

The Alliance has been concerned from its inception with identifying best practices for product development; our lead article gives a recent perspective. Our second article deals with the issue of technology transfer from University to Industry, drawn from the presentation to the May 1999 Alliance Conference.

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## Transferring Technology from University to Industry

### Jack M. Granowitz and Fred H. Kant

Columbia University's technology transfer office was created in 1982 under the name of "Office of Science and Technology Development". The name of the office was changed to "Columbia Innovation Enterprise" (CIE) in 1994. The main driving force for the creation of such an organization, at Columbia as well as at other major research universities, was a change in government regulations dealing with intellectual property created at universities as a result of federally sponsored research. The major change for universities resulted from the so-called Bayh-Dole Act (Public Law 96-517, passed in 1980), which

permitted universities to take title to inventions/patents resulting from federally-sponsored research, provided that certain key conditions were met:

- the university must attempt to develop the invention - e.g., via licensing
- the university must provide the government with a free right to unlimited use of the invention for its own purposes
- in granting licenses to commercialize inventions, the university must favor small businesses and must insure that the in-

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## United States

- all proceeds from licensing the invention must be dedicated to educational purposes
- the university must share with the inventor(s) a portion of the royalties received from licensing such inventions

The activities of CIE are aimed at managing the relations between the University and industry and focus on the identification, protection and commercialization of intellectual property. In this connection, the CIE staff:

- works with faculty members to identify inventions and seek patent protection
- negotiates license agreements with companies covering the University's intellectual property
- works with faculty members to seek industrial support for academic research programs
- works with faculty members who have an interest in commercializing their intellectual property by creating a new company
- closely controls and monitors its operation to assure compliance with all relevant government regulations

In addition, CIE helps companies who need space by introducing them to the Audubon Business and Technology Center, located adjacent to the Columbia's Health Science campus in upper Manhattan.

CIE reports to the Executive Vice Provost of the University. It is organized into two marketing units plus an administration/finance unit. The marketing units correspond functionally to each of the two major campus locations - i.e., the Health Science campus (medicine and dentistry) and the Morningside campus (engineering and physical sciences). The current CIE staff includes 12 individuals involved in marketing and 10 in administration and support

I want to discuss briefly our overall model for the general technology transfer process, and, in particular, for the creation of start-up companies. Figure 1 describes the technology transfer model, which begins with the submission of an invention report to CIE. These invention reports are discussed at regularly held review meetings, with participation of the inventors, CIE, patent counsel, and consultants where appropriate.

The decision on whether to file a patent application is usually made at the conclusion of these meetings.

Once a patent application has been filed, CIE begins its marketing effort, which consists of contacting potential licensing targets. At this point, I want to emphasize the

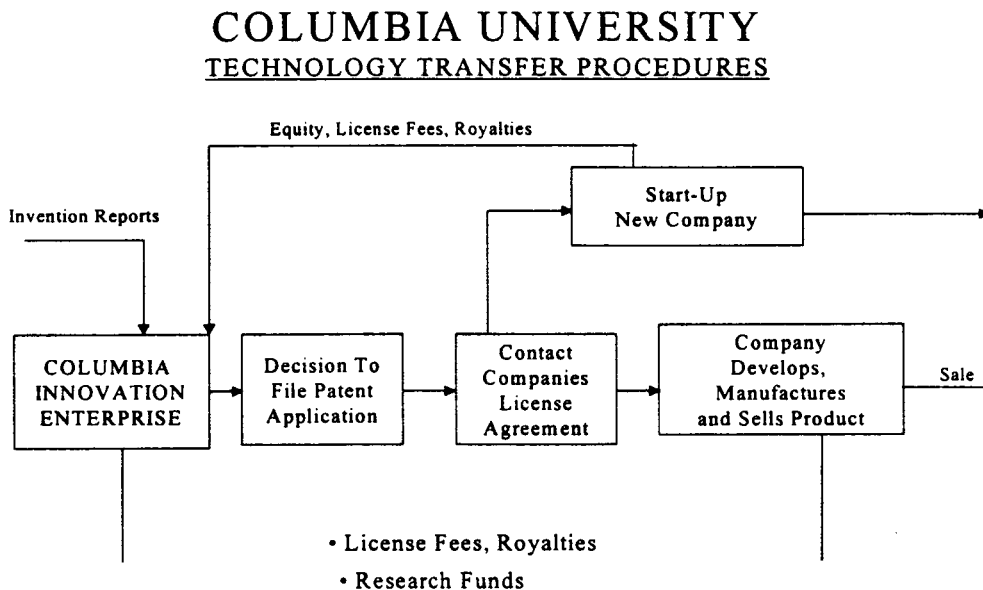


Figure 1 important role played by our web-site in helping to market Columbia technology and to fulfill all other aspects of CIE's mission. This web-site which can be accessed via: <http://www.columbia.edu/cu/cie> contains a wealth of information about CIE and is basically aimed at two audiences: our faculty (including an inventor's guide, invention report form, intellectual property policies, etc.) and our corporate customers (including a complete and up to date list of technologies for license). It is our aim to keep this list current by adding technologies as soon as we have evaluated them. A measure of the success of this list as a marketing tool is the fact that, on the average, about 100 "hits" from industry are registered every month.

Once a promising licensing candidate has been identified, the terms of the license agreement are negotiated. In addition to some mix of royalties and license fees, we usually try to get the licensee to sponsor research at the University related to the licensed technology. In return for this sponsorship, the licensee gets an option to negotiate an exclusive license to any intellectual property originating from the research.

Figure 1 also indicates that a start-up company may result from Columbia technology. In such a case, in

## Transferring Technology (continued)

order to get the rights (usually exclusive) to such technology, the company would grant Columbia equity in the company as part of the consideration for the license. Figure 2 summarizes the steps in the creation of such a start-up company, designated as "NEWCO". It illustrates two features of such arrangements:

- The creation of the company involves financing and support from corporate partners and for sources of venture capital.
- In the case of the biotech industry, it is customary for NEWCO to enter into marketing arrangements with a large pharmaceutical company.

CIE has been very active in the creation of start-up companies. To date, Columbia technologies

have been involved in the creation of 18 companies, which are listed on our web-site. We expect that start-ups will continue to play a very important role in Columbia's technology transfer process.

### A Productive Source of Inventions and Technology

Any successful technology transfer program begins with an ongoing source of high-quality science and technology, which forms the basis of the program. Columbia, like all other major research universities, derives most of its research funding from the federal government – e.g., NIH, NSF, DOE, etc. For example, for the 1998 fiscal year, about 90% of the research base of \$350 million came from the federal government.

It is this research base, coupled to the industrially sponsored research, that provides the inventions that lead to successful license agreements. Having such a source of science and technology, however, is merely the first step of the process

### A Favorable Policy Environment

The university must have a policy framework in place for claiming intellectual property, including a mechanism for equitable distribution of any licensing pro-

ceeds. Columbia's intellectual property policy is posted on the CIE web-site cited previously. It recognizes that licensing income must be shared among the inventors of the technology, their research project, their department and school, and the University.

### No Interference with the "Academic Culture"

An important consideration in achieving success of a university-based technology transfer program is not to interfere with the academic environment or "culture". Professional recognition for members of the faculty involves scientific papers, talks, textbooks, etc. If such

publications contain subject matter that deals with a potentially patentable invention, publication would preclude worldwide patent protection. This would diminish the commercial value of such an invention. The objective is to learn about such inventions and to protect them early

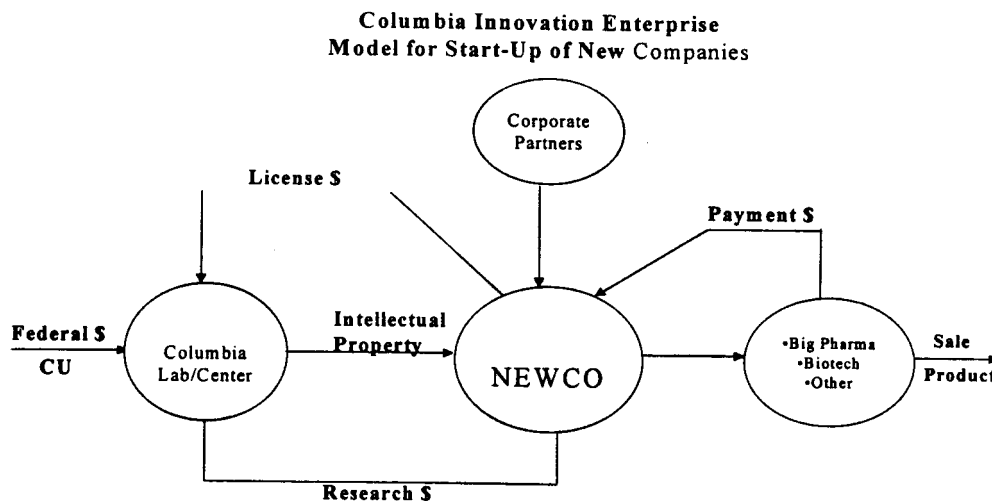


Figure 2

enough without in any way interfering with the academic publication process. Drawing from our experience at CIE, this objective can be met, at least most of the time, provided that: (1) the faculty is made fully aware of the value of reporting inventions, and (2) the technology transfer office maintains an active "outreach" program to the faculty, which can serve to identify potential inventions.

Finally, it is extremely important that, when university administrators authorize the creation of a technology transfer activity, they have the patience and commitment to give this activity time to grow and achieve significant financial results.

### A Technology Transfer Staff with Industrial Experience

Based on our experience, I believe it is important that as many members of the staff as possible have industrial experience. Our present staff, for example, includes individuals with experience in the pharmaceutical, chemical, petroleum, computer, and telecommunication industries. Such experience is very valuable in identifying potential licensees or research sponsors. It is also useful in negotiating appropriate license and research agreements.

## Best Practices

## Authors' Biographies

Jack Granowitz is Executive Director of the Columbia Innovation Enterprise, at Columbia University. Since 1983, he has been actively involved in technology transfer programs at the University. Prior to Columbia, Mr. Granowitz worked in the corporate sector with companies in the health care industry. He has held senior executive positions at IPCO Corporation, American Cyanamid Company and Pfizer. He was involved with the development and marketing of a number of medical and pharmaceutical products and holds several patents related to medical and surgical devices.

Fred Kant has been at CIE since 1984 and was Director for Physical Sciences Technology from 1994-1998. Before joining Columbia, Dr. Kant spent a 30-year career at Exxon in various management roles in research, new business development and strategic planning. He was closely involved in Exxon's programs in synthetic fuels, petrochemicals, non-fossil energy sources, and environmental control and management. He holds a number of patents in the areas of separations and shale oil conversion.