

TECHNOLOGY TRANSFER AT PURDUE UNIVERSITY



JANUARY 2008

**OFFICE OF TECHNOLOGY
COMMERCIALIZATION**

PURDUE
RESEARCH FOUNDATION

Copyright 2008, Purdue Research Foundation
All rights reserved. Reprints by permission.

TABLE OF CONTENTS

INTRODUCTION	2
ABOUT TECHNOLOGY TRANSFER	3
What is it?	3
Purdue Policy VIII.4.1	4
Who Handles IP?.....	4
Why Bother?	5
THE BAYH-DOLE ACT.....	5
DISCLOSURE CONSIDERATIONS	6
When to Disclose	6
Public Disclosures.....	6
OVERVIEW OF THE DISCLOSURE PROCESS	7
INVENTION DISCLOSURE	8
Disclosing a Creation/Invention to OTC	8
Forms Needed	9
TECHNOLOGY ASSESSMENT	10
IP AND COMMERCIALIZATION PLAN.....	12
Patent Filing	12
Patent Costs.....	13
LICENSING AND COMMERCIALIZATION.....	15
Marketing of the Creation/Invention to Potential Licensees.....	15
Licensing to Established Companies	16
Licensing to Start-ups	16
Other Services Provided by OTC.....	16
FUNDING SOURCES.....	17
TRASK FUND.....	18
Technology Innovation Awards.....	18
Pre-Seed Capital Investment Program	18
DISTRIBUTION OF INCOME.....	19
DISCOVERY PARK & OTC	19
SPONSORED PROGRAM SERVICES & OTC.....	20
OTC STAFF.....	20

INTRODUCTION

Novel ideas and inventions are conceived of every day within the laboratories and classrooms of Purdue University, but the challenge is moving these innovations out of the University and into the mainstream of society where they can benefit the public good.

There are often questions surrounding the disclosure of innovations including what should be disclosed, at what point it should be disclosed, and how the information is handled after it is disclosed.

This guide is designed to serve as a starting point for answering commonly asked questions on how Purdue University handles the technology transfer process – from disclosure through commercialization.

For more information, please visit our Web site at www.prf.org/otc or contact us at (765) 494-2610.



ABOUT TECHNOLOGY TRANSFER

What is it?

The knowledge of how to create a unique innovation is known as “intellectual property” (IP) and it may be legally protected and distributed. IP includes patents, copyrights, trademarks/servicemarks, and tangible research property. “Technology transfer” is the process of taking that IP and identifying one or more practical applications for its use.

Technology transfer covers a gamut of interactions between universities and industry. It can signify the publication of research, the delivery of seminars, faculty consultancy, transfer of the skills and knowledge that a student, newly educated in the state of the art, brings to his or her future employers. Formally, however, the term denotes the licensing of university intellectual property to both established and start-up companies. This subset of transfers is also referred to as technology commercialization.

Purdue University considers technology commercialization to be an important obligation to maximize the public impact of technologies created through the scholarly activity of the University's faculty, staff, and students. The goal of the Purdue Research Foundation's Office of Technology Commercialization (OTC) is to ensure that Purdue satisfies the contractual intellectual property obligations of sponsored projects and, more specifically, to ensure that the creative products of Purdue's faculty, staff, and students will benefit the public.

Purdue's policy guiding the management of IP developed at Purdue is *Purdue Policy VIII.4.1*.

*Policy VIII.4.1 can be seen in it's entirety at:
www.purdue.edu/policies/pages/teach_res_outreach/tro.html*

Purdue Policy VIII.4.1

Policy VIII.4.1 provides for management of University inventions and copyrights by OTC and the potential distribution of the net proceeds of creation/invention-related income to the creators/inventors and the University.

In general:

- The University owns all inventions conceived in whole or in part during the course of any employment, research, or scholarship activity involving or relating to the use of University resources.
- The University permits authors to retain the copyright to instructional and scholarly copyrightable works. Excepting the foregoing, the University owns copyright in copyrightable works:
 - created pursuant to terms of a University agreement with an external party;
 - created as a specific, written requirement of employment or as an assigned University duty;
 - specifically commissioned by the University;
 - the creator of the copyrighted work made more than incidental use of University resources; and/or
 - the copyrighted work is also patentable and/or is associated with a University trademark.
- The University owns all rights, title and interest in trademarks that relate to university intellectual property or relate to a program of education, service, public relations, research or training of the University.
- The University owns all rights, title, and interest in tangible research property and research data developed with support from University resources.

Who Handles IP?

At Purdue University, technology transfer is handled by the Office of Technology Commercialization (OTC), which is a division of the Purdue Research Foundation. OTC works on behalf of the University to identify, evaluate the commercial potential, protect (when appropriate) intellectual property created at Purdue, and manage the marketing and licensing of these properties.



Why Bother?

The technology transfer process creates a win-win situation for all parties involved – the inventor, the University, private industry, and the end consumer.

Benefits include:

- Helps transform nascent scientific discoveries into products and services available for the public good.
- Creates jobs.
- Provides additional revenue to the inventor and the university through patent licensing fees.
- Leads to additional sponsored research from industry.

THE BAYH-DOLE ACT

In 1980, the enactment of P.L. 96-517 of *The Patent and Trademark Law Amendments Act* (more commonly known as *The Bayh-Dole Act*) transformed the process of technology commercialization from universities and began a revolution in how to view the 'proper' role of the university in its interactions with business and in economic development. It has had both national and worldwide effects.



Prior to this law, government agencies retained rights to IP generated from research they funded and would issue only non-exclusive licenses. Because the private sector was more interested in exclusive licenses which would give them an edge on their competitors, most of the innovations resulting from this research were never licensed and, thus, never made it to commercialization.

The Act allowed universities to own the patents on inventions made using federal funding. As most U.S. university research is funded by the federal government, these universities were now in control of most of the patents generated from their research. Under the Act, universities were allowed to license the inventions to companies and to receive royalties, with a requirement to share a portion of the royalties with the inventors. Effectively, a financial incentive was included in the law to encourage both universities and investigators to participate in the process of technology commercialization.

DISCLOSURE CONSIDERATIONS

When to Disclose

All inventions at Purdue start with an individual faculty/student/staff member or a research group. The idea – once conceived – needs to be developed and its feasibility assessed before it becomes an invention. This is the ideal time for the inventor(s) to contact the Office of Technology Commercialization for discussions on the best path for the transfer of their invention to the public.

In many cases an idea requires additional development and investment. Investments are often only available when access to the technology can be controlled in a manner that allows the investor to get a return on that investment.

A disclosure to OTC is not the same as a public disclosure. While a public disclosure may result in loss of IP rights, a disclosure to OTC is the first step in technology commercialization.

Public Disclosures

Public disclosures can be made through publication, seminars, posters, abstracts, or discussion. *If it is believed that an idea has commercial potential, please contact OTC prior to disclosure for a consultation.* Disclosing an invention to OTC at the time a paper is submitted for publication, or earlier, is essential to allow for protection of patent rights while ensuring unrestricted publication. Failure to do so may result in the loss of some or all patenting rights per U.S. patent law.

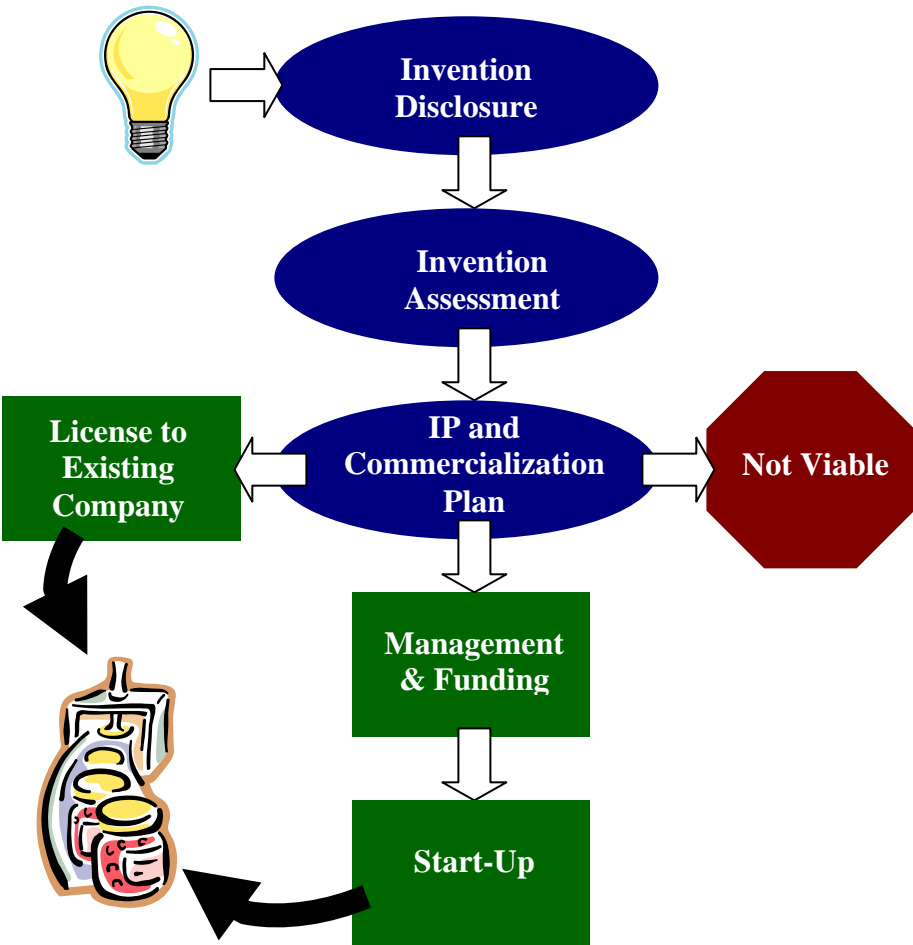
The criterion for determining if a disclosure would bar the patenting of an invention is that it has to be “enabling”. This means that the disclosure has to provide enough of a description of the invention for a person skilled in the art to understand and practice it.



Under U.S. patent law, there is also a grace period of one year after the date of an enabling disclosure within which to file a patent application. However, there is no such grace period in a majority of countries including Europe, Japan and Australia. An enabling disclosure would, thus, considerably limit the potential commercial benefit of the invention.

OVERVIEW OF THE DISCLOSURE PROCESS

When a disclosure is filed with OTC, it sets into place a series of actions to evaluate both the technical and marketing aspects of the innovation. An overview of the process is shown in the chart below:



INVENTION DISCLOSURE

Disclosing a Creation/Invention to OTC

Purdue faculty, staff, and students are responsible for disclosing to OTC all creations/inventions that arise from research or other projects conducted with University resources. For this purpose, OTC encourages faculty and staff to keep the following points in mind when they are working on a project that has (or may) lead to a new creation/invention:

- Care should be taken in maintaining complete, permanent, dated, and contemporary records of an idea and its development;
- If you think an invention has been made, schedule a predisclosure interview with the OTC professional in your area of technology. If you are not sure who to contact, please call OTC at 494-2610;
- An "Invention Record and Disclosure Form" or "Copyright Materials Disclosure" should then be completed and sent to OTC so that the creation/invention can be evaluated; and
- In addition to writing a precise description of the creation/invention, the creator/inventor should take special care to list all of the individuals who may have made a creative contribution to the inventive concept. The formal naming of inventors on a patent (if filed) is a legal determination that will be made with the aid of an expert patent attorney once the patent application is completed.



Formal review of the copyrightable material or invention is initiated when a disclosure is received by OTC. The office evaluates the disclosed technology and, with the creator/inventor, determines whether it should be patented, copyrighted, trademarked, or otherwise managed. When intellectual property is deemed commercially viable, OTC takes the necessary legal steps to file a patent, register a copyright and/or trademark registration, and works toward locating an appropriate licensee. OTC receives close to 250 disclosures each year describing potentially patentable technologies and copyrightable materials.

Forms Needed

The **Invention Record and Disclosure Form (IRD)** is used for disclosing any innovation containing intellectual property which could be patented. The IRD is sometimes referred to as a “full” disclosure because it requires the inventor(s) to supply all information regarding funding, key contributors, and invention details. OTC requires an IRD before it can file a patent application. Ideally, this form should be submitted to OTC at least eight weeks prior to any public disclosure so the Technology Manager has a chance to evaluate the technology and move forward with any patent protection to ensure IP rights are secured.

A **Pre-Disclosure Form** is an abbreviated version of the IRD which can be filled out and submitted online. The Pre-Disclosure should be used when the inventor wishes to establish a record of the invention but does not yet have all the details to complete an IRD. This is particularly helpful if there are plans to disclose the technology at a seminar or other event and an IRD has not been completed. Keep in mind that a pre-disclosure will *not* protect some foreign patent rights if the public disclosure is made prior to a patent application (see *Publishing and Other Public Disclosures on page 6*).

The **Copyright Disclosure Form** is used for software, courseware, education/training manuals, and all other copyrightable materials.

*These and other related forms,
along with submission information,
are available on the OTC Web site
at www.prf.org/otc.*

TECHNOLOGY ASSESSMENT

There are many things to consider when evaluating a new innovation and whether or not it is patentable and/or has any commercial potential. Once an Invention Record Disclosure Form (IRD) is submitted to OTC, the case is assigned to a Technology Manager for assessment. The invention is evaluated based on the following criteria:

- **Legal Issues** – Work with faculty to correctly identify contributors, inventors.
- **Sponsor related directives** – Work with Sponsored Program Services and faculty to fulfill obligations to sponsors as defined by the research agreement under which the work is funded. If government funded, identify export control restrictions, if any.
- **Patentability** – Work with faculty and OTC interns to identify prior art and hence determine the potential value of the patent in terms of:
 - Strength
 - Breadth
 - Geographic limitations
 - Ownership – sole vs. joint
 - Patent Landscape (who else owns IP in the space?)
- **Commercial potential** – Work with faculty to determine the commercial potential of an invention. Rarely do the inventors or OTC have complete information on potential applications of a technology. Given the number of cases OTC manages, and the lack of detailed application data for most inventions, OTC tends to err on the side of protecting and marketing technologies broadly rather than trying to screen out inventions at an early stage. If there is little or no response from the marketplace, continued investment is less likely. Five key characteristics that influence an innovation's adoption rate¹ are:
 - Relative advantage – the degree to which the new technology is perceived to be much better compared to the existing technology.
 - Complexity – the degree to which an innovation is perceived to be difficult.
 - Compatibility – the degree to which the innovation is consistent with the values, needs, and experience of the recipients.
 - Observability – the degree to which customers can perceive the advantages and other reasons for purchasing an innovation.
 - “Trialability” – the ease with which an innovation can be used experimentally before final adoption.

¹ Rogers, E. M. (1995). *Diffusion of innovations (4th ed.)*. New York: Free Press.

- **Stage of development** – How far along is the technology? Is it still in the research stage? Has a prototype been developed? Obviously, the further along an invention is, the more marketable it is.

In a technology licensing context, other important factors to evaluate are:

- What is unique or new about the invention?
- What are the possible uses for the invention? Who would be likely to purchase and use the invention? Who would benefit from the invention?
- How is the function of the invention being performed today? In what ways are existing techniques better than the invention?
- How is the invention better, cheaper, faster, etc. than other existing methods/technologies?
- Could the invention be used to build a stand-alone product, or must the invention be incorporated into a larger system to be effective?
- Is this invention compatible with existing techniques, or does it require practitioners to radically rethink how they approach a process or problem?
- How easy is the invention to learn? Does the invention require a significant transfer of know-how before the invention can be put into practice?
- How easy would it be for a potential licensee to test this invention? How expensive, risky, or time/labor intensive would testing the invention be?

During this period of review, the Technology Manager will often confer with the inventor(s) regarding any questions or issues surrounding these review criteria. An ongoing dialogue will help ensure that all concerned parties are informed of the progress and any potential problems leading up to the decision to patent or not patent an invention.



IP AND COMMERCIALIZATION PLAN

Patent Filing

If the technology appears to have commercial potential, OTC will proceed to obtain patents or other intellectual property protection at PRF's expense. There are two principle types of U.S. patent applications – provisional and non-provisional. A provisional patent is essentially a place-holder; it establishes a timeline for inventorship. However, it is not necessary to file a provisional patent prior to a non-provisional patent. A provisional patent is never processed and is only valid for 12 months from the filing date at which time it must be converted to a full patent in order to retain patent rights.

A non-provisional filing can take several forms – design, plant, or utility. Design patents are used to protect a configuration or ornamental design of something that is manufactured; for example, a new car design. Plant patents are used to protect genetic modifications of plant species. The utility patent is the most common type of patent. It is used for machines, manufactured goods, compounds, processes or improvements to an invention that fits in one of these areas. Design patents provide protection for a term of 14 years from issuance; plant and utility patents are for 20 years.

To qualify for a patent, an invention must meet three criteria:

- 1) It must demonstrate utility,
- 2) It must be novel, and
- 3) It must lack obviousness.



OTC secures the services of patent attorneys for the writing and filing of patent applications. Before drafting the application, the attorney will initiate a patent search to see if any claims under the new patent are already protected by issued or pending patents filed by someone else. The attorney may need to work with the inventor(s) and OTC to revise or remove some claims from the patent or may recommend against patent filing based on the findings of the prior art search.

Patent Costs

Due to the cost of patenting, not every invention that is disclosed to OTC can be forwarded to the patent office. The decision to patent or not to patent is based on the outcome of the evaluation process described under “Technology Assessment” above.

While OTC regards all Purdue IP to be significant, consider that the costs associated with a provisional filing can range from \$300 up to \$10,000 and a full patent filing costs between \$6,000 and \$20,000. Additionally, there are fees for defending claims based on office actions and responses, fees when the patent issues, and fees at 3 ½, 7 ½, and 11 years after issuance for patent maintenance.

Also consider that when a patent is filed with the U.S. Patent and Trademark Office, the protection is only good in the U.S. For protection in other countries, additional filings and costs must be incurred. Applying for foreign patent rights can cost anywhere from \$8,000 to \$23,000. Additionally, for each foreign country where the patent is filed, a patent fee is assessed – typically \$2,000 to \$11,000 per country.

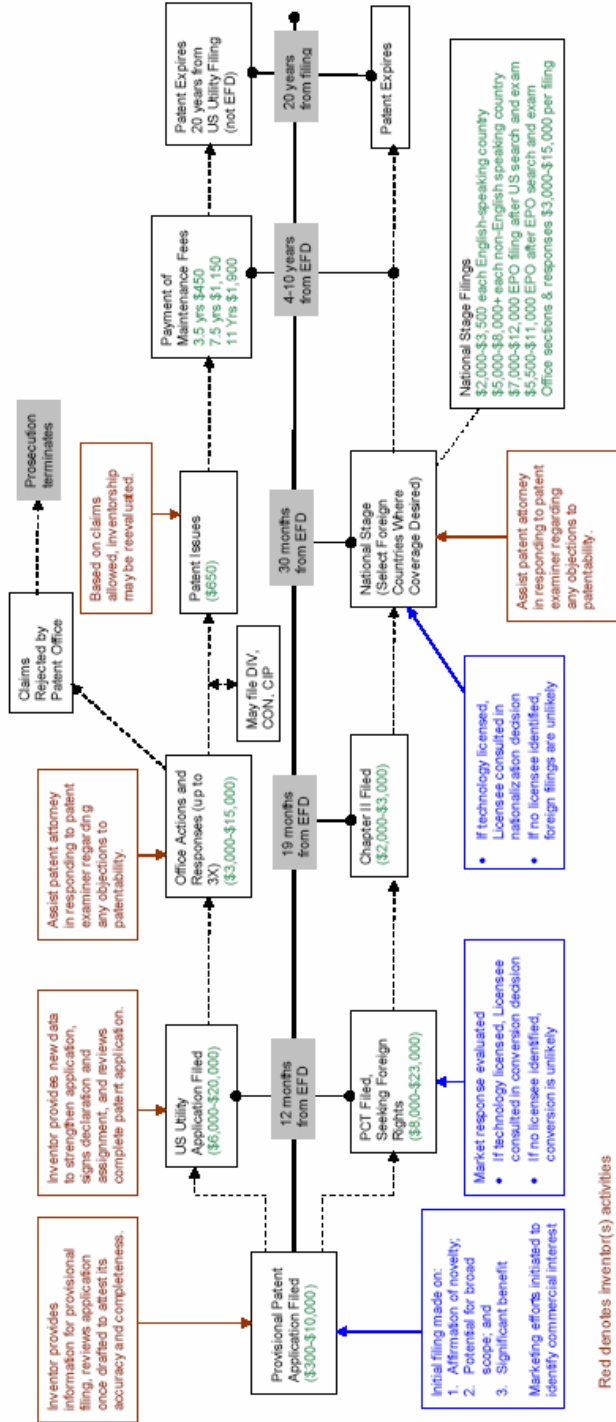
Although PRF covers these costs associated with patenting, it seeks to reclaim them through licensing agreements and revenues. The reclaimed funds are then used to cover new patent filings. To ensure the sustainability of patent funds, those technologies that have identified potential licensees and/or strong commercial potential have a greater chance of being patented by OTC.

A chart summarizing the costs and activities related to patenting a technology at Purdue are shown on the following page.

*For more information on patents,
please visit www.uspto.gov.*

General Guidelines on Patent Calendar and Cost Estimates

(This flow chart represents general calendar rules. Please note that each case is different and can be affected by innumerable factors.)



Red denotes inventor(s) activities
Blue denotes OTC activities
Green denotes Purdue investment decision

Provisional – Place holder/starts clock
 Utility – Application that is examined
 EFD – Effective file date – Date provisional patent application filed
 DIV – Follow-on application to request examination of separate sets of claims
 CON – Continuation; Refile to continue prosecution
 CIP – Continuation in Part; Procedure to file new subject matter to replace the original

Documents to be executed by inventor/PRF

- Declarations & Power of Attorney (POA) – Sworn attestation by inventors that they are true inventors of technology claimed in the patent application and PRF attests that it is the owner of the application
- Assignments – Documents assigning invention to PRF under VIII.4.1

LICENSING AND COMMERCIALIZATION

Marketing of the Creation/Invention to Potential Licensees

After OTC has received a creation/invention in the appropriate form and consulted with the submitter(s), a non-confidential description is prepared and forwarded to selected industry representatives to determine market interest. If a company expresses interest in learning more about the creation/invention, technical details are provided under a confidential disclosure agreement with PRF. The company's further evaluation of the creation/invention, which often involves direct communication with the researcher(s), may result in an interest to commercialize a creation/invention. Ideally, the next step would be negotiation of a license agreement and/or a research agreement with an option to license.

If the technology can be the basis of a start-up company, OTC will work with the inventors in providing linkages to potential business partners, investors and providers who can assist in getting the company off the ground.



One of the best sources of marketing leads for Purdue technologies comes from the inventors themselves. They are familiar with the major competitors in their field and often have contact information for corporate personnel due to previous collaborations and/or funded research agreements. OTC's marketing efforts, therefore, begin with a meeting with the inventor(s) to identify potential licensees. Additional contacts are determined through databases, previous communications, and expressed interest. Mailings, Web sites, and other targeted marketing efforts are undertaken to locate parties who might have interest in the technology.

Technologies which demonstrate strong potential as start-up companies may also be highlighted in Technology Roadshows hosted by PRF's Business Development area. These events showcase several technologies per show to potential investors, licensees, and entrepreneurs across the state of Indiana. The goal is to identify top management talent and/or financial resources to develop a successful company, preferably one which will locate in the Purdue Research Park and provide economic benefit to the State.

Licensing to Established Companies

When a potential licensee is identified, a negotiation process begins between the Technology Manager and the entity. Negotiations can include topics such as: the yearly licensing fees, terms for renewal, revenue percentages, improvements to the technology, etc. Once the terms are agreed to, the license is executed and the licensee can begin working toward commercialization. This process can take anywhere from a few months to a couple of years.

Licensing to Start-ups

In some instances, Purdue faculty or staff may have an interest in creating a start-up company around their technology. Faculty led start-ups are encouraged by the University; however, faculty are required to take certain steps to mitigate any conflict of interest issues. Conflict of interest is governed by Executive Memorandums C-1 and C-39 and is administered through the Office of the Vice President for Research (www.purdue.edu/research/vpr).

Other Services Provided by OTC

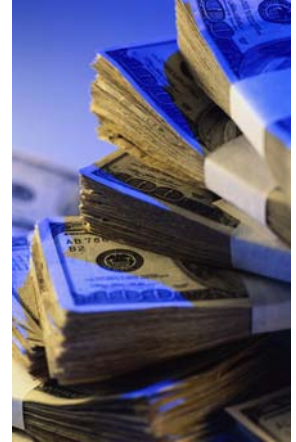
Because of OTC's close ties with industry, this office provides information on a number of other technology transfer matters besides the copyrighting, patenting, and licensing of creations/inventions developed by Purdue University personnel. Some examples are described below:

- Intellectual property and license terms in sponsored research agreements — OTC assists the University Contracting Group in the negotiation of intellectual property terms in sponsored research agreements.
- Agreements for industrial review of proprietary materials — OTC assists faculty by negotiation of agreements for those situations in which an outside enterprise wishes to examine proprietary materials. These agreements include:
 - "Confidential Disclosure Agreements" (CDAs) that outline the terms by which a company can review proprietary material from Purdue that is in a written format;
 - "Material Use Agreements" (MUAs) that outline the terms by which a company can evaluate the physical embodiment (e.g., biological or chemical) of proprietary materials from Purdue; and
 - "Permission to Use Agreements" that outline the terms for outside parties to use PRF-owned copyrighted works.

FUNDING SOURCES

The source of funding chosen for development can have a significant impact on the options available to the University in terms of future commercialization of the invention. The available options include:

1. *Internal University and PRF sources* – This source, though limited, still allows the University to pursue all possible venues of commercialization as the rights in the technology are not subject to any third party claims, while retaining the right to publish.
2. *Federal funding* – Under the Bayh-Dole Act, the federal government retains the right to use the invention for U.S. governmental purposes, but allows the University the opportunity to pursue many alternative avenues of commercialization, while allowing researchers to retain the right to publish.
3. *State funding* – This may be more restrictive than federal funding depending on the granting agency but is still very attractive from a future commercialization point of view, while allowing researchers to retain the right to publish.
4. *Industrial funding* – Industrial sponsors often ask for, at a minimum, first option to license any technologies that are developed under the plan of work. If the University has a good partner, this may be a great way to rapidly transfer the technology to the marketplace. It is important, however, for the University to limit the timeframe for which the sponsor can tie up the technology if it does not plan to further develop it.



The University always retains the right to publish, with some allowances to delay publication to preserve patent rights.

TRASK FUND

The Trask Fund is designed to assist in the commercialization of Purdue University's intellectual property by funding commercialization efforts and by funding emerging companies in the very early stages of development. Two programs exist under this fund: the Technology Innovation Awards and the Pre-Seed Capital Investment Program.

Technology Innovation Awards

This program supports short-term projects that will enhance the value of intellectual property disclosed to the Purdue Research Foundation. The goal is to create a strong patent position for the intellectual property and/or reduce technical risk of the technology and increase the probability of attracting a commercial partner. The program does not support basic research. Awards in this program are up to \$100,000 for a period of one year.

All proposals will undergo dual review—a peer review for science/technology quality, and a technology commercialization review to assess commercial potential. Proposals to support technology development will be moved into the review process only after formal disclosure has been filed with OTC.

Pre-Seed Capital Investment Program

This program will utilize Trask funds as pre-seed capital for initial capitalization of qualified Purdue University technology-based startup companies. The goal is to provide pre-seed capital to move the company through the Gateways Program at the Research Park and enhance the potential to receive seed capital from angels or venture capitalists. Awards from this program are limited to those who are starting a company that will license disclosed University technology. This program is limited to a one-time investment up to \$250,000.

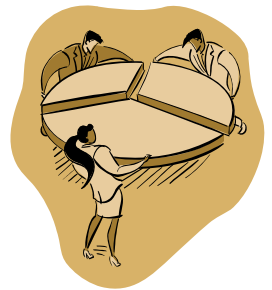
Awards will be made based upon an extensive review of the business plan and license agreement with the Purdue Research Foundation. The decision to provide one-time funding will also depend upon the potential for the company to attract seed capital and the assessed business plan.

*For more information
on the Trask Fund,
please visit the OTC
Web site at
www.prf.org/otc.*

DISTRIBUTION OF INCOME

When commercial agreements are established with companies, an invention may generate income. Subject to the University's discretion, Policy VIII.4.1, provides for a division of net royalties between the University and the submitters of the disclosure. One-third of net proceeds is distributed to the submitter(s), one-third to the submitter's(s') department(s), and one-third to the PRF Trask Fund for investment in promising disclosures. If a recognized University center/institute plays a significant role in the development of University Intellectual Property, the share of royalties normally distributed to the department/administrative unit shall be distributed one-third to the center/institute and two-thirds to the academic units having administrative responsibility for those staff who are participating in the distribution of the inventor's share of royalty proceeds.

Expenses for the patentability search, patent application fees, and legal fees are deducted from gross revenue resulting from that particular disclosure prior to income distribution.



DISCOVERY PARK & OTC

Purdue's Discovery Park and the Office of Technology Commercialization (OTC) work cooperatively to facilitate the movement of innovations into the private sector. The collaborative research efforts at Discovery Park pair experts across a variety of disciplines including science, engineering, and business. Because of this blending of expertise, the technologies generated at Discovery Park can benefit from a holistic approach.

The Burton D. Morgan Center for Entrepreneurship is the catalyst for bringing the various entities at Discovery Park together. By engaging in the invention process from the outset, BDM staff can help identify potential collaborators, funding sources, and market potential which can guide the research efforts toward a more favorable commercialization outcome.

OTC markets the technologies coming out of Discovery Park to qualified companies as a licensing opportunity or assists in identifying the appropriate contacts for a new business start-up.

SPONSORED PROGRAM SERVICES & OTC

OTC works closely with Sponsored Program Services (SPS) to determine any sponsorship obligations related to funding and any restrictions, such as export control, which may be applicable to the technology. For more information about SPS, please visit their Web site at www.purdue.edu/sps/.

OTC STAFF

OTC staff members can provide rapid answers to your questions concerning disclosures, marketing, agreements, and patents. OTC's offices can be reached at (765) 494-2610 or visit www.prf.org/otc for additional contact information.



Front row:

Susan Henderson, Julie Goonewardene, Sally Ross, Karen White, Simran Trana, Bindu Komalavally

Back row:

Eric Lynch, Dea Pass, Sue Grimes, Hilton Turner, Jenny Kelly, Matt McFarland, Mark Krivchenia

Not pictured:

Molly Byers, Shane Fimbel



**Office of Technology Commercialization
Purdue Technology Center
3000 Kent Ave.
West Lafayette, IN 47906
(765) 494-2610**