about the process. Inventors often build a relationship with the patent attorney handling their application and start making decisions that might not

be consistent with the strategy of the technology transfer office. It is important to let the attorney know that all relevant decisions about the application process will be made by the technology transfer office and not the inventor. It is also important to be kept informed of discussions and to be copied on all documentation being transferred directly between the inventor and the attorney. Specify in the engagement letter that you will be copied and informed of all interactions between the attorney and the inventor.

Instructions for the Patent Attorney

Once you and your patent attorney have reached agreement and executed an engagement letter, you will need to provide specific instructions to your attorney for each application that you want filed including an agreed budget estimate. This is especially true when you use an attorney for many years because that attorney might draft and prosecute several applications for you, and each of those applications might require different instructions. Instructions for attorneys can be provided by phone once an engagement letter is in place but should be followed up in writing via a letter or e-mail along with the agreed budget estimate.

Filing for a patent involves more than just drafting an application. It involves a number of other tasks including prior art searches and inventorship determinations. It is important to make sure that you are clear with your attorney with respect to the tasks that should be performed.

Prior Art Searches

When you send an invention disclosure to a patent attorney, do not assume that a prior art search will be performed unless it is specifically requested. If you provide some prior art documents with the description of your invention, your attorney may assume that you have already performed an appropriate prior art search and will not conduct another search. If you want a more complete search performed by your attorney, specifically request it.

Inventorship Determination

It is not uncommon for situations to arise in which faculty are included as inventors for political reasons or because faculty members equate their name on a patent to having

their name on a scientific paper. In either case, it might be difficult for the technology transfer office to make an inventorship determination; moreover, inventorship is a function of the claims that are included in an application so a determination cannot be made until claims are drafted by the patent attorney. Attorneys will often assume that the inventors listed on the disclosure are the true inventors on the associated application unless advised otherwise. Having the incorrect inventors listed can invalidate a patent, so if you want the inventorship checked, your engagement letter should specify that you want an inventorship determination made once claims have been drafted for your application.

Deadlines

Deadlines are a key feature of filing a patent application. You will always want to indicate a deadline for the filing of a patent application. If, for example, you request the conversion of a provisional application to a utility application or there is an upcoming publication bar date, the attorney will need to be made aware of the required filing date for the utility application. In all cases, you should request an earlier due date for a first review of a draft application. Without such a deadline, attorneys often wait until what seems to be the last minute to work on an application. The problem arises when the inventor, who might be traveling or working against a grant deadline, is not available or does not have sufficient time to review the application and provide proper comments before the required filing date. It is better to specify an initial draft by a date at least a couple of weeks prior to the deadline, so there is sufficient time for the attorney to work with the inventor to revise the application.

Monitoring the Application and Prosecution Process

Once the engagement letter has been signed, specific instructions have been provided, and the attorney begins drafting the application, it is important to monitor the process to control costs and ensure quality. The best way to control costs is to agree to a reasonable estimate before the work begins, as described above, but other steps can also be taken to control costs including performing prior art searches in house, providing the patent attorney with a sufficient description of the invention and prior art, avoiding unnecessary fees, and questioning unreasonable charges.

Prior Art Searches

Prior art searches are searches of the relevant scientific literature and prior patents and patent applications, and they are an important step for making the decision to even file an application. It is recommended that such searches be first performed by the technology transfer office or by a search service, which will likely be less expensive than having your patent attorney perform the search. Searches can be performed through the U.S. Patent Office's Web site (http://www.uspto.gov), i.e., for patents and patent applications, or through a search service or your institution's library for technical articles. The results of such a search should be reviewed by the technology transfer office to determine if the invention is truly novel and not obvious before making a decision to file a patent application. You do not want to waste money having an application drafted and filed just to find out during the prosecution phase that the invention is not novel.

Steps for Monitoring the Application/ Prosecution Processes and Controling Costs

- Perform prior art search prior to sending to your attorney
- Provide sufficient information to your attorney
- Avoid extension fees
- Question unreasonable charges
- Review applications before they are filed
- Monitor the inventor's relationship with your attorney

Provide Sufficient Information

Before making a decision to file a patent application, make sure that you have sufficient information to provide to the attorney, including a detailed description of the invention and all relevant prior art that you might have obtained during a search. Ideally, you will have a manuscript in electronic form that you can send to the attorney. Electronic manuscripts save you the costs associated with having the law firm retype the invention's description. It is not unreasonable for technology transfer offices to require the inventor to draft a manuscript, or equivalent, before deciding to file a patent application. This will ensure that the invention is fully conceived before beginning the application process and minimize the costs associated with the attorney extracting the invention from the inventor. If you request that an attorney draft an application from scratch, it will add significant costs.

Avoid Extension Fees

After an application has been filed and examined by the patent examiner, the examiner will send an office action to the patent attorney of record. The attorney will review the action and draft a response. The response is due back to the patent office within three months from the date that is issued. This time can be extended for an additional period of up to three months by filing a petition and paying a number of extension fees. There are two reasons that you want to make sure that you avoid any extensions of the due date for office actions, or any other responses due to the U.S. Patent Office. First, they cost money. Attorneys and your inventor will likely not be concerned with delays because the money is not coming out of their pockets. To minimize costs, the technology transfer office must keep track of these deadlines and ensure that the inventors work with the patent attorney so a response can be filed in time to avoid the extension fees. Second, delays could limit the life of the patent if prosecution takes longer than three years. When prosecution takes longer than three years due to delays in the U.S. Patent Office, patent terms can be extended for a period of time up to a maximum term of seventeen years from the date of issue. This patent term extension will be reduced by the number of days that prosecution was extended by you, including deadline extensions.

Question Unreasonable Charges

It is important to review all of the invoices that you receive from a law firm. In the event that you identify unreasonable charges on your invoices, you should contact your attorney and question the charges. Law firms process a large number of bills and, from time to time, do make mistakes in billing. If you raise a concern about the appropriateness of questionable charges, often the attorney will make an adjustment to the bill. Furthermore, the attorney will know that you are conscious of the charges and will be more likely to ensure that he or she is working within the limits of the agreed budget.

Review Applications before They Are Filed

As emphasized earlier, the quality of the patent application is of primary importance. Technology transfer offices rely on the expertise of the patent attorney who is hired to ultimately ensure a quality patent, but it is in the best interest of the technology transfer

office to monitor the process to ensure that the patent covers the applications of the technology envisioned by the office. This should begin with a careful review of the patent application and its claims before it is submitted to the U.S. Patent Office. You will want to review the claims to make sure that they are well-drafted and that they cover the scope of the applications of the technology that you envision.

Reviewing the patent application is also important to get a sense of the amount of work done by the attorney. You might want to compare the application with the manuscript that you provided to the attorney. A good attorney will take the description of an invention, which might be narrowly focused, and expand on the potential applications. For example, a manuscript that describes a novel gene sequence should be embellished by an attorney to cover, not only the gene sequence, but possibly the protein encoded by the sequence, an antibody to the protein, a diagnostic kit using the antibody, etc.

Monitor the Inventor's Relationship with the Attorney

Throughout the application-and-prosecution process, monitor your inventor's relationship with the patent attorney. You will want to make sure that your inventor is happy with the attorney to ensure that they will continue to work together in a productive manner. You must also ensure that your inventor cooperates with the attorney. At times, inventors can be very busy and unresponsive to requests for information and comments made by an attorney. It is important to avoid situations where an unresponsive inventor is a cause for increased costs or a lower quality application.

Alternative to Using External Counsel

The alternative to hiring outside counsel is for the technology transfer office to hire a staff attorney who is dedicated to drafting and prosecuting applications. While this can reduce patent costs for technology transfer offices that file a significant number of applications per year, there is still the challenge of finding a staff attorney with technical expertise in the various technical areas in which invention disclosures are made. For this reason, hiring this type of professional is really only an option for larger offices that file a large number of applications in a limited number of technical fields.

Special Issues Related to Jointly Owned Patents

When a patent is owned by more than one party, extra steps must be taken to ensure that your interests are protected. This is especially the case when a company or licensee is a joint owner in a patent and wants to take the lead with prosecution. Additional steps must also be taken when an invention is owned by more than one university or research institution.

When a Company/Licensee Is the Joint Owner

When a licensee takes the lead with filing a patent application, it is important to ensure that the application will be prosecuted as broadly as possible. First, you want to ensure that you are timely copied on all patent-related correspondence and that all documents filed with the U.S. Patent Office meet with your approval. A licensee might have an interest in limiting claims to minimize the royalties that it would have to pay, while it is in your best interest to ensure that the patent is drafted as broadly as possible. Second, you should ensure that you have the right to hire separate counsel to represent your interests in the application in the event that you cannot reach agreement on the strategy for prosecution or if you feel that the application is not being prosecuted in your best interests. This situation should only arise when a patent is jointly owned by your institution and the company. For solely owned inventions, the owning entity should always take the lead with prosecution to avoid these issues.

When another Institution Is a Joint Owner

Difficulties can also arise when more than one institution is an owner of a patent application. Typically, the institutions involved will enter into an interinstitutional agreement that will designate one institution that will take the lead with regard to patent prosecution and specify how costs and revenues will be allocated. To maintain appropriate files, it is again important that you are copied on all patent-related correspondence and have an opportunity to provide comments. It is often easiest to have the law firm provide copies to all of the parties. This costs a little bit more than having one institution make the copies and mail the documents to the other institutions, but it is often more efficient.

Managing Patent Documentation and Accounting

You now have some basic guidelines for working with patent counsel and monitoring the patent process. As you go through this process, you will accumulate draft applications, invoices, and other correspondence related to the prosecution of your patent applications. You will need to set up a filing system to store and organize all relevant documentation and an accounting system to track patent-related expenses.

Patent Filing Systems

Each technology transfer office has a different system for organizing its patent files. Some offices use special three-fold folders for patent-related documents and correspondence while others use basic expanding files. Some offices keep their invention-disclosure files together with their patent files and others keep them in separate locations. There is no perfect system. The various options and the advantages and disadvantages of each are presented here in an effort to enable the reader to choose a system that works the best for his or her institution.

When setting up a filing system for a new office, the first thing you must decide is how to track each patent. Most technology transfer offices use their disclosure reference number for tracking corresponding patent applications. The challenge with this approach occurs when multiple patent applications result from a single disclosure as a result of continuation or divisional applications. An alternative approach is to use a separate patent reference system that identifies each patent in a patent family. Numbering schemes can range from very basic to very detailed. The more detailed numbers obviously give you more information, but long strings of letters and numbers can be easily mixed up.

After choosing a specific naming convention, the type of file folder to use for patent-related documents and correspondence is the next decision to be made. Some offices use the special three-fold patent folders, which help keep things very organized but are more expensive than other options. Other offices use multipart folders with fasteners or basic expanding (pocket) folders. These options are less expensive but require more effort to ensure proper organization. Whichever type of folder you choose, it should be durable

and it should have at least one section where important documents, such as original assignments, can be fastened down for safekeeping. You should have another section in your folder where you can keep all patent-related correspondence in chronological order. This should also be fastened down so you can easily review the prosecution history by looking at one place in the file.

The type of folders that you choose might also be influenced by whether you want to store patent documents and its corresponding invention disclosure together in one location or whether you want to store patent documents in one location and disclosure information in another. The issue of individual file location is a matter of preference and also a matter of how patent matters are handled in your office. Offices that have a dedicated staff to manage all patenting activity for an office are more likely to have a patent filing system separate from their disclosure filing system. You might also consider separate filing systems if your patent folders are a different size, i.e., legal, than your disclosure folders, i.e., letter. Special provisions should be considered for storing the ribbon copy of issued patents. Storing this important document in a fireproof vault or safe is recommended.

As your office grows, you will no doubt want to inactivate cases and you will eventually run out of space to store all of the materials. In this case, you should consider an archive strategy such as offsite storage. Alternatively, some technology transfer offices are attempting to store everything, including inactive case files, electronically. This is a growing trend and something to consider when setting up a new filing system.

Tracking Attorney Correspondence and Patent Expenses

Most technology transfer offices use a database system to track pertinent information about disclosures, related patent filings, and all associated costs. Ideally, the same database will track correspondence from patent attorneys, such as office action response due dates and the like. Alternatively, you could choose to use a separate docketing database system, spreadsheet, or calendar to keep track of response dates. Such automated systems are necessary as patent portfolios grow. Having a dedicated person, who is responsible for patent-related matters, manage these systems seems to be the norm in large offices, but will probably not be possible for a small office. Small offices need an automated system

because they are not likely to have a dedicated person to monitor deadlines and follow up with inventors and attorneys. In either case, it is important to monitor patent activity and its associated deadlines.

Tracking patent expenses is critical to every technology transfer office. The basic idea is to assign all such expenses to a related disclosure or patent reference number and then track those expenses to be reimbursed by a licensee or to recoup the patent expenses from license payments and running royalties. The ability to track expenses in this manner is an important feature of any patent database system. Selecting a database management system for your technology transfer office is one of the most important decisions that you will make. There are basically two types of systems, those that are custom-built and those that are purchased. Many factors will influence your choice, including your budget; your internal technical support, especially if you develop your own system; and the support and training that a vendor will provide if you decide to purchase a commercial system.

As mentioned above, tracking patent expenses is important. Transactions entered into a database are the easiest to monitor. The person monitoring the database is quite often the person who is responsible for ensuring that the bills are paid. After an invoice is approved for payment, the responsible person will then forward it to the financial services group within the institution for payment. Invoices can be processed in batches or just as they come in.

If the expenses are to be reimbursed by a licensee, the responsible person, again quite often the same person managing the database, should give notice to the licensee that this expense has to be reimbursed. Licensee payments for reimbursed patent costs should be monitored as closely as royalty payments. If the invention is jointly owned with another institution that is sharing patent costs, the other institution should be notified of the invoice just as you would with a licensee.

Maintenance Fees and Annuities

Several options exist for tracking maintenance fees and annuities, which accumulate for issued patents and foreign applications. Some patent firms will track those payment dates

for you, but there are also annuity services available, such as Computer Packages Inc. Annuity service firms charge by the case and will give volume discounts. The more cases that you have, the less you pay per item. Patent firms often contract with annuity service firms, so if you have enough volume, it will probably be less expensive to deal directly with an annuity service. For small offices, annuity service firms are usually not a cost-saving option.

Regardless of the external tracking system used, most technology transfer offices still maintain some type of internal docket system for monitoring maintenance fees and annuities. If you pay the maintenance fee directly rather than having your attorney or a service pay, you will save money, but your institution will be liable if rights are lost because an annuity was not paid. It is still recommended that fees and annuities be tracked by a law firm or annuity service. This is especially important if the patent is licensed, in which case, there is more risk associated with missing an annuity deadline.

Conclusion

Patents are the main assets on which all technology transfer offices rely for their operations. Not only do technology transfer offices spend a large portion of their budget on external patent expenses, but significant internal resources are allocated to managing the patent process and tracking expenses. It is a complex process amounting to a significant investment by institutions, and technology transfer offices must be diligent with managing it and have an appropriate infrastructure established so they can manage it effectively.

Electronic Management and Tracking

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As the number of universities and colleges involved in intellectual property (IP) management, technology transfer, and commercialization increases, so does the need for additional resources to perform these activities.

A recent *AUTM Licensing Survey*™ survey[1] noted that, over the past fifteen years, the total research expenditures for U.S. universities, hospitals, and research institutes increased threefold. As a result, the number and variety of documents (invention disclosures, patent applications, legal correspondence, patent files, licenses, and various types of agreements) handled by technology transfer offices has exploded. Furthermore, the number of stakeholders has grown and the need for timely decision making and/or the harmful consequences of not doing so has amplified. All of this has helped fuel the demand for bigger and better electronic management and tracking systems (EMTSs). In response, suppliers have developed systems ranging from simple, off-the-shelf, stand-alone products for database management to sophisticated, customized, state-of-the-art network solutions to serve almost every need. Several vendors are taking advantage of the Internet and offer subscription-based services on the Web. An increasing number of small- to medium-sized offices are replacing their spreadsheets and flat-file databases that they have used in the past for data keeping and management with systems based on a relational database, using complex algorithms and expert rules. Today's systems offer almost any service for a technology transfer office: automated document generation, document tracking, assistance with decision making, automatic reminders, computerized filing, and much more.

Considerations for an EMTS

There are more than one hundred EMTSs and IP software systems available to the technology transfer community today (a fairly comprehensive list of IP software available on the market today can be found at http://www.ipmenu.com/ipsoftware.htm). Most of these

systems have been developed and are sold by boutique shops that offer specific solutions servicing niche markets. Several companies are trying to build modular systems to mimic one-stop shopping, however, as of today, there is no system that can do everything for everybody in the field of IP management and technology transfer. The IP menu Web site classifies IP software resources according to their scope such as IP analysis, IP drafting, IP filing, IP management, and IP miscellaneous (covering topics from invention assessment to patenting cost estimation to updates on worldwide IP legislation).

The question is how to pick the most appropriate EMTS for a technology transfer office. While cost and budget factors often are the most important and over-riding concerns (and often the determinants) in such a decision, there are other important factors that need to be considered by technology transfer managers prior to deciding on the EMTS. Consideration of these factors can help make an informed decision and assist in navigating through the myriad choices in the marketplace today—including the make-or-buy decision (discussed later).

It is critical to do your homework because, once a system is installed and put in use, replacing or modifying it could be even more expensive than the original purchase. Expenses for modifying or replacing could include not only direct costs, but also indirect expenses of user training, data corruption, differing hardware requirements, programming requirements, etc. Furthermore, a thorough and an educated approach can help lower the cost of purchase, alleviate future dissatisfaction, improve acceptance by the users, shorten the project time frame, and provide for future scalability.

The considerations listed below are for guidance to the IP manager and/or technology transfer professional when evaluating EMTSs.

Scope of Activities

One of the first steps is to clearly define the objectives to be achieved and the purpose of incorporating the EMTS. The manager (or the decision-making team) must understand and define the activities relevant to the specific organization within the overall realm of IP management and technology transfer field. For example, a research institution or a university might need a system for invention disclosure management, while an attorney's

office might need an IP docketing and electronic patent-filing system. It is critical to layout the scope or the breadth of the organizational needs, maybe itemize them in order of importance, and then seek the appropriate solutions to meet those needs. Some of the common variables are listed below.

Invention Disclosure Records Management

How important is invention disclosure records (IDR) management? What can the EMTS do or should do? Would it be simple storage and retrieval of information, whereby information from paper copies will be re-entered into the database, or electronic generation of IDRs that can directly populate a database? Since research organizations (universities or otherwise) vary widely in the quality and quantity of data captured on their IDRs, for any automation, it would almost always necessitate some form of customization. Does the IDR management system need to include the ability to communicate with researchers and their technical managers or legal staff (especially if they are off site)? How will drawings and publications related to IDRs be stored and in what form?

Intellectual Property Management

What critical services are required for IP management? For example, docketing, IP maintenance, prior-art searching, drafting, filing? How critical are international IP management features of the system? For example, if the university's IP portfolio contains mostly U.S. patents, then a system designed to manage European patents might not be required. What is the most common form of IP in the portfolio—patents, trademarks, copyrights, service marks, or mask works? For example, if most of the IP is patents only, then trademark management may not be relevant.

Deal Management

If an organization has many agreements (joint research contracts, licenses, material transfer agreements [MTAs]), then a module that can assist in follow-up and auditing may be useful. What are the most common forms of agreements? Licenses, sponsored research, MTAs? If the university has just a few agreements, then the deal-management feature may not be very relevant.

Contacts Management

How important is managing contacts (internal staff, researchers, and/or external stakeholders) through the EMTS? Although most systems include some basic functions, more sophisticated tools, such as e-mail reminders and automatic correspondence generation, may not be included. If these functions are important, it is critical to keep them in mind, as well as how easily the system can be updated. Finally, if there is a system in place, data-transfer issues might need to be reviewed.

Revenue/Expense Management

Accounts receivable, accounts payable, royalty tracking—are these functions handled by the technology transfer office or the accounting office? If it is the latter, then does the EMTS need to send reminders when payments (for example, patent-maintenance fees) are due? For international agreements, can the EMTS convert foreign currency into U.S. dollars (useful for reporting)?

Functionality

Once the needs and scope are defined, the manager must decide the functional requirements of the EMTS. This will depend a lot on the nature and structure of the technology transfer office. For example, a small office with less-experienced staff might need a system that has more built-in intelligence and automation, while an office with more-experienced people handling a large amount of data might look for a system that offers improved reporting capabilities. Some of the items to consider are listed below.

Information Warehouse/Organization

How easy it is to enter and retrieve information or correct, change, and update it? How will the stored information be organized? How will the information be archived? Although this functionality will depend a lot on the scope of the system (which dictates the amount and the type of data to be handled), it is an important consideration for new technology transfer offices.

Reporting

Most systems offer a set of predefined reports. Are these sufficient, or, if not, then how easy it is to create customizable reports? Does the system offer statistical and graphing capabilities?

Intelligence

Many systems have built-in expert rules that help prevent critical mistakes and offer advice on IP management. For example, the system might ask questions about prior publications when entering a new invention disclosure or check for correctness of a value entered for patent-maintenance fees. Does the system have the ability to cross-reference related agreements and/or documents? Several Web-based systems provide links for additional information. What areas of expertise does the system need to provide? How will the system intelligence be kept up to date?

Automation

Consider the tasks that need to be automated such as generating reports, creating form letters, performing routine calculations, sending e-mail reminders and/or warnings. Is the system pro-active or reactive (i.e., on command only)?

Technical (Information-Technology Related) Considerations

The key information technology (IT) components of an EMTS are: data storage, data-management tools (algorithms and rules for data manipulation and retrieval), security controls, graphical user interface (GUI), and communication protocols with other programs and computers. It is the variances in these that differentiate various systems in their scope, functionality, technical features, and, eventually, the cost.

The level of technical considerations of an EMTS will depend largely on its scope and functionality. For a small, off-the-shelf package, technical considerations may be minimal, however, for a large system or a customized system to be used by multiple users, IT-related technical considerations could be substantial. The involvement of internal IT staff may be necessary to resolve issues such as those listed below.

Deployability

What will it take to deploy the new system or install it in the current IT infrastructure? What about the time to populate the new system with current data, training for employees, data-migration issues (if applicable), connectivity issues with current hardware, etc.?

Maintenance

Who will maintain the system and how will it be done on a regular basis? Who should the users call with problems and questions, i.e., who will provide technical support? How will changes be communicated to all users? Who will be responsible for fixing bugs? Who is responsible for periodic backups, and where and in what form will the data be stored?

Upgradeability

Can the system handle upgrades? This is especially relevant if the organization is planning changes in its operating system or platforms. Will the EMTS work on the new platform? What changes might be required and who will be responsible for making them? Does the vendor offer a system that can operate on multiple platforms?

Modifiability

Does the EMTS come with a software development kit (SDK) that would allow some level of customization? Does the technology transfer office have access to staff with the skills necessary to use the SDK?

Compatibility

Is the EMTS compatible with other existing programs and within the current computer system? A review of the new system platform and architecture as well as data-transfer issues should be conducted.

Security

Consider the security of data, correspondence (internal and external), user permissions (read only, ability to change/modify critical data, and to add other information such as marketing related).

Connectivity

Who will connect with the EMTS (discrete independent users or distributed multiple users on a local area network) and will they be need Internet connectivity? Who are the people who need to communicate on technology transfer-related matters and what type information do they need to share?

Web-Based Application Service Provider

Web-based application service provider (ASP) solutions offer their own pros and cons. While they can help alleviate some of the considerations, they can also increase other concerns. For example, ASP solutions can help reduce, or even eliminate, maintenance and upgradeability issues (since it is done remotely by an independent provider). However, they can raise concerns over security and trust issues with respect to data compromise and/or data leakage. An advantage of ASP services is that they are generally subscription-based (pay as you go) and that helps reduce upfront acquisition costs.

Other Considerations

Besides the considerations mentioned above, there are other factors that are equally critical while choosing an EMTS. These considerations really require a thorough examination and often can make or break a decision.

- *Ease of use:* Quite often, in the zeal to add features and capabilities to the software, vendors overlook a simple concept—how easy it is to use their product. As you test drive EMTSs, think about how many clicks it takes to perform simple tasks, how descriptive the screens are, how intuitive navigational capabilities are, etc.
- *Vendor experience:* Find out how many systems the vendor has installed and are currently in use, get a list of current and past customers, ask around to find out about the vendor's reputation. If you can, contact some of the vendor's current customers and ask them about their experiences in dealing with the vendor and the product.
- *Vendor stability:* As the EMTS industry evolves, mergers and acquisitions will rise, and it is important to evaluate the ability of the vendor to stay in business and be available for product support.

- *Urgency of need:* How urgent is the technology transfer office's need to incorporate a system? If the need is not urgent, it may be prudent to wait for an upgraded version or conduct additional due diligence.
- *Secondary services:* How are the after sales and technical support from the vendor? Is support available 24/7? Is it included in the total package or is there additional cost?

Mini-Survey Results

A mini, informal survey of twenty-five randomly selected universities (mostly small to medium sized) was conducted to assess the relative importance of the above-mentioned considerations in each category.

Not surprisingly, budget and cost were the top considerations. However, minus that, the other two most important considerations in each category as indicated by the respondents are shown in the chart.

Category	No. 1	No. 2
Scope of EMTS	IDR management	IP management
Functionality	Information organization	Reporting
Technical	Maintenance/upgradeability	Compatibility
Other	Ease of use	Vendor experience

The Make-or-Buy Decision

Depending on the organization and the scope of activities it is involved in, the decision to make or buy an EMTS is a major one that must be made early on. From earlier discussions, if the scope of the EMTS is pretty broad, if specific needs of the organization are not met by any available packages on the market, or if the need for customization is extensive, developing an in-house system may be an option.

However, this decision should not be made hastily. Although there are many benefits of building an in-house system, to truly evaluate the alternatives, a total-project-cost approach that makes business sense and provides return on investment information

should be taken. A careful and thorough analysis should be made to qualify and quantify as many variables as possible—a task easier said than done. The analysis can include:[2]

- Obtaining functional requirements of the technology transfer office
- Reviewing ready-made packages
- Determining the gaps and overlaps
- Estimating the effort to fill the gaps and quantifying it
- Conducting a cost-benefit analysis of the two alternatives

Since there are no silver bullets that can help a technology transfer professional reach a decision on whether to make a system or buy one, the following provides some generic guidance in evaluation of pros and cons of the two options.

Potential Advantages of Building an In-House System

Some of the advantages of building an in-house system are that it can:

- Address unique requirements and customization
- Include flexibility to make changes
- Provide better control of the project (time and cost)
- Require no or low initial capital outlay
- Produce low maintenance costs (which can be up to 10 percent to 20 percent of the purchase cost of an off-the-shelf system) since it can be done during off times
- Use in-house labor and expertise, if available
- Evolve (start small and grow as needs change)
- Be easier to get after-sales service and future product improvements
- Reduce integration issues with current systems
- Offer the rare-but-possible opportunity of creating a marketable product

Potential Disadvantages of Building an In-House System

However, building a system in-house also has some potential disadvantages such as

- Internal departmental politics
- Lack of domain expertise (in-house system developers may not have any knowledge of IP management or technology transfer issues that can define needs or solutions in the design phase)

- Best practices may not be represented
- Deadline creep (the tendency to change requirements thereby affecting project completion time and cost)
- Feature creep (the tendency to keep adding features)
- Poor (or lack of) documentation and instructions
- Potentially losing a critical individual that can create a major setback
- Accurately assessing the overall project cost
- Time (the time until the system is available for use is likely to be significantly longer)

Management and Maintenance of an EMTS

As with any electronic system, the basic requirements to keep an EMTS going and extracting maximum value from it depends on its usage and maintenance. Notwithstanding the technical/IT-related aspects in terms of computer upgrades, operating-system changes, and network modifications (which vary from system to system and installation to installation), other basic requirements are generic in nature.

- *Populating the system:* If the system has no data, it cannot produce results. Accuracy in populating the system is also critical, especially if the system is unsophisticated or unintelligent or if changes have been made in-house.
- *Keeping the system updated:* For example, currency-conversion factors or patent-maintenance fee changes are critical to deriving accurate results and feedback from the system. Furthermore, depending on the changes made by the vendor, it may be critical to update the system with the latest version.
- *Responding immediately to bugs:* If problems are discovered, the system must be immediately fixed. If the vendor publishes patches, they must be immediately installed since they usually contain fixes to known bugs.
- *Increasing user acceptance:* By providing good instruction materials and periodic training and being responsive to user issues/problems, you can ensure that users will gain confidence in the new system. It is not uncommon to see wonderful electronic systems fail in an organization simply because users do not want to “mess” with it. Implementing a new system can mean the culture of the organization must change and old habits modified.

- *Maintaining management support:* Management support, or lack of it, can go a long way in the eventual success or failure of any electronic system. Management can support an EMTS by demanding reports with updated information, reviewing system-usage statistics, talking about the system, and, of course, providing adequate funding for its maintenance.

Conclusion

The decision to incorporate an EMTS in an existing technology transfer office should not be taken lightly. Depending on the size of the office and the amount and type of data to be handled, besides cost, there are several factors that should be taken into consideration. While the danger of paralysis-through-analysis always exists, the importance of conducting basic due diligence not only of the various packages available on the market, but of internal needs and desires, cannot be underestimated.

Incorporation of an EMTS is a long-term investment (irrespective of the dollars involved) and should be treated as such.

Notes

1. Association of University Technology Managers, *AUTM Licensing Survey: FY2003* (Northbrook, IL: Association of University Technology Managers, 2004).
2. Rick Sherman, "Essential Guidelines for Evaluating Analytic Applications," *DM Review,* August 2003.

Record Retention for University Technology Transfer Offices

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Systematic control over the creation, volume, protection, discarding, and storage of documents is an essential element of the management of many business and academic operations. Much already has been written in this field, especially in view of the numerous well-publicized legal battles involving the destruction of documents. This article, however, focuses the discussion on the issues that a university or other nonprofit technology transfer organization should address when considering the implementation of a document retention policy. The discussion begins with a summary of reasons for having a retention policy and points to keep in mind when creating documents in the first place, followed by general and specific suggestions regarding the substance of retention policies.

The Need for Document Retention Policies

Technology transfer management might wonder why it should implement a document retention policy, and following are several reasons in support of implementation. A full understanding of these reasons, *throughout the technology transfer organization,* will not only enable the design of a policy best suited for that organization, but should, as discussed below, engender more cooperation from technology transfer staff and university administration.[1]

One main benefit from implementation of a document retention policy is saving space. Each technology transfer office will have to evaluate the situation at its particular institution, but for many technology transfer offices, storage space (especially space that allows for daily access to documents) is limited—and the space that is available can be costly. Because *(a)* university technology transfer efforts have greatly expanded over the past two decades and *(b)* technology transfer is likely to generate large amounts of paper,

many technology transfer offices are (or will be in the near future) short on storage space—so a reasoned decision must be made about what materials to retain and what materials to discard. A document retention policy should reduce the magnitude of these problems by reducing the volume of stored documents.

Second, a document retention policy is essential in allowing a technology transfer office to remain efficient and effective. Technology transfer office employees need to be able to quickly and efficiently find important documents. This is true for all businesses, but is an even greater issue for universities and other research institutions given, for example *(a)* the limited personnel with which many offices operate, *(b)* the frequency with which older documents must be referenced, *(c)* the time pressures inherent with licensing and patenting activities, and *(d)* the need to support and document technology transfer decisions and actions to the university's administration. Weeding out insignificant documents may be the only way to ensure the availability of crucial documents and prevent the technology transfer office from becoming engulfed in paper.

This problem may be particularly acute with respect to out-of-date documents, such as *(a)* drafts, *(b)* documents that subsequently have been corrected, and *(c)* documents making statements later determined to be inaccurate. Not only do the presence of such documents make it difficult to locate more current or more important documents, but they may confuse university or other personnel and/or may cause people to erroneously rely upon inaccurate information. A document retention policy, in combination with a well-designed filing system, should permit rapid access to the technology transfer office's most important and most accurate information, facilitating the work of technology transfer personnel.

Third, a document retention policy is necessary due to the potential of litigation inherent in this business. From time to time, the university or (more likely) its licensee will need to enforce its intellectual property rights, and the problems associated with the retention of extraneous documents are exacerbated in connection with litigation.

For example, patent litigation necessary to preserve the commercial viability of a licensee's product takes place in federal courts, where the liberal discovery rules require

that any document that might lead to admissible evidence be shared with the parties to the lawsuit.[2] Moreover, just as written documents are discoverable by opponents in litigation, so is computerized data, including embedded information and drafts.[3]

A technology transfer office (of public and private institutions) must assume that all of its documents will be made available to both its licensee and any opponent in patent litigation—and that many of these documents subsequently will become publicly available. While no potentially pertinent document should be discarded once litigation begins or appears likely, a document retention policy implemented and carried out prior to that time will *(a)* reduce the cost and burden of responding to discovery demands for documents that the institution should not have retained in the first place and *(b)* also eliminate the inaccurate documents discussed in the prior paragraph.

Accordingly, it is important for a technology transfer office to come to a reasoned determination as to how the office will handle its documents, which should include the generation and implementation of a written document retention policy.[4] This chapter will focus on the documents that are typically found at university technology transfer offices (generally licensing, patent, and accounting documents) and on some of the issues that technology transfer offices confront when addressing document retention. It is essential to realize, however, that there is no one-size-fits-all policy because each organization operates in a different manner and environment, so the suggestions below should be adapted to the particular circumstances.

Creation of Documents and Files

Many document retention policies focus on the treatment (discarding or long-term storage) of previously existing documents. Though such treatment is the focus of this article, document retention also should include consideration of the manner in which documents are originally created and stored.

Files: Daily Storage of Documents

Most technology transfer offices have already set up routine procedures for the handling (creation, organization, and storage) of their documents and files, but it bears mentioning that each office should carefully consider and implement such a procedure.

Many offices require that all paper files associated with a particular invention disclosure be stored centrally to allow access for all staff. Some offices, for example, will separate different types of documents (e.g., patent files, licensing/marketing files, and accounting files) into separate (but centrally located) filing systems or sections since often such files may be maintained and used by employees in different roles.[5] Typically, this is a matter of personal choice for technology transfer management, and so some other offices will utilize a single large file for each invention, with folders containing patent, licensing, and accounting records. Of course, the particular arrangement is not as important as having a reasonable and consistent location for each type of document, with suitable subfolders.[6]

The best document retention policies will also address the storage of electronically created documents, for example, by requiring the printing of each document to be saved and stored in a paper file, implementing an electronic document management system, or a combination of the two.[7]

The files then may be organized, for example, by an assigned file number, inventor name, and/or inventor's department. Regardless of the particular layout, an office should set a policy useful for that office and unfailingly follow it.

Document Creation

Another fundamental consideration ancillary to effective document retention is the need for thoughtful and attentive drafting of every document. Properly constructing each document can serve to avoid problems before they happen.

First, you must assume that anything in writing will be available to and read by others outside of the institution; therefore, documents must meet basic standards of decorum, accuracy, and readability.

Managers should encourage and train employees to write e-mails as they would any other document—thoughtfully, accurately, and completely—keeping in mind that persons other than the intended recipient may someday read the e-mail. An e-mail is equivalent to a written memorandum and should not be written in a casual or offhand way, rely upon

incorrect assumptions or facts, contain offensive remarks, or mix business with personal comments. Even though e-mail is in its second decade of widespread use, litigation attorneys and others continue to see e-mails written by clients and opponents that are damaging because of the improper way in which they were written. Computer forensics and discovery techniques ensure that almost anything that is sent or saved electronically will be available to your opponents in litigation.

Further, a writer taking an extra few minutes to draft *(a)* a description of background from the university's perspective, *(b)* a full and thoughtfully worded discussion, and/or *(c)* a clear articulation of the university's position, even for internal documents, often can prove invaluable in the future and save considerable time, money, and effort in the long run. Legal counsel may recommend that certain (e.g., sensitive or negative) statements not be made in writing, but again this is a matter of opinion that will vary among institutions, counsel, and the situation at hand. Be sure to fully and accurately label e-mails and documents so that they may be stored and retrieved, but do not create and store documents that will be of little or no use in the future.

Attorney-Client Privilege and Other Issues

Finally, while it is not possible here to address attorney-client privilege or similar legal privileges and immunities that may apply to documents, it should be a goal of the technology transfer office to become educated about these issues and their impact on document creation and retention, preferably relying upon counsel that is very well acquainted with the institution.[8]

General Guidance for Document Retention Policies

Before turning to a discussion of specific types of documents encountered by technology transfer offices, the following are a few general suggestions.

First, make a thorough search of pre-existing institutional policies to determine whether any applicable statements of policy applying to the technology transfer organization already exist. The drafter of the technology transfer policy may be required to consider and/or integrate such policy statements.

Involve those persons who will carry out the policy in the process of formulating the policy, either as drafters of the policy or through interviews with these individuals. Custodians of files have the best information about those files, including how documents are created; when, how, and how often those documents are later used; where documents are stored; and who is in the best position to carry out the policy. Consultation with the appropriate information technology (IT) personnel also is crucial to drafting a policy that is effective for the various electronic records created and retained by the office. The policy must be set and mandated by a senior member of the technology transfer organization, but not without the input of those most affected.

Make the policy simple and educate staff on it. A policy that is too complicated either will be ignored by the often-busy people in the technology transfer organization or will be met with resistance. Simplicity may require some judgment on behalf of those implementing the policy, but this is acceptable because it will be impossible to legislate the handling of every document. Take the time to make the policy easy to read, and consider including a chart that summarizes the treatment of each type of document, as shown in the appendix.

Make the policy persuasive (either through language in the policy itself or through a persuasive message to staff when implementing the policy). The policy and the principles upon which it is based must be explained, because even the best, well-reasoned document retention policy does no good if employees retain their own side files, do not clean up electronic storage space, or ignore the policy. When explaining the importance of the policy, the focus should not be solely on legal issues, but must include practical issues such as limited storage space, the elimination of confusing documents, and, most importantly, the need to quickly and efficiently find the office's critical documents. Remember that there will be circumstances in which the policy might have to be shared with others outside the organization.[9]

Make document retention and organization an ongoing process, but concerted efforts to organize files should be made periodically. For example, you can place triggers in the system so that a complete review of given files is undertaken after certain critical events.

For a license file, this trigger might be execution of a license, while for a patent file, triggers might include allowance of an application or issuance of a patent. Well-thought-out and clearly specified triggers will allow more documents to be available while essential activities are ongoing, but subsequently cause a review of the file when most documents are no longer needed.

Know your audience, and understand that you may not be able to fully enforce the policy with respect to all the persons at your institution who are involved with technology transfer. For instance, the technology transfer office may have the ability to ensure compliance by its licensing staff, but it may be much more difficult to ensure compliance by others, particularly faculty. Through ongoing efforts, the office will need to convince the non-technology transfer staff and faculty that there are important reasons for following the retention policy.[10]

Address in the policy, as specifically as possible, each category of documents that are generated or held by the technology transfer office, since various types of documents must be treated differently. The categories may be broad or narrow as may be suitable, but may include: marketing, patent, license, revenue, scientific data, and/or royalty and financial. With respect to each category, rules concerning the following should be set out: the documents to be retained, the documents to be discarded, the length of retention of retained documents, and method of discarding documents. Some categories of documents may require the person performing the review to make a judgment call, so select a useful rule, but keep the rule simple so that it can be remembered and relatively easily followed.

Some time should be spent considering the effect of the university's contractual obligations on its document retention policy. For instance, a license agreement may include provisions requiring the retention of certain research or patent documents during the life of the license. The technology transfer office should avoid undertaking contractual obligations inconsistent with its document retention policy. However, there may be reasons to negotiate different provisions and, obviously, agreements predating the document retention policy will not have been negotiated with that policy in mind. Therefore, the policy must take into account such contractual obligations.

Many of the factors involved in deciding how and whether to store different types of documents are discussed below; however, philosophies on whether to save or retain certain types of documents will be affected by

- technology transfer management's level of comfort with its ability to explain decisions to the university administration,
- availability and cost of storage space,
- level of detail of information held in any databases maintained by the technology transfer office,
- manner in which access is required to patent and other documents,
- extent to which files contain summarizing memoranda as opposed to notes, and
- legal counsel's past experience with documentary discovery in litigation.

The specific suggestions below attempt to strike a balance.

Suggestions for Particular Types of Documents

Following is a discussion of the major types of documents encountered by a technology transfer office and how each category of document might be addressed. In addition, the policy should state who should perform the activities required under the policy. (See the sample document retention policy in the appendix.)

Licensing Documents

Because most documents generated in connection with a transaction are useful until the transaction closes, generally, it is advisable to wait until completion of the transaction before reviewing the file, organizing it, and removing unnecessary documents as dictated by the policy. For example, the completion of one of the following might trigger a review of a file: *(a)* a license agreement (including material transfer agreements), *(b)* an interinstitutional agreement, *(c)* an assignment of rights back to an inventor, and/or *(d)* the closing of a file.[11] Because there may be a good deal of activity shortly after the transaction closes, waiting at least one to two months after the license is executed may also be advisable.

After setting *(a)* any types of documents that are not ever to be placed into files and *(b)* a trigger, the document retention policy should then specify the treatment of the various categories of licensing documents found in the file. The categorization of documents for

the retention policy may be based upon the labels of paper subfolders that are in standard use by the technology transfer office. Though the types of subfiles used by the technology transfer office will vary from institution to institution, the following is a list of possible categories and suggestions on their possible treatment (again, with respect to all hard copy and electronic documents). For documents that are to be retained, the policy must specify the period of retention; it is advisable to save the retained documents for at least several years after all patents in the licensed portfolio have expired.[12] The licensing professional responsible for the invention is best-suited to perform the activities described below.

Invention disclosure forms should be retained permanently, for example, in order to help prove a date of invention and because they may be valuable for purely historical reasons.

Reports from licensees should be retained because they are useful in enforcement of the license or in patent infringement litigation and might be valuable should the technology later have to be re-licensed to another entity.

Internal correspondence/e-mails should be retained if they meet a basic standard of criticality or importance. As discussed above, set a simple standard such that critical documents are retained while noncritical documents are discarded, keeping in mind that licensing staff may need oral guidance from time to time on management's interpretation of the standard. See the appendix an example standard of "critical and nonroutine."

Notes may be treated as internal correspondence and e-mails and be retained if they meet a basic standard of importance. The comments in the second section of this article are particularly relevant to these documents.

External correspondence with nonlicensees (e.g., correspondence marketing an invention) might be discarded if it is more than a specified age, since records of companies to which technology was marketed may be considered valuable for a limited time but then lose their value. As with internal correspondence, the office should, of course, retain critical documents, which might include documents discussing an alleged infringement of the university's patents, discussing ownership disputes, or demonstrating the value of the patents.

Original agreements must be retained permanently, though certain agreements of lesser importance (primarily confidentiality agreements) that expired more than a specified number of years ago might be discarded. Drafts of agreements generally may be discarded, though university counsel should be consulted.[13]

Documents relating to university stock holdings in a licensee (such as board minutes, shareholder agreements, shareholder resolutions and consents, voting agreements, etc.) generally should be retained for a set period of time, possibly until the stock is liquidated, though this will vary from institution to institution since the documents may be voluminous, rarely consulted, and copies may be obtained from the company. However, such documents may be valuable in assessing rights as a shareholder, valuing stockholdings, and liquidating shareholdings. Some institutions will retain all such documents (e.g., electronically), but others may handle them on a case-by-case basis, retaining those that seem to have potential future value.

Royalty and patent expense information should be retained, keeping in mind any institutional policy on financial documents, as these documents may be useful in enforcing the agreement or patent rights.[14]

Patent Documents

The assigned licensing professional or administrative person handling patent prosecution may be best suited to *(a)* seeing that unnecessary documents never make it into a file and *(b)* performing the other retention activities described below. Drafts (nonfinal versions) of patent documents (e.g., patent applications and patent office responses) should usually be discarded during the prosecution process and not wait for any particular trigger. Notwithstanding this general premise, it may be useful to retain at least initial drafts of patent applications for inventions that have not been reduced to practice i.e., put into tangible form. Under U.S. interference law, draft applications can be useful in proving diligence necessary to establish a date of invention earlier than that of an opponent in the interference. It will be important to discuss this policy with patent counsel[15] and inventors.

Aside from these documents, as discussed above, the technology transfer office should wait for a reasonable point in patent prosecution to trigger the review of a file. For example, the trigger may be the issuance of a patent, abandonment of an application, or completion of prosecution of a related family of patents/applications (or a specified period of time after one of these activities). The document retention policy should then specify the treatment of at least the following categories of patent documents. Documents that are retained may be discarded several (e.g., six, as discussed above) years after the patent or any related patents have expired, although since the volume may be low, the technology transfer office may retain the documents indefinitely.

Original inventor assignment (or photocopy if original is not available) and any other title (e.g., Bayh-Dole) documents should be retained as these documents may be essential in proving ownership of patent rights in any future disputes, including patent enforcement.

The original ribbon copy of each patent should be retained as it may be useful in enforcement of the patent or as a historical record.

Correspondence from outside counsel generally need not be retained in its entirety, but at least one letter should be retained to show what firm handled the prosecution, in case the patent must be enforced. Any letters explaining anything unusual in the prosecution or demonstrating an inventorship analysis should be retained, similar to the criticality standard discussed above with respect to licensing correspondence.

Primary technical data generally should be retained, though if it is voluminous, the technology transfer office may wish discard such data if it confirms that the inventor has and will retain a duplicate copy.

Filed patent documents generally may be discarded, since all such documents may be obtained from the patent office or outside patent counsel if needed. Some technology transfer offices may wish to retain copies until the patent is licensed in order to facilitate sharing of the documents with future potential licensees, but those offices facing space issues are able to discard such documents.

Other correspondence/e-mails and notes should be treated as discussed above for licensing correspondence and notes.

Prior art and patents generally should be discarded unless in use at the time, except possibly for documents that are difficult or expensive to obtain. Whenever prior art is obtained or reviewed with respect to a particular file, confirmation should be made that the art was disclosed to the patent office, if necessary. Some offices may decide to not place copies of prior-art publications and patents in their files at any time, as these may be voluminous and can cause confusion over alleged duties to review the art in the future.

Other Documents

The document retention policy should also address other documents that are created during the technology transfer process. For example, the technology transfer office will wish to consider what to do with documents of departing employees and address the issue in the document retention policy. Generally, at the time the employee departs, the office should have the employee's documents reviewed and handled in accordance with the same principles outlined for other documents in the document retention policy. Other issues include the general instructions on the office's file-keeping requirements, storage, and retention of inventors' files, and storage and retention of litigation files.

Special Considerations with Respect to Electronic Data

Electronic documents and data require particular care and consideration when being deleted from a computer hard drive, saved electronically for retention purposes, shared outside the office, etc. Electronic documents often contain information embedded therein, and such information may exist in a document without the writer's knowledge.[16] Also, "deleting" a document does not necessarily mean that the document is no longer easily retrievable by others, including your opponents in any future litigation. You must assume that anything you write (even drafts) may be discovered (e.g., in litigation) and read by others outside of your institution.

As part of this consideration, understand how your electronic data is stored and backed up. Generally, information is backed up onto a medium such as a tape, with multiple tapes being recycled through the system to provide for a reasonable history of the stored

information.[17] Back-up tapes will be subject to discovery in litigation and possibly freedom of information act (FOIA) requests.[18] Since a backup is generally for restoring a system after a crash, the technology transfer office probably does not need old backup tapes, but only the most recent versions that will, in turn, be recycled for future backups. Keeping old and unnecessary backup tapes may lead to use of out-of-date documents and, because they are discoverable in litigation, can lead, at a minimum, to greatly increased litigation costs and internal time dedication if the technology transfer office must enforce its patent rights. In short, because there are so many variables, know how your electronic documents are stored before you set your office's document retention policy.

After a Document Retention Policy Is Implemented

Compliance

It is critical for the technology transfer office to take whatever action is necessary to assure compliance with the document retention policy. Several suggestions are given above, including emphasizing the importance to staff and making the policy easy to understand. Further, it may be valuable to select a contact person or persons responsible for document retention issues in the technology transfer office, both as an organizer/facilitator and as a person responsible for ensuring compliance. Responsibilities might be broken down by types of documents (for example, a different person responsible for licensing, patent, and accounting documents—or a different person responsible for paper and electronic documents).

The office, both through upper management (e.g., director) and the above-mentioned contact person, should periodically educate staff, emphasize the importance of compliance, account for the review of all electronic storage devices (e.g., hard drives and servers), and audit staff members.[19]

A shortage of funds, personnel, and time can hinder the full implementation of a document retention policy, but there are ways to make it happen, including, for example, *(a)* doing all the work without outside help and cost, *(b)* providing time to technology transfer staff for organizing files[20], *(c)* motivating staff through rewards and/or emphasizing that com-

pliance can pay off in both efficiencies for individual staff and the organization's success, and *(d)* seeking no-cost or low-cost resources from other areas within the institution (such as the general counsel's office and risk management office) that have an interest in the addressed issues.

If Litigation Is Filed or Contemplated: Revisiting Reasons for Having a Policy

There are many resources that discuss the handling of litigation (including the complications of electronic data and documents), and it is beyond the scope of this chapter to provide instructions on the production of documents for litigation or FOIA purposes.[21] However, technology transfer professionals must understand that, once the technology transfer office (or any of its staff) is aware that litigation may be filed (or has been filed or threatened), it is essential to immediately contact litigation counsel, whether that counsel be in-house or outside of the university. The next (or concurrent) step is to identify the individuals and departments that might have information or knowledge of the data and documents in question so that counsel is able to hit the ground running when notified of the situation.

Once litigation has started or been threatened, regardless of the document retention policy, no documents should be destroyed or deleted without consulting with counsel. [22] This may include the requirement to stop recycling of backup tapes or servers. A party is obligated to preserve all documents relevant to a litigation upon filing of a complaint,[23] and spoliation (the improper destruction of documents or evidence) may result in severe penalties imposed by courts, including exclusion of valuable evidence at trial, admitting evidence of misconduct at trial, monetary penalties, subjecting the party to increased discovery obligations, contempt citations, and even dismissal of a lawsuit.[24] A properly implemented document retention policy, carried out before the threat of any litigation, may help to avoid court sanctions.

Production of electronic documents and data in accordance with the rules of litigation can be complicated and expensive, and for many lawsuits, regardless of the value of the documents, tens or even hundreds of thousands of dollars are spent on gathering information from hard drives, servers, and backup tapes; consulting with IT departments;

analyzing data (including extracting nested data, generating fingerprints); culling duplicates and attorney-client privileged material; searching for differing versions of the same documents, embedded information and metadata; and converting documents into usable formats. The costs are so great that a number of firms specialize in the electronic discovery field solely to work with litigation counsel.

Opponents in litigation may put a significant effort toward finding any documents, data, and e-mails that at one time were on employees' computers and servers. At times, parties are forced to put significant efforts and money into resolution of disputes regarding procedures for preservation, examination, copying, and imaging of computer and other electronic information, in which a very large number of issues may come into play.[25] Failing to produce electronic documents is not an option and may lead to catastrophe.

Public Institutions Compared to Private Institutions

It does not appear that any major differences exist in how documents should be retained based upon whether the institution is a public one subject to FOIA laws or a private one that is immune from such laws. However, consideration must be given to specific state statutes and rules (which could differentiate between public and private institutions) and university policies that govern document retention.

Although there is a federal FOIA,[26] university FOIA issues are generally state law issues, and a discussion of each state's law is not possible here. State FOIA laws typically provide that any person may obtain copies of documents held by government institutions such as universities. Of course, various exceptions will exist, but again, these will vary from state to state.[27] Although laws will vary from state to state, in many states, it is expected that e-mail and other electronic documents might fall under the broad description of "public records." Therefore, it is possible for public institutions that a request could trigger state FOIA laws and require the disclosure of a large amount of information held by the technology transfer office.[28] Most public institutions will have a person or persons expert in that state's FOIA law, and these persons should be consulted when formulating a document retention policy for the technology transfer office.

Conclusion

The issues discussed above show that a technology transfer organization should evaluate how it organizes and retains documents, and that a systematic policy covering the same must be seriously considered. A policy may save space, increase efficiency, ensure that valuable documents are preserved and available, and reduce potential litigation costs and liabilities. When drafting a policy, consult the appropriate persons in order to draft a persuasive, concise policy that provides a simple rule for each general type of document found in a technology transfer office. And after the policy is introduced, make every effort to ensure it is explained and faithfully implemented, creatively using resources already available to the office.

Although there will be differences of opinion with respect to the precise rules that may be selected, well-reasoned decisions made regarding a policy for the retention of documents should pay off for your institution.

Notes

1. A comprehensive implementation of a document retention policy will require resources, and so the administration staff under which the technology transfer office falls may wish to receive justification for such expenditures.
2. See Fed.R.Civ.P 26 and Fed.R.Civ.P 34, http://www.law.cornell.edu/rules/frcp. Rule 34 provides: "Any party may serve on any other party a request (1) to produce and permit the party making the request, or someone acting on the requestor's behalf, to inspect and copy, any designated documents (including writings, drawings, graphs, charts, photographs, phonorecords, and other data compilations from which information can be obtained, translated, if necessary, by the respondent through detection devices into reasonably usable form), or to inspect and copy, test, or sample any tangible things which constitute or contain matters within the scope of Rule 26(b) and which are in the possession, custody or control of the party upon whom the request is served ... ." Various state laws (often referred to as *freedom of information acts*) provide that the public shall have access to certain written documentation of governmental entities such as public universities. See Mark Ballard, "Digital

Headache." *National Law Journal* (February 10, 2003): 18. Typical costs of production of copies of hard copies and acquisition of electronic documents may run into the millions of dollars. See also Philip Allen Lacovara, "What Corporate Counsel Should Do about Bad Documents," *American Corporate Counsel Association Records Retention Manual* (1995).

3. Though sometimes courts will require a demonstration of the need for analysis of electronically stored data before ordering a party to do so. *Physicians Interactive v. Lathian Sys., Inc.,* No. CA 03-1193-A, 2003 WL 23018270 (E.D. Va. December 5, 2003) (discovery through making mirror images of hard drives was granted); *Super Film of America, Inc. v. UCB Films, Inc.,* 219 F.R.D. 649 (D. Kan. 2004) (party ordered to produce e-mail, databases, spreadsheets even though it argued that retrieval was beyond its expertise); *Rowe Entertainment, Inc. v. William Morris Agency, Inc.,* 205 F.R.D. 421 (S.D.N.Y. 2002) (listing factors to be considered when determining whether electronic discovery should be granted and who should be responsible therefore).
4. See Steven Schoenfeld and Rosena Rasalingam, "Document Retention Policies Have Long-Term Benefits," *New York Law Journal Corporate Counsel* (November 18, 2002).
5. The utility of such a separation might be influenced by the configuration of the office's storage space.
6. Just by way of example, subfolders for patent files might be entitled "Correspondence and Notes," "Patent Application as Filed," "PTO Documents, Assignments and Formal Papers," "PCT Correspondence," and files for each country filing. Some offices use commercially available folders designed for storing patent files (such as used by patent law firms), which have integrated dividers for separating the types of documents. Subfolders for licensing files might include "Invention Disclosure and Sponsor Information," "Correspondence and Notes" (divided into multiple subfolders by some offices), "Agreements," and "Royalty Distribution and Expenses." The office, for example, might create a main folder (such as a hanging file) and certain predesignated subfolders (such as small paper folders) as a matter of course each time a new invention disclosure is received. The folders will be populated with documents over time, subject to the retention policy. However, many different useful schemes exist and are readily apparent to technology transfer managers.

7. Keep in mind, however, that when an office stores documents electronically, if there is subsequent litigation, it may be required to produce electronic versions to an opponent in the litigation. See *In re Bristol-Myers Squibb Securities Litigation*, 205 F.R.D. (D.N.J. 2002).
8. Other issues somewhat related to document retention include limiting exchange of metadata in documents communicated outside the university, creating and training employees as to privacy policies (including with respect to personal employee information, Health Insurance Portability and Accountability Act (HIPAA)-protected information, and personal use of university computers), limiting data disclosure to those employees requiring access, conducting employee background checks, and proper treatment of computer access codes and credit-card information.
9. The policy may have to be shared with litigation opponents in order to account for the state of the technology transfer office's files.
10. For instance, the technology transfer office may emphasize improved licensing results that may personally benefit the faculty member.
11. A file may be considered closed when there is no further activity planned for the file and no license is in force.
12. Damages for infringement occurring prior to expiration of a patent may be sought up to six years after the patent expires.
13. The opinion of many informally surveyed legal counsel indicates a tendency toward discarding drafts of agreements. However, some counsel advise that drafts exchanged between the parties be retained because they may be useful in resolving ambiguities in the final agreement. Each office should consult with its own counsel.
14. As stated above, damages for patent infringement may be sought up to six years after expiration of the patent. Past royalty information may be important in determining the level of damages for which an infringer of the university's patent is liable and may also help in determining the royalty that the university might seek in order to license the infringer.
15. Patent firms will have their own document retention policies, some of which simply cause the destruction of all files a number of years after the last communication with its client, with other policies being more complex. The technology transfer office should request that outside counsel follow the technology transfer policy on docu-

ment retention with respect to its files, or the parties should work together to resolve differences. In addition, legislation is currently pending before Congress which could greatly alter or eliminate interferences.

16. Embedded metadata should be minimized in the exchange of electronic redline drafts of documents between licensor and licensee. Discuss with your IT staff manners of eliminating such embedded information and metadata from documents before they are forwarded outside of your office.
17. An institution's IT staff should know and be able to explain best practices for data backup. Various examples are available on the Internet, but, for example, see http://www.hpcx.ac.uk/services/policies/data_backup.html, http://searchstorage.techtarget.com/originalContent/0,289142,sid5_gci886601,00.html?bucket=NEWS, and http://www.smallbusinesscomputing.com/webmaster/article.php/3415261.
18. See Albert Barsocchini, "Electronic Data Discovery Primer," *Law.com* (August 28, 2002), http://www.law.com/jsp/article.jsp?id=1029171611801. See also Paul French, "Electronic Document Retention Policies (And Why Your Clients Need Them)," *Law Practice Today* (January 2004), http://www.abanet.org/lpm/lpt/articles/ftr01045.html.
19. It may not be easy to control the documents held by faculty, so reasoned explanation of document retention policies and concepts is the best way to increase the likelihood that nontechnology transfer employees comply with the policy.
20. At least one university technology transfer office sets aside specific time for its staff once or twice per year to organize files, place documents from individuals' offices in the central filing system for safekeeping, and ensure compliance with its document retention policy. Though a document retention is best handled by routine document management, such a regular time commitment may go a long way to both making sure that the policy is recognized as important and providing time for compliance that otherwise might not be available.
21. Gregory Joseph, "Electronic Discovery." *National Law Journal* 24 (November 2003): 30. See Mark Ballard, "Digital Headache," *National Law Journal* (February 10, 2003): 18. Nevertheless, depending upon the applicable state law, one may wish to treat a FOIA request in the same manner as described herein with respect to lit-

igation documents. See also the discussion in "Public Institutions Compared to Private Institutions" below.

22. Courts will likely find that enacting a document retention policy during litigation to destroy harmful documents is litigation misconduct. See, e.g., *Rambus, Inc. v. Infineon Technologies AG,* 220 F.R.D 264 (E.D. Va. 2004) (even if a party does not institute a document retention policy in bad faith, "if it reasonably anticipated litigation when it did so, it is guilty of spoliation"). Conversely, a document retention policy properly implemented prior to potential litigation (or requests under any applicable FOIA) can be a legitimate explanation for the retention of documents, while on the other hand, the lack of a document retention policy may call into question why some documents exist and some do not. Courts, for example, generally will accept that documents are missing where their destruction was pursuant to a document retention policy, was in good faith, and not during a period of threatened or actual litigation.
23. *Keir v. Unumprovident Corp.,* 2003 WL 21997747 (S.D.N.Y. 2003); *Turner v. Hudson Transit Lines,* 142 F.R.D. 68, 73 (S.D.N.Y. 1991) ("once a complaint is filed, [a litigant] is under a duty to preserve what it knows, or reasonably should know, is relevant in the action); *New York Nat'l Org. for Women v. Cuomo,* No. 93-7146, 1998 WL 395320 (S.D.N.Y. 1998) (court held that counsel has a duty to advise clients to take reasonable steps to preserve records subject to discovery).
24. *Danis v. USN Communications,* 53 Fed. R. Serv. 3d 828 (N.D. Ill. 2000) (failure to take reasonable steps to preserve data resulted in fine against defendant's CEO); *GTFM v. Wal-Mart Stores,* 49 Fed. R. Serv. 219 (S.D.N.Y. 2000) (due to failure to provide accurate information to other party about computer records and later destruction of records, defendant must pay certain attorney fees and costs and for recovery of data); *Kucala Enterprises, Ltd. v. Auto Wax Co.,* 56 Fed.R.Serv.3d 487, 2003 WL 21230605 (N.D. Ill. May 27, 2003) (plaintiff ordered to pay attorney fees and costs as the result of spoliation); *MasterCard International, Inc. v. Moulton,* No. 03 Civ. 3613, 2004 WL 1393992 (S.D.N.Y. June 22, 2004) (where e-mails were destroyed, court ruled it would instruct jury to take a negative inference based upon missing evidence); *In re Prudential Ins. Co of Am. Sales Practices Litig.,* 169 F.R.D. 598 (D.N.J. 1997) (pattern of destruction of documents resulted in $1 million fine); *Rambus, Inc. v. Infineon Technologies AG,* 220 F.R.D 264 (E.D. Va. 2004)

(even if a party does not institute a document retention policy in bad faith, "if it reasonably anticipated litigation when it did so, it is guilty of spoliation"); *Renda Marine, Inc. v. United States,* 58 Fed. Cl. 57 (Fed. Cl. 2003) (after party did not properly produce documents and destroyed e-mails, party was ordered to produce backup tapes at its own expense and have computer hard drives examined).

25. *Sonnino v. University of Kansas Hosp. Authority,* 220 F.R.D. 633 (D. Kan. 2004) (party required to provide detailed information to other party concerning computer and e-mail systems); *Positive Software Solutions Inc. v. New Century Mortgage Corp.,* 259 F. Supp. 561 (N.D. Texas 2003) (party not allowed to image all servers of other party); *New York Law Journal Techtrends,* Vol. 7, No. 5 (February 2, 2004) (describing the need and means to protect privileged documents in the context of producing large numbers of documents in litigation discovery).
26. 5 U.S.C. 552. For background, see "A Citizen's Guide on Using the Freedom of Information Act and the Privacy Act of 1974 to Request Government Records," U.S. House of Representatives (108th Congress, 1st Session), Report 108-172, http//:www.fas.org/sgp/foia/citizen.html. The Sarbanes-Oxley Act may affect how certain entities must implement document retention policies, though it may not affect universities. See Michelle Lange, "New Act Has Major Impact on Electronic Evidence," *National Law Journal* (November 4, 2002): C8-9.
27. For example, the State of Michigan exempts at least the following from disclosure: trade secrets and commercial information provided to the university for use in developing public policy; trade secrets and commercial information provided to the university to be used for research and related activities (presumably including technology transfer); intellectual property, at least until the university is able to secure patent protection and/or publish; and trade secrets and proprietary information having potential commercial value in which the university holds an interest. MCL 15.231 et seq.; MCL 390.1551 et seq.
28. Arthur Siegal, "Email Destruction Violates the FOIA," *Michigan Bar Journal,* 81, no. 3 (March 2002): 14-17.

Appendix: Sample Document Retention Policy

MEMORANDUM

To: Tech Transfer Office Staff

Re: Tech Transfer Office Documentation Retention Policy

The technology transfer office (TTO) is instituting this document retention policy to provide a procedure for organizing our files, including instructions for the storage or discarding of documents. The policy will conserve limited storage space, eliminate confusing documents, and ensure the ready availability of crucial documents for both internal use and potential litigation.

These policies and procedures are effective immediately. However, if litigation relating to a particular matter is ongoing, imminent, or threatened, no document (hard copy or electronic) related to that matter or related matters may be destroyed. In such instances, litigation issues must be addressed by legal counsel before any document may be discarded or reorganized. Also, if there are any unusual circumstances or problems surrounding a particular license or patent file, then, prior to discarding or reorganizing documents, the matter should be discussed with the TTO director.

The procedure is broken down by major document types. As used in this policy, the term *document* includes both electronic documents (e.g., e-mail and documents stored on local computer hard drives) and hard copies.

A. General Instructions on File Keeping

TTO files are to be kept free of unimportant materials, especially drafts of documents. TTO generally will not retain (either electronic or paper) copies of the documents listed immediately below, unless there are special circumstances. (Outside patent counsel should be instructed to not send copies of document types 1-3 to TTO as a matter of course.)

1. PCT or foreign publications of TTO patent applications
2. Patents and prior art

3. Drafts (which should be sent only to the specific person required to review the document, unless otherwise instructed by the TTO licensing rep (rep) or TTO attorney)
4. Routine e-mails, such as scheduling or ministerial issues

The reps and TTO attorneys are all responsible for educating university employees on document retention issues. Whenever possible, inventors and non-TTO employees should be advised of this policy and reminded that personal files will be subject to discovery, review, and involvement in legal proceedings if there is ever a patent infringement, breach of contract, or other lawsuit related to the subject matter. Any questions should be directed to TTO attorneys.

B. Instructions Regarding Files Related to Licensing

1. The TTO director will periodically and regularly schedule time for organization of files. At such time, the rep will perform the following actions for each TTO file where one of the following has been completed at least *six months prior:*

- License agreement (exclusive or non-exclusive)
- Interinstitutional agreement
- Reassignment of a file to the inventor(s)
- Closing of a file (meaning there is no further activity planned for the file and no license is pending)

2. The rep will review each tech transfer file covered by the agreement, including

- Paper files
- Electronic files, including e-mails (important electronic documents and e-mails should be printed out by the sender at the time they are created, because multiple staff members typically require access to a file, and the paper copy will be made part of the official file; reps may store electronic documents on CD-ROM after discussion with the TTO director)
- Files, including electronic files, held by all those employees working on the matter
- Any consolidated files, e.g., those relating to a startup/spin-off company

3. The rep will discard the following:

- For *(a)* any licensed file or *(b)* any closed file, the entire subfolder containing patents and prior art.
- All agreement drafts, including internal drafts and exchanged drafts.
- Although notes generally will be discarded, *critical, nonroutine* notes may be retained if they are thought to have some particular value. What is critical and nonroutine will vary depending upon the circumstances; for example, it may be desirable to retain more documents where a file remains open and has been licensed nonexclusively (or in less than all fields). Consult the TTO director or TTO attorney with any questions.
- Nondisclosure agreements that expired more than five years prior.
- Correspondence with nonuniversity entities (including licensees) that is more than five years old.

4. The rep will retain the following in the central, official file:

- Invention disclosure forms.
- All correspondence with nonuniversity entities (including the licensee), *where the correspondence is less than five years old.* Exchanged draft agreements may be saved only if approved by the TTO director and/or attorney.
- Reports from licensees, e.g., as required by a license agreement.
- Any *critical, nonroutine* internal TTO correspondence (including e-mails and materials noting decisions by TTO management, letters, and e-mails of explanation to TTO employees, and confirmations by TTO employees, e.g., when a faculty member agrees to TTO strategy, etc.) will be retained. The remainder of internal correspondence will be discarded.
- The original agreement(s), license amendments, stock transfer agreements, letter agreements of any kind, corporate legal documents (where TTO holds stock). The rep must make sure that no agreements are missing.
- Stockholder information, press releases, and other public relations materials related to the licensee, *if less than five years old.*
- The entire subfolder relating to royalties and expenses.

5. Manner of file storage.
[Suggest discussing any specifics concerning the method in which the papers should be organized.]

6. Location of files.
[Suggest discussing any specifics concerning location of file storage.] After the file is organized according to these procedures, the central filing system will include a complete set of documents relating to each file. Backup electronic versions will not be retained.

7. Finally, at this time, the rep must at least give careful consideration to drafting a short memorandum discussing any important points regarding the negotiation, interaction between agreements, licensing/management strategy, or planned further actions. A memo can be extremely valuable for future work on or related to the file or to later explain the TTO's strategy.

C. Instructions Regarding Patent Files

1. During the patent prosecution process, the patent administrator (PA) will discard all draft documents (e.g., applications or patent office responses) immediately after the document at issue has been filed. Notes relating to the drafts will also be discarded at the same time. The PA will also assist on an ongoing basis in ensuring that university employees and outside patent counsel are aware of and comply with this policy of discarding drafts. [Note comment in text of article concerning proof in U.S. interferences.]

2. The file-organizing process for patent documents will be triggered upon issuance of a patent or abandonment of an application. If the process was completed because a U.S. patent issued, the PA will initially perform a quick check to ensure that there is no need to request a certificate of correction. If a certificate of correction is needed, the PA will contact outside patent counsel about the issue or ask the rep to do the same, prior to proceeding with this file-cleaning and organizing procedure.

3. The PA will confirm whether any related applications are pending, including:

- Continuations
- Divisionals

- Continuations-in-part
- Other pending U.S. applications covered by the same license agreement

4. If there are no related United States applications pending, the PA will for all related applications review the patent files and discard the entire patent file, *except* as noted below. Any documents that are to be retained will be stored in a single folder identified by the TTO file number and patent number. The following will be *retained:*

- The original recorded assignment (or photocopy if the original is not in the file) and any other title documents.
- One letter from outside patent counsel (to enable confirmation of which firm handled the application, in case this information is omitted from the face of the patent).
- The original ribbon copy of issued patents.
- All routine notes and correspondence generally should be discarded. However, a *critical, nonroutine* note or correspondence may be retained if the document is thought to have some very specific value, for example, to explain why an unusual strategy was taken. Examples of documents that might be retained include: correspondence noting that we have forwarded original ribbon copies of patents, e-mails and materials noting decisions by TTO management, letters and e-mails of explanation to TTO employees, confirmations by TTO employees (e.g., when a faculty member agrees to TTO's strategy), explanations of decisions to abandon, and explanations of geographic coverage.

5. Location of files.
[Suggest discussing method of document organization and location of file storage.]

D. Instructions Regarding Personal Files

After a matter has been concluded (e.g., after conclusion of a license agreement or patent prosecution as described above), the official copy of the file in the central filing system will be the only storage location for documents. TTO staff will not retain copies of materials (e.g., e-mails or draft documents) either electronically or in hard copy form.

When a staff member leaves the employ of TTO, all of his/her files will be reviewed with respect to this policy within one month by the TTO director.

TTO staff will not keep prior-art files that are associated with a particular matter. However, if a TTO staff member is aware of prior art relevant to a particular patent application, he/she must notify (or have the appropriate rep notify) the patent attorney prosecuting the application.

E. Instructions Regarding Inventors' Files

Within three weeks after the execution of one of the agreements listed above, the rep will telephone or visit at least the lead inventor to explain these policies and to assist the inventor in complying with them.

Within three weeks after *(a)* the issuance of a U.S patent or *(b)* the issuance or abandonment of all patent applications related to a particular file, the PA will telephone or visit at least the lead inventor to explain these policies and to assist the inventor in complying with them.

F. Instructions Regarding Litigation Files

Litigation files will be stored according to procedures set by the office of general counsel.

Note: This document may be protected by attorney-client privilege, so it should not be shared with persons outside the university.

[Appendix to draft policy. It may be valuable to summarize the retention rules. For example, following is a sample summary for patent documents.]

General Rules: Patent Documents

Type of Document	Retain	Discard
The original recorded assignment (or photocopy if the original is not in the file)	Yes	Extra copies
Original ribbon copy of issued patents	Yes	None
One letter from university's outside patent law firm(s)	Yes, unless a letter is already attached to the recorded assignment	All remaining unless nonroutine
Correspondence with third parties	Only *critical, nonroutine* correspondence with university's patent firm or other entity (including where we forward ribbon copies of patents)	Remainder, including routine correspondence with university's patent firm
U.S. Patent Office correspondence (filed papers)	None	All
Notes	Notes may be retained if they are thought to have some very specific value in the case at hand, for example, to explain why an unusual strategy was taken	All remaining
Internal TTO correspondence	If *critical and nonroutine*	All remaining
Personal files related to patent	Organized per rules above	

Institutional Technology Transfer Policies

Institutional intellectual property policies generally provide the legal parameters of the rights and responsibilities that affect the entire research community. Intellectual property policies are all encompassing and involve, among other things, ownership rights and financial considerations and seek to limit risk and liability exposure. Additionally, the process of establishing an intellectual property policy is extensive, as many entities within the institution such as boards of directors, regents, faculty groups, and foundation directors need to agree on the intent and content of the policy. The technology transfer business is ever-changing, and, thus, differences in technology transfer missions, changing cultures, economy, and regulatory environments are reflected in the many institutional policies whose content and style are varied.

Some issues covered by policies include

- Who owns the invention?
- Does the policy cover students?
- Are there different policies for copyrighted vs. patentable technologies or is there one combined policy?
- What is the revenue distribution? Can an inventor waive his or her rights to royalties?
- What are the options for commercialization of an inventor's technologies (e.g., will the university reassign to the inventors)?
- How is equity treated?
- Are there appeal processes?

There is much overlap in topics within institutional intellectual property policies, including sponsored research, institutional and employee conflict of interest, and equity. Each published policy should clearly state when it was implemented, who is responsible for the policy, how a policy change would occur, and how the policy relates to other institutional policies. High-level issues are usually dealt with at the institutional-wide policy level, but those that are very detailed and less strategic in scope and that require more frequent revision are usually handled at the departmental level as internal procedures.

In the United States, the enactment of the Bayh-Dole Act created within academic and research institutions a new profession and activity for the management of intellectual property that results from federally funded research. The act enabled institutions to acquire title to intellectual property; required that, for any invention disclosed, the institution asserts its rights and prepare and file patent applications; that the inventor assign his or her rights to the university; that a portion of any revenue generated be shared with inventors; and that licensing preferences be granted to U.S. small companies.

In addition, the institution is required to report to the federal government, on a regular basis, the existence of any federally funded intellectual property. The passage of the act had a profound impact on the creation of intellectual property programs, policies, and procedures. A pivotal policy generally found in the United States is that institutions require their researchers to assign rights of inventions directly to the institution, with the technology transfer office handling commercialization and federal reporting. However, there are exceptions to these requirements. For example, faculty members at the University of Wisconsin own their own inventions if they are not federally funded. While Wisconsin is unique in the United States, this is one example that illustrates the variations in technology transfer policies.

In Canada, the absence of any national legislation comparable to the Bayh-Dole Act means that universities are freer to establish their own policies on ownership and management of inventions and other intellectual property. Some Canadian universities have chosen to assert ownership of inventions (e.g., the University of British Columbia and McMaster University), some grant inventors complete rights of ownership in inventions (e.g., University of Waterloo and Queen's University), and some universities jointly own intellectual property developed using university resources (e.g., McGill University and University of Toronto).

Although the policies are different in Canada, in each case, there is a technology transfer office that is available to protect intellectual property, commercialize technologies, and share revenues with the inventors. Compared with the U.S. model, in Canadian universities with inventor-owned or jointly owned intellectual property policies, the inventors have

the option to patent and commercialize without the assistance of the technology transfer office and retain a larger share or, in some cases, 100 percent of any revenues. Universities with these policies argue that they nurture a more entrepreneurial culture among the faculty and students. Statistically, the impact of intellectual property policies on conventional technology transfer metrics tends to suggest that intellectual property policies are not as important as other considerations in determining overall effectiveness in technology transfer.

The following list of policies includes both those that are comprehensive in scope and those that are specific or focus on more recent facets of securing research from the faculty; assessing, protecting, commercializing intellectual property; distributing royalties; material transfers; trademarks; and copyrights. These policies are provided by way of example, to use as you develop or revise policies at your institution.

This list is by no means comprehensive, and we encourage you to review many different policies before embarking on a new or revised policy. Where we could, we have included the date that the policy was last amended, as well as the organization name and the Web address.

For even more examples of policies and agreements, visit the AUTM Web site at http://www.autm.net/aboutTT/aboutTT_policies.cfm.

Disclaimer: AUTM does not endorse or recommend any of the policies listed here. They are provided as-is and are for illustrative purposes only.

Comprehensive Intellectual Property

- Boston College (8/04): http://www.bc.edu/offices/policies/meta-elements/doc/policies/IV/4-200-150.shtml
- Massachusetts Institute of Technology: http://web.mit.edu/tlo/www/guide.toc.html
- Stanford University: http://otl.stanford.edu/inventors/policies.html
- The Texas A&M University System (3/04): http://tlo.tamu.edu/tlo/faculty-services/policies.shtml
- University of Toronto: http://www.rir.utoronto.ca/policies.html#intellectual

Conflict of Interest within Institutions

(Faculty Consulting, Conflict of Commitment) Conflict of interest policies are different than and separate from intellectual property/technology transfer policies. However, they often affect intellectual property and technology transfer policies; thus sample policies are listed here.

- Massachusetts Institute of Technology (4/05): http://web.mit.edu/policies/4.4.html
- Stanford University (5/03): http://otl.stanford.edu/inventors/policies.html
- University of California (3/03): http://www.ucop.edu/ott/ttimport.html
- University of Maryland at College Park (5/03): http://www.otc.umd.edu/Inventors/InventorHome.htm
- University of Miami: http://www.miami.edu/UMH/CDA/UMH_Main/1,1770,9018-1;9039-2;9031-3,00.html
- University of Texas Southwestern Medical Center (3/03): http://www8.utsouthwestern.edu utsw/cda/dept41605/files/43763.html
- Council on Governmental Relations: http://www.cogr.edu/files/publications_Conflicts.cfm

Copyright and Software

- North Carolina State University (8/01): http://www.ncsu.edu/ott/university_policies.html
- University of North Carolina at Chapel Hill (2/01): http://intranet.northcarolina.edu/docs/legal/policymanual/500.2.pdf
- University of Pennsylvania (2/01): http://www.ctt.upenn.edu/oasis/org/U.aspx?M=M031007-1631190190&U=031020-20382732
- University of Washington (10/03): http://www.washington.edu/admin/rules/APS/59.04.7.html

Equity

- Iowa State University Research Foundation (6/03): http://www.techtransfer.iastate.edu/documents/ISURF_Equity_Policy_052405130459.htm
- Stanford University (5/01): http://www.stanford.edu/dept/DoR/rph/4-6.html

Faculty

(Visiting Scientist and Sabbaticals, Entrepreneurial Leave, and Faculty Evaluation)

- Ohio State University (7/04): www.oaa.osu.edu/handbook/ix_loaentrepren.html
- University of Maryland at Baltimore: www.ord.umaryland.edu/policies_procedures/index.html
- University of Toronto: http://www.facmed.utoronto.ca/userfiles/page_attachments/library/13/promomanual06_10221_3406906.pdf

Material Transfer Agreements, Tangible Research, and Research Tools

- Johns Hopkins University (4/01): http://www.ltd.jhu.edu/For%20Hopkins%20Inventors/materialtransferagreement.html
- Northwestern University (5/04): http://www.northwestern.edu/ttp/investigators/material_transfer.html
- University of Illinois at Urbana-Champagne: http://www.research.uiuc.edu/ora/mta.asp
- University of Washington (3/05): http://depts.washington.edu/uwinvent/MTA/

Patent, Outside Counsel, Conflict of Interest with Counsel, Ownership Back to Inventors, and Royalty Sharing

- Cornell University (5/04): http://www.cctec.cornell.edu/inventors.html
- Harvard University (3/03): http://www.techtransfer.harvard.edu/Policies.html
- North Carolina State University (4/03): http://www2.ncsu.edu/prr/research/POL10.00.1.php
- North Carolina State University (4/03): http://www.ncsu.edu/policies/research/REG10.00.3.php

Record Retention and Management

- Brigham Young University (9/04): http://library.byu.edu/departs/urm.html
- The Texas A&M University System (9/98): http://sago.tamu.edu/policy/61-99-01.htm
- University Washington (6/01): http://www.washington.edu/admin/recmgt/uw.gs7.html

Sponsored Research

- Harvard University: http://vpf-web.harvard.edu/osr/support/policies_main.shtml
- University of New Mexico: http://www.unm.edu/~handbook/E60.html

Startups

- Washington University in St. Louis (7/01): http://www.wustl.edu/policies/startup.html
- University of Pittsburgh (11/03): http://tech-link.tt.pitt.edu/inventors_policies.html

Technology Management Agreements

(Interinstitutional, Internal Department Patent Management, Cost Sharing Agreements)

- University of Wisconsin System (4/03):
  http://www.bfs.uwm.edu/ASM/view.aspx?id=2.2.4

Trademark

- Indiana University: http://arti.indiana.edu/Webdb/adpolsmt.htm
- Princeton University (6/93): http://www.princeton.edu/patents/policies/tradepol.html
- University of Texas at Austin (2/05): http://www.cc.utexas.edu/trademarks/policy.html

Managing Student Intellectual Property Issues at Institutions of Higher Education: An AUTM Primer

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Introduction

An understanding of intellectual property (IP) is an important skill set in today's increasingly dynamic, information-based economy. Awareness is especially important at academic institutions where many of society's brightest students first learn about and begin practicing innovation and entrepreneurship. Accordingly, university community members—including students, faculty, alumni, and administrators—should all have reasonable access to IP literacy. For students, this necessarily involves gaining an understanding of their institutional IP policy and how it affects their potential rights and obligations.

While the main purpose of a university's interaction with students is in the delivery of education, there are times when these students develop intellectual property. These inventions can occur, for example, when students are working on entrepreneurship projects, when they are working in the lab as part of a research experience, or during industry-sponsored Capstone projects. In some cases these inventions have real value,

and there are many examples of student activity—including that of undergraduates—resulting in the formation of viable businesses. Unlike faculty and graduate researchers whose contractual relationship with an institution tends be quite formalized, undergraduates and masters students are not generally regarded as being employed by their university in the traditional sense. Accordingly, student-generated IP lies outside of the clear-cut employment context and raises a unique set of issues concerning ownership and other IP-related rights.

Depending on the policy of the university, newly generated student IP may be construed as belonging to either the institution or the student. In general, IP laws in each country—particularly those whose legal systems are rooted in English Common Law—grant default IP ownership rights to the inventor or author unless he or she knowingly agreed otherwise. For there to be a legally binding contract, there must also be consideration. That is, the university must give something in exchange for the student's rights to his or her invention. Thus university IP policy, when it comes to students, needs to be carefully thought out, clearly worded, widely disseminated, and fair.

[1] According to a recent study, "There is a lack of consensus among institutions on how to manage IP generated by undergraduates." Not surprisingly, the policy that a given university implements tends to reflect its individual institutional priorities. For example, institutions trying to promote income may implement policies asserting broad ownership over most, if not virtually all, student IP. If this is the case, the institution needs to ensure that it invests in sufficient resources for making students aware of its IP policy and managing that IP to minimize risk and ownership disputes. In contrast, institutions less focused on revenue generation may assert little to no ownership over student IP at all.

This primer is not intended to prescribe how and when a university should claim ownership of student IP. Rather, the intention is to raise awareness of the key issues and decision points involved in the process. The remaining sections of this chapter will discuss and consider the major issues that an institution ought to consider in the course of developing and promulgating a comprehensive student IP policy that is efficient and consistent with institutional objectives.

As part of preparing this document, the authors have sought out and collected various IP policies from around the United States, Canada, and Great Britain to help consider the range of best practices that make for a fair and comprehensive student IP policy. (Some examples of student IP policies can be found at autm.net/policies.) As there is no single best answer, this chapter presents what the Student IP Policy Task Force learned through a set of accompanying scenarios that university Technology Transfer Offices (TTPs) may encounter in practice. (See the appendix.)

The appendix highlights what considerations might apply in these scenarios to help the institutions come to their own conclusions.

Scope and Purpose

Who Is a Student?

For the purposes of this document, a *student* is considered to be any individual registered in university courses who anticipates earning a degree, diploma, or certificate. He or she may be undergraduate (e.g., BS, BA) or postgraduate (e.g., MA, MSc, MBA, PhD). Some may also operate as employees of the university, while others may not. Analyzing the distinction between students enrolled in programs and courses that are primarily teaching-based versus those that are fundamentally research-based is a key point analyzed more thoroughly throughout the chapter.

The Need for a Specifically Enumerated Student IP Policy

Student involvement in institutional research activities is the most frequent context in which potentially destructive IP ownership issues tend to arise. Universities have an obligation to inject clarity into how their policies address student research participation. The worst outcome for both parties is the emergence of an IP stalemate—with neither the student nor the university feeling confident that they possess sufficient rights for pursuing commercialization. Under these circumstances, the IP and its associated value can diminish or even languish entirely before either party is able to capitalize. This outcome is economically inefficient and potentially risky for the university if, for example, the ownership conflict interferes with its legal obligation for facilitating the national patenting process.[2]

Key Issues

There are seven key issues that every institution should consider when developing and implementing an institutional IP policy or set of bylaws.

Institutional Objectives

- All universities pursue multiple missions and strategic objectives. The weight that a particular institution attaches to particular objectives relative to others will affect how it structures its student IP policy. For example, does the university care more about optimizing revenue (including income from the appropriation of IP) or innovation in general (including the resulting socioeconomic benefits)? This fundamental institutional priority necessarily factors into the school's IP policy calculus and is perhaps best-addressed explicitly rather than left to implication. Of course, these two goals are not mutually exclusive, and a well-implemented policy can promote the spread of innovation and help maximize institutional revenue.
- Revenue issues aside, is the university worried about missing out on particularly novel, high-profile, or prestigious inventions? In other words, does the fear of loss outweigh the need for gain? For example, what if there is a big winner and the university (or its officers) are blamed for not having negotiated effectively? The university wants to maintain its appearance as an attractive place for budding entrepreneurs, while simultaneously implementing a policy that minimizes its chances of losing out on especially valuable IP.

Significant-Use Criteria

- To what extent did student work resulting in the creation of new IP involve *significant use* of university resources? In this instance, significant use means economic rather than intellectual input, such as use of university facilities, support staff, and consumables. As a mainstay feature of many, if not most, existing institutional IP policies, significant-use language is problematic. It is also legally problematic that there are no known high-court decisions clearly defining this term and its significance with respect to student IP. For example, an inventive contribution may be highly significant in the traditional sense of the word, even though the accompanying use of university resources results in negligible marginal cost to the university. For a more detailed

examination of the specific factors and decision points involved in significant-use analysis, refer to the appendix, which discusses student IP scenarios.

Role of Existing Research Programs

- Does the new IP build upon the university's expertise and technology? This brings up issues of coownership and the terms on which the university's research staff and faculty "gave" the student access to proprietary information and/or provided guidance.
- Does the university wish to subsequently license the IP to a third party? If so, it may want to ensure that it has unencumbered rights to the entire package. Without proper handling from the outset, this particular problem is often exacerbated by the fact that licensing opportunities can arise years later, after the student has already left the institution.
- Is the IP arising from the project already encumbered? For example, does it fall into the definition of *foreground* under a third-party sponsored research project? In some ways this is the easiest situation to cope with since students can—and often are—legitimately asked to waive IP rights in exchange for the opportunity to work on a Capstone or similar project. (The alternative being a more abstract project with less-direct or formalized access to third-party resources.)

Contractual Enforceability

- What is the likelihood that a university could successfully enforce its asserted IP rights against a student? Although many nations have enacted laws encouraging universities to assert ownership over IP tied to federal funding—such as the Bayh-Dole Act in the United States—the separate issue of contractual enforceability should not be overlooked.[3] An ambiguously written or substantively Draconian clause resulting in an ownership dispute could be construed in favor of the less-sophisticated party, which is virtually always the student in this case.[4] Language involved in the definition of significant use is a particularly sensitive area and should be vetted carefully for enforceability.
- Does the institution's IP policy—or the manner in which it is presented or implemented—come off as coercing or duping unsophisticated students into signing away their rights? For example, by their agreeing as a default condition of enrollment to be bound cumulatively by an assortment of institutional terms contained within a

single student handbook. It is important not to interpret previous authority supporting institutional administrative policies in general as a rubber stamp of approval over all university IP clauses. With students unlikely to regard academic enrollment as contractual and unable to meaningfully negotiate the terms involved, any ambiguous or unduly burdensome IP provisions risk invalidation or severance and, therefore, pose a risk to the university.

Former Students and Alumni Relations

- The extent to which a university enforces IP rights under old contracts with former students is another important strategic consideration, particularly in the context of alumni relations. Institutions should consider who the former student is and how well-known his or her association is with this invention amongst members of the university community. A university that binds itself into claiming an especially popular or high-profile invention (particularly one that is already viewed as belonging to a particular alumnus) risks potentially harming alumni revenue without generating enough additional licensing revenue to offset the loss.
- Self-limiting the duration of its rights over former students and proactively reaching out to student inventors while they are still enrolled to assess the status of ownership are strategies that institutions can explore to anticipate and mitigate potential alumni issues.

Administrative Overhead

- Does the institution allocate sufficient resources for enforcing compliance with its stated IP policy? Many universities rely exclusively on officers and faculty for self-enforcement of the school's IP policy. Compliance is likely to suffer unless these procedures are clearly articulated and well-understood by the various parties involved—faculty and students especially.

General Strictness: Balancing Research Quality Versus Quantity

- Finally, the balance between maintaining strict IP rules and preserving the quality and depth of institutional research is a critical, overarching concern. An overly strict policy by itself may stifle interaction and sharing between student and research personnel—diminishing the richness and relevance of research projects across the board. Ironically, in this case the stricter policy—intended to broaden university IP ownership rights—may instead have the opposite effect of harming institutional licensing revenue via a loss in research quality.

Taught Courses Versus Research

When a matriculated individual develops IP on campus, the university must determine whether the person should be treated as a student or as a researcher under the school's IP policy in that particular instance. This important factual determination is not always as clear-cut as it might initially appear. For example, an undergraduate student might choose to participate in an independent study drawing upon and interfacing with an existing institutional research program. Likewise, a graduate researcher being paid primarily for his or her work in the lab might still be enrolled in traditional academic courses pursuant to his or her doctoral program. Therefore, a proper determination of student status cannot simply depend on the general enrollment status and must necessarily account for the facts of each scenario on a case-by-case basis.

Most institutions focus this analysis on the type of resources the individual accessed in the course of developing the IP at issue. Typically, the distinction is drawn between resources that are teaching- or study-based versus those that are primarily research- or industry-based. Teaching resources include all forms of instructional course content, course references and study materials, personalized instruction provided outside of normal class time, and so on. Once presented to students, the use and derivation rights in all teaching resources are transferred into the public domain, allowing students free access without raising significant IP concerns.[5]

Determining student status can be especially difficult in the following three teaching contexts.

- *Project work:* A student engages in an independent project that substantively involves research but has little to no interaction with existing researchers and research programs. Should this person be treated as a researcher under the school's IP policy? See Scenario 3 in the appendix for a more-thorough discussion of the key factors and decision points involved in this type of scenario.
- *Extracurricular activity:* A student engages in an extracurricular venture entirely outside of his or her defined curriculum but makes incidental use of significant university research resources without formally engaging the university or understanding the consequences. Again, how should this person be considered under the institutional IP policy? See Scenario 1 and Scenario 3 in the appendix for additional discussion of issues likely to arise in this type of situation.
- *Mandatory coursework:* Especially in upper-level undergraduate classes and graduate programs, students are expected to do independent research as part of the educational process. As this research is a requirement for graduation, it is not clear how the significant-use concept applies. Again, significant use is discussed further in the appendix.

In contrast, research-based resources include all embedded programs and projects specifically structured and geared toward producing novel data and concomitant IP. Universities tend to actively pursue ownership, protection, and commercialization of research-generated IP, and researchers are less likely to retain any ownership interests regardless of their level of involvement or use of resources.

Furthermore, even if a school's policy formally designates a participating researcher as a student in some instance, the student's use of lab and other research equipment could very well trigger the school's significant-use provision—thereby leading the university to assert that the student has relinquished his or her ownership rights anyway.

Conceptually, the types of IP issues surrounding graduate researchers are no different from those of undergraduate students carrying out research projects. In practice, however:

- IP issues in the graduate context are more likely to arise simply because of the duration of the project, the access granted to such students, and the amount of information—both tacit and codified—exchanged as the student becomes a trusted and integral member of a research team.
- Graduates tend to be older and more mature, making them more likely to understand the complex legal and commercial interests attached to their research. Specifically, this enables them to better comprehend and anticipate IP issues and make tradeoffs between various projects with different IP structures, etc.
- The graduate admissions process and dialogue at many institutions is more likely to address the applicable field of research and associated IP issues directly. Graduates are therefore more likely to understand complex IP arrangements, and—from a contractual standpoint—reach a meeting of the minds with the university.

For these reasons, universities often implement distinct IP policies applicable to research students (usually doctoral degrees) versus those enrolled in teaching programs (usually undergraduate and master's degrees). Essentially, it is the nature of the activity, the involvement of the university—both via physical and intellectual resources—and the embeddedness of the research project that should be material, not simply whether the student is being paid by the university in some employment capacity.

Specialized Student IP Cases

Preexisting Student Intellectual Property

When a student enters the university with preexisting IP, he or she should be encouraged to disclose its existence before any further research or development work is undertaken using university resources. If the invention was not disclosed before additional development work is undertaken, then the student may be asked to show evidence of when and where the invention was made.

Capstone Design Courses

One area where student IP issues are often more prevalent is in the context of Capstone design projects. These projects typically involve collaborating with a private industry sponsor, granting the student valuable access to industry resources, but consequently inserting an additional party into the IP equation beyond just the student and the

university. Since Capstone projects more closely resemble the type of inventive work undertaken in actual industry settings, they are significantly more likely to result in the generation of commercially valuable IP than traditional undergraduate coursework. While many institutions have already enumerated an IP policy specifically addressing Capstone projects, the need for continued university awareness and leadership in this area is critical. Similar forms of independent study—such as service learning, senior theses, dissertations, etc.—can raise comparable IP issues and are discussed in the next section.

Capstone project structure and administration can vary significantly from institution to institution—creating a wide range of potential project scenarios and making it difficult to articulate a singular, uniform policy. The set of issues involved is perhaps best-understood in terms of two extremes. On one hand there is the classic Capstone scenario: a formalized arrangement in which students actively partner with an industry sponsor for a sustained period of time, using significant sponsor resources, and eventually producing a deliverable tied to actual industry products and services.

In the classic scenario, universities usually offer, and sponsors typically expect, unencumbered ownership over any resulting IP in return for their contributions to the project. Given the significance of the legal interests involved, universities offering these sorts of sponsored Capstone projects need—and in many cases already have—dedicated policies formalizing the respective rights between student, sponsor, and institution.

Service Learning Projects and Other Independent Studies

In addition to Capstone projects, institutions are also increasingly offering science, technology, engineering, and mathematics students the ability to participate in experiential education through community-oriented service learning and other hands-on projects. Unlike Capstone education—which tends to be quite formalized and industry-oriented—service learning occupies the other end of the spectrum, with projects varying greatly in scope and structure depending on the institution. Students may seek out some degree of collaboration with a third party or use varying degrees of industry or university resources, but typically these projects culminate in a purely academic report or evaluation as opposed to an industry-tied deliverable.

Service learning projects raise threshold issues of: (1) how the project should be categorized under the school's IP policy and (2) whether the enumerated category sufficiently addresses the types of IP issues likely to arise in that project context. Such projects can take on numerous forms in which the student may or may not be working alongside other researchers, receive academic credit for the project, or develop a working relationship with an industry member or other third party. University technology transfer offices have a professional duty of care to ensure there is clear understanding concerning the presence or lack of institutional involvement in these types of relationships.

For example, a senior thesis in computer science might not engage any formal sponsorships—distinguishing it from the usual Capstone project and tempting the university to treat it as generic student IP. Suppose, however, that the same project implicates a host of copyright issues that neither the student nor the university have specifically contemplated or previously addressed in the technology transfer context. Without a project-oriented IP policy in place, ironing out the legal details for every iteration of student project on a case-by-case basis would be prohibitively expensive for most technology transfer offices.

Furthermore, with less than 30 percent of surveyed institutions promulgating IP handbooks or similar material to their students—an increase in university-led outreach and education apprising students of their IP rights is one area that could enhance student involvement in the technology transfer process at relatively low cost.[6] This approach is discussed in greater detail in the following section.

Makerspaces

Many universities and colleges are creating and investing significant resources in the creation of Makerspaces. These facilities contain equipment (including 3D printers, laser cutters, and, in some cases, machine tools), workbenches, and a supply of materials to enable students to design and build small project prototypes and models that may or may not be part of their formal educational curricula. Access to these spaces is usually made available to all students, staff, and faculty at the institution and sometimes to students of other local institutions and members of the community as well.

In many, but not all cases, institutions have a clear policy that any IP developed within the Makerspace belongs to the inventors and not to the institution. As with many other policies, it is up to an individual institution to decide on the specific IP policy for these activities and ensure that participants are aware of the policy.

Similar concerns exist with respect to other student-focused entrepreneurship programs, such as student incubator and accelerator programs where new inventions may be discovered as part of a student's engagement. Again the tendency at institutions has been not to claim any IP ownership, but whatever the decision has been on IP ownership it is important to have a clear policy that is well-publicized.

Outreach and Implementation

If students are not familiar with their institution's IP policy yet voluntarily consent to it anyway, the policy risks not being fully legally binding on the student. To minimize this risk, effective student outreach is critical. Effective outreach in the student IP context has two key components: (1) spreading substantive awareness about the policy in general and (2) obtaining and documenting informed consent from students—especially those likely to be involved in IP-generating activities.

There are many mediums for available for disseminating a student IP policy including:

- posting it
  - on school or departmental websites
  - in newspapers and other publications
  - on departmental and dorm bulletin boards
- having it read
  - by faculty in classes
  - by administrators during welcome and other periodic check-in events
  - on the radio or TV on campus stations
  - in student governance and club sessions
- making it required reading
  - in student orientation booklets
  - in handouts for classes that include research projects
  - in consent forms for participating in internships, co-ops, lab and teaching assistantships, fellowships, and other work or practical experiences programs

This list is by no means exhaustive.

As with any outreach effort, placing the message in communication channels already monitored by the targeted audience is helpful and usually most-effective. The structure of these channels will vary from campus to campus, making it important for each institution to conduct its own independent analysis. Obviously, it helps to make the informed consent process as easy and inviting to students as possible.

Both web- and print-based documents can serve as integral components of an ideal outreach strategy. For example, when students register for classes, the student IP policy could pop up similar to an end-user licensing agreement, which must be read and clicked on before the student navigates away from the page.[7] In addition, faculty could be asked to reference the policy in their syllabi and indicate how students can access it more fully.

For students who are also research or teaching assistants, IP policies are often embedded as a clause in their employment contract or a signed addendum. From the university perspective, these students may be treated no differently than any other employee being asked to surrender prospective IP rights in exchange for employment, and the significance of what they are purportedly agreeing to may not be made clear to the student at the time of signing. Structuring the student IP policy similarly to the faculty/employee IP policy is one way to increase faculty outreach—as faculty members will be in a better position to advise students on IP issues using their knowledge of the policy. However, institutions should take care that IP clauses in student employment contracts are sufficiently conspicuous or else students may not know to approach faculty for guidance in the first place.

One issue with traditional media is the lack of bidirectional, question-and-answer type dialogue. Thus, a periodic seminar on commercialization of student inventions at the beginning of each semester, quarter, and so on, could be another valuable outreach tool. A repeat forum of this sort helps ensure that those who are most likely to encounter IP issues have an opportunity to contemplate and ask clarifying questions about the policy and innovation in general. It also helps to have one person in your technology transfer office designated as the lead for student IP-related issues. This person's job could include maintaining an online frequently asked questions database to accompany the policy,

providing official interpretations of the policy upon request, and acting as the point person for student IP questions and issues in general.

Conclusion

Increased proliferation of student IP literacy remains a challenging, but feasible goal. The standard hands-off approach is not an optimal solution for maximizing the economic and societal value of student innovation as a whole. Through open communication, hard work, and modest policy revisions, the entire technology transfer industry can mutually benefit from a race-to-the-top to maximize student IP. Furthermore, this issue largely transcends individual institutional revenue models and financial priorities—presenting a unique opportunity for industrywide cooperation and improvement.

For more information contact the Association of Technology Managers (www.autm.net) or the National Collegiate Innovators and Inventors Alliance (www.nciia.org).

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Notes

1. Nathalie Duval-Couetil, Jessamine Pilcher, Phil Weilerstein, and Chad Gotch, "Undergraduate Involvement in Intellectual Property Protection at Universities: View from Technology Transfer Professionals," *The International Journal of Engineering Education* 30-1 (2014) 60–71.
2. This is particularly relevant in countries with legislation requiring universities to facilitate the tracking and capture of (usually via patenting) institutionally generated IP. *See e.g.* Bayh-Dole Act, 35 U.S.C. § 200-212 (2012) (containing relevant technology transfer statute under U.S. law). Other countries including Brazil, China, Japan, and most EU members have also enacted similar legislation. "Bayh-Dole Act," AUTM, accessed January 24, 2014, http://www.autm.net/Bayh_Dole_Act1.htm.
3. See e.g. 35 U.S.C. § 202(a)–(c) (permitting nonprofit institutions to retain ownership over IP created pursuant to federal funding; resulting in promulgation of many modern-day institutional IP policies). See also *Chou v. University of Chicago,*

254 F.3d 1347, 1356-57 (3d Cir. 2001) (holding matriculation as academic student sufficient to bind student to general institutional IP policies despite lack of separately signed agreement).

4. See *Stanford v. Roche*, 131 S. Ct. 2188 (2011) (upholding third-party ownership claim over subject IP where institution's ambiguous language of assignment failed to effectuate transfer of rights from student to university).
5. See e.g. 17 U.S.C. § 107 (2012) (setting forth U.S. copyright fair-use provisions and referencing House Judiciary Committee, House Report No. 94-1476 indicating clear legislative intent that fair use apply in academic teaching contexts).
6. Duval-Couetil et al., *supra* note 1.
7. See 15 U.S.C. § 7001 (mandating that electronic signatures be given full contractual effect). The E-Sign Act in the U.S. and others like it around the world help ensure that "click" signatures and other forms of digital contracting remain a viable mode of exchanging contractual rights and obligations.

Appendix:
Student Intellectual Property Scenarios

The following scenarios were developed to illustrate situations in which students may develop or participate in the development of new intellectual property (IP) and how technology transfer offices (TTOs) and other academic administrators may approach a determination on ownership. All presumptions grouped with a particular conclusion must be true in order for the associated conclusion to apply.

Scenario 1

An individual or group of registered students who conceive and develop a new business idea in their dorms. The idea may or may not be inspired or draw upon their course material or assignments (all of which are assumed to be public domain) and makes only incidental use of university resources, therefore resulting in zero or negligible additional cost to the university.

Decision Point 1: Students conceive and develop an idea independent of their formal studies, drawing on their own insights and technical skills. The students make no specific use of university resources while developing their idea.

- *Presumption 1a:* The students receive no guidance or input from any staff, faculty, or administrators at their university.
  - *Conclusion 1:* Defaults to wholly student-owned IP. The university takes no equity and is willing to execute an IP waiver if requested.

Decision Point 2: Students make incidental use of university resources to develop their idea, for example the use of generic equipment, laboratories, computers, meeting rooms, and other publicly accessible resources.

- *Presumption 2a:* The students receive no guidance or input from any staff, faculty, or administrators at their university, except for assistance from technical staff with respect to the generic resources used.
- *Presumption 2b:* The university incurs zero or negligible marginal costs in relation to the resources used.
  - *Conclusion 2:* Defaults to wholly student-owned IP. The university takes no equity and is willing to execute an IP waiver if requested.

Decision Point 3: Students draw upon the time, knowledge, or networks of technology transfer (or other professional, nonacademic) staff at the university.

Presumption 3a: The TTO does not incur any direct expenditures (patent, legal, consultancy, proof of concept, etc.) in the course of administering such advice.

Presumption 3b: At the time of providing said advice, the TTO does not enter into any formal arrangement with the student pertaining to IP ownership, IP rights, or a monetary sum sought in consideration.

Conclusion 3: Defaults to wholly student-owned IP. The university takes no equity and is willing to execute an IP waiver if requested.

Decision Point 4: Students draw upon the expertise and knowledge of a faculty member at the university.

Presumption 4a: Faculty input amounted to no more than advice/consulting on where to locate information or other general considerations pertaining to development. The faculty member's communications cannot have conveyed ideas constituting an inventive step.

Conclusion 4a: Seek verification and waiver from the relevant faculty member. Otherwise defaults to wholly student-owned IP. The university takes no equity and is willing to execute an IP waiver if requested.

Presumption 4b: Faculty communications amounted to assistance that may constitute an inventive step or otherwise create a joint author or inventor situation. However, such assistance did not draw upon existing intellectual property arising from the faculty member's ongoing research.

Conclusion 4b: Co-ownership by faculty may be warranted. The university may wish to waive any rights to IP generated by students or faculty. However, the students should be advised to seek assignment of IP from the faculty member.

Decision Point 5: Students engage in significant use of university resources while conceiving of or developing their invention or work of authorship.

Presumption 5a: The resources used are only those commonly accessed as part of the normal educational or dormitory-living experience.

Conclusion 5a: The university should view any emergent IP as a normal consequence of the educational experience and disclaim any ownership interest.

Presumption 5b: These resources used result in additional expenditure by the university, but do not constitute the use of any proprietary equipment, specialized resources, or other intellectual property.

Conclusion 5b: The university may consider charging a reasonable sum for the use of resources.

Presumption 5c: The students make use of or incorporate the university's intellectual property.

Conclusion 5c: A formal IP license to the new venture will be required in anticipation of future due diligence by an investor. This will necessitate formal involvement by the TTO. Such input may warrant the university seeking a stake in the new venture as well.

Scenario 2

Students conceive and develop an idea as part of their formal studies—typically an assignment or project for credit. They may receive input (guidance, technical advice, referrals, etc.) from faculty supervisors, and the development of the idea may result in some direct costs to the university (e.g., inexpensive consumables, laboratory time, significant computing resource, etc.). However, this input and resource allocation are no greater than that budgeted for any student coursework or project activity.

Decision Point 1: Students conceive and develop an idea as part of their formal studies: an assignment or project. Students were assigned the task of developing said idea by an instructor to fulfill a course requirement.

Presumption 1: The instructor provides little to no direct input toward the initial idea conception, only a general topic or problem to be addressed by the student.

Conclusion 1: Defaults to wholly student-owned IP. The university takes no equity and is willing to execute an IP waiver if requested.

Decision Point 2: Students may receive input (e.g., guidance, technical advice, referrals, etc.) from faculty supervisors. Improvements or modifications to the idea may have resulted directly from suggestions by the faculty supervisors, resulting in potential for co-ownership of the final IP.

Presumption 2a: Faculty input amounted to no more than advice/consulting regarding where to locate information or considerations for development, not complementary ideas to make the idea more functional or improved.

Conclusion 2a: Defaults to wholly student-owned IP. The university takes no equity and is willing to execute an IP waiver if requested.

Presumption 2b: Faculty input amounted to assistance above and beyond what was required or necessary for completion of the assignment.

Conclusion 2b: Co-ownership by faculty member may be warranted, and the institution would therefore likely have rights assigned to it in accordance with its employee IP policy.

Decision Point 3: Development of the idea may result in some direct costs (e.g., inexpensive consumables, laboratory time, significant computing resources, etc.). Concrete "threshold value" for when resources used for IP development are significant to the institution.

Presumption 3a: Resources used are no greater than budgeted for any student coursework, and those resources are provided to the student in exchange for the students' payment of tuition, fees, etc.

Conclusion 3a: Default to student-owned IP since the institution did not contribute resources to the student above and beyond what was allocated to him or her for completion of his or her coursework

Presumption 3b: Resources used include extra laboratory time above and beyond that allotted for coursework or specialized lab time requiring additional training or supervision by institutional employees were needed to develop the IP.

Conclusion 3b: This may constitute use of significant resources by the institution's standards. Establishing a threshold value for resources that contributed to the IP is key in this situation. If significant resources were in fact used, then the institution should have a proportionate amount of rights assigned to it.

Overall Conclusion: In most cases, if institutional input is minimal or in accordance with the expected resources available to students for completion of coursework, then this scenario describes student-owned IP. Key considerations in this case are primarily financial and should include: (1) whether IP was generated as a part of routine coursework and (2) the measurable extent of institutional resources accessed (as

represented by workspace, employee time/effort, reagents, additional funding, etc.) by student that are deemed included with student tuition and fees.

Scenario 3

Students embark upon an independent research project not part of their studies. This project necessitates significant use of university equipment and is likely to draw on the expertise and knowhow of faculty and other research staff. Students may be treated like any other researcher drawing on specialized technical assistance and facilities of the university as well as consumables. One way or another the university adds significantly to the success of the project by subsidizing it and may even (if only incidentally) make an inventive contribution.

Decision Point 1: Who are the formal inventors or authors? Who as part of the project substantially participated in the conception of the invention or expression of the creative work?

- *Presumption 1a:* The project was developed jointly by the student and members of faculty or research staff. This will result in co-ownership of the IP.
  - *Conclusion 1a:* The university will have some rights to the IP from the assigned rights of the co-inventors/coauthors. The TTO will proceed with protecting the IP, but will need to enter into an agreement with the student either getting him or her to assign his or her rights to the institution or developing an interinstitutional agreement (IIA) that gives the university the lead in protecting and licensing.
- *Presumption 1b:* The invention or work of authorship was developed solely by the student.
  - *Conclusion 1b:* The university may or may not elect to pursue ownership depending on how significant the institutional resources used in the development of the IP are judged to be. (See Decision Point 2 for further discussion.) The university may decide not to take any ownership and will not pay to prosecute a patent or otherwise commercially exploit the IP. Furthermore, the university needs to ensure that it does not automatically assume any liability despite its intent not to pursue ownership. The student may be directed to other university resources that will help him or her pursue commercialization of his or her IP.

Decision Point 2: How significant was the university contribution?

Presumption 2: The resources used in the development of the IP were significant vis-à-vis the use of expensive equipment not normally available to students, support staff time to assist with experimentation, or institutional trade secrets.

Conclusion 2: The university can assert that it has rights related to the project because of its investment of significant resources. However, the university should ensure that it was made clear to the student in advance of using institutional resources that such use would enable the university to claim ownership over resulting intellectual works. This would have enabled the student to decide not to undertake the project using the same extent of university resources.

Decision Point 3: What does the student want to do?

Presumption 3a: The student wants to retain his or her ownership of the invention or work of authorship.

Conclusion 3a: This situation may be problematic if the university wants to enforce its ownership rights as a result of its investment of significant resources. The institution will need to reach an agreement (usually in the form of an IIA) with the student so that the parties' respective IP rights can be settled. This is especially important if there are co-inventors/coauthors who have already assigned their rights to the university. The absence of an agreement here creates a risk for both parties going forward even if the institution has a broad significant-use policy in place.

Presumption 3b: The student wants to assign his or her rights to the university.

Conclusion 3b: The student will be treated as a co-inventor/coauthor. As part of assigning his or her rights to the university, there will be a negotiated share of revenues resulting from the IP that will be assigned to the student. The university will proceed with protecting and licensing the technology.

Decision Point 4: What does the TTO want to do?

Presumption 4a: The TTO decides that there is value in the inventive or creative work and that it has a significant claim of full ownership over the IP.

Conclusion 4a: The university negotiates with the student to assign IP rights to the university, and then pays to protect the technology, manage all ensuing licenses, and distribute royalties to the inventors and other stakeholders.

Presumption 4b: The TTO decides that there is little value in the invention and decides not to assert ownership.

Conclusion 4b: The technology belongs to the student, and the student is free to protect and commercialize the technology.

Overall Conclusion: There are many factors involved in this scenario, and the TTO ultimately has to make a decision involving how strong of a claim it has over the IP relative to how much it wants to invest protecting and licensing it. The TTO also needs to ensure that students entering into this type of situation are briefed before any significant inventive actions are taken. In the ideal outcome, the student will assign the IP to the institution and enjoy a share of any revenue stream. In the worst outcome, the student and the university enter into a very public battle over rights which—despite potentially being winnable in court—will do little to aid the public image and reputation of the institution.

Scenario 4

Students are invited by a faculty member or other university employee to play a part in an existing project or research program—which may be funded from external sources (and may be formally sponsored by an industry member). The student is not forced to accept the project, but sees it as a groundbreaking opportunity that will increase employability and marketable skills. He or she will probably generate new IP, and such IP may be the subject of a patent filing on which the student would be co-inventor. To make a full contribution and maximize learning, the university intends for the student to be an integral member of the research team—privy to confidential information and other knowhow available to the project. Ideally, there should be a clause in the student handbook or guide setting forth the circumstances under which students can reasonably expect the university to pursue ownership of student-generated IP.

Decision Point 1: Who are the inventors or authors? Who as part of the project actually participated in the conception of the invention or expression of the creative work?

Presumption 1a: The student is an integral part of the team and contributed significantly to the conception of the idea or expression of the creative work.

Conclusion 1a: The student is a co-inventor or coauthor.

Presumption 1b: The student is an integral part of the team, but does not contribute significantly to the conception of the invention or expression of the creative work.

Conclusion 1b: Legally, the student is merely an observer with respect to the act of invention, in which case the student is not a co-inventor. The same considerations that apply in determining whether a faculty member is an inventor also applies in the student scenario. A student's subjective belief regarding whether he or she should be listed as a co-inventor is only relevant if objective data supports that he or she actually made a substantial contribution. The fact that students often think mere participation in an R&D project automatically conveys co-inventor status highlights the need for additional IP outreach and literacy targeted at students who participate in research projects.

Decision Point 2: Who owns the IP?

Presumption 2a: The student is not being hired to work on the project by either the company or the university. If this were a work for hire, then the terms of the employment contract would affect ownership of the IP—for example, if the contract explicitly stated that all inventions belonged to the employer.

Presumption 2b: The invitation to work on the project is not made contingent on signing away rights to the IP, in which case a contract would likely exist supported by mutual consideration between the university and the student. If nothing explicit is said, there is no reason for the student to infer they are relinquishing rights simply by accepting the invitation.

Presumption 2c: There are significant university or third-party sponsor resources used to conduct the work—such as lab equipment, computers, databases, chemicals, etc. The key issue here is whether the student is participating as a normal part of his or her educational experience or if the activity in question lies outside the typical educational package. Since students attend the university primarily to get an education, the presumption has to be that in the absence of other evidence, nonformalized research activities are a normal part of their educational experience. This presumption is strengthened by the fact the student's participation was invited by the university or one of its representatives. All people in universities are not equal. Faculty and staff members have a certain power over students, both in terms of

grades and contacts/references for future graduate education and employment. Such invitations may not be easy to turn down.

Presumption 2d: The university agreed with a sponsor or funding agency to relinquish its rights or provide a no-cost license/right of first refusal over any resulting inventions. Here, the third-party agency can claim assignment of ownership or other IP rights from the university, but not until the university has secured title from all co-inventors/coauthors. These rights can be secured through employment contracts or purchased directly from the inventors. For students, if a good case can be made that the project was not part of the normal educational experience, then an advance participation contract might be appropriate. Consult counsel before implementing one of these as such contracts are governed by local law.

Conclusion 2: English Common Law and other prevailing legal systems presume that inventors retain ownership of their inventions unless they choose to relinquish it. Therefore, the university must be able to show that the inventor not only had reason to relinquish his or her rights, but did in fact do so. Explicit documentation with a clear informed consent on the part of the potential inventor is necessary to demonstrate this. This principle was central to the holding of the U.S. Supreme Court's landmark decision *Stanford* v. *Roche*. (See *Stanford v. Roche:* Supreme Court Clarifies Intellectual Property Ownership by Kimberly Honeycutt, PhD, in Volume 2 of the Technology Transfer Practice Manual.)

The need for explicit documentation and informed consent is especially important when students are involved. First, since the students are attending school to get an education, virtually every part of the university or college experience can arguably be seen as part of the normal educational experience. Participating in a research project (whether internally funded, externally funded, or merely a faculty member or teaching assistants's self-funded work) must therefore presumptively be treated as part of the student's usual educational experience unless there is strong evidence of informed consent to the contrary. Furthermore, since students are generally unsophisticated parties in the legal sense, any contractual arrangement with them should be treated carefully (especially contracts of adhesion with which the student has had no say in negotiating—e.g., the blanket undergraduate enrollment agreement signed by every student upon enrollment). A specific, written contract in plain, easily understood language is highly recommended if you need to vest ownership in the institution or third party.

Decision Point 3: What should the TTO be doing?

Presumption 3a: The TTO has developed and posted on its website material for students and third-party collaborators clarifying how the institution treats students with respect to IP. The TTO should make sure that collaborators, project leaders, university employees, and all participating students know how to access this information, have accessed and read the information, and do in fact agree with the terms. Ideally, students should be encouraged to send back documentation and other feedback acknowledging that they have read and understood the applicable IP policy. If they do not understand or agree with its terms, students should be encouraged to ask questions or raise concerns. Unlike, for example, the dense and layered end-user license agreements often presented in the context of new software, IP documentation presented to students should be in plain and easy-to-understand language, and a receipt of acknowledgment should be a condition precedent for moving forward with the project.

Presumption 3b: The project is already off and running by the time the TTO finds out about it. The TTO should ensure that everyone involved understands and agrees with the university's policy on student participation in creating IP. If there is disagreement and participants will not agree to sign informed consent, the appropriate person(s) in university management should be informed that a potential liability issue has emerged.

Presumption 3c: Student IP is created, and all parties unambiguously agree that the university owns it. It is treated like any other IP created at the institution.

Presumption 3d: Student IP is created, but the student has not consented to relinquish rights to the university. The TTO needs to communicate to the student how it sees the student's rights relative to the university's. Ideally it would negotiate with the student to obtain rights in exchange for the typical inventor's share of revenues. The usual policy for treatment of outside co-inventors on inventions made with university employees should apply.

Overall Conclusion: Inventors automatically own their invention unless they agree to part with their ownership rights. The key difference when dealing with student inventors versus other institutional inventors is that students are: (1) there primarily to learn and (2) in an unequal power relationship relative to faculty and other university personnel. These issues mean that clear policies and informed consent are critical before asserting

university ownership of student-generated IP (especially where university ownership is necessary to honor and effectuate a contractual conveyance to a third-party sponsor/funder).

It is insufficient for the university to depend solely upon catchall significant-use language to secure IP ownership. This is precisely because of how difficult it is to say what is or isn't outside the scope of the normal educational experience at an institution of higher education. So while a formal policy on student IP is highly advisable, good policies without adequate and thorough dissemination mean little on their own. Neither does the fact a student has read the applicable IP policy—achieving true informed consent status requires a proactive stance. The university needs reasonable IP policies, and students should agree with those policies before they are permitted to participate in research projects. As demonstrated in *Stanford* v. *Roche*, an ounce of prevention is worth a pound of cure.