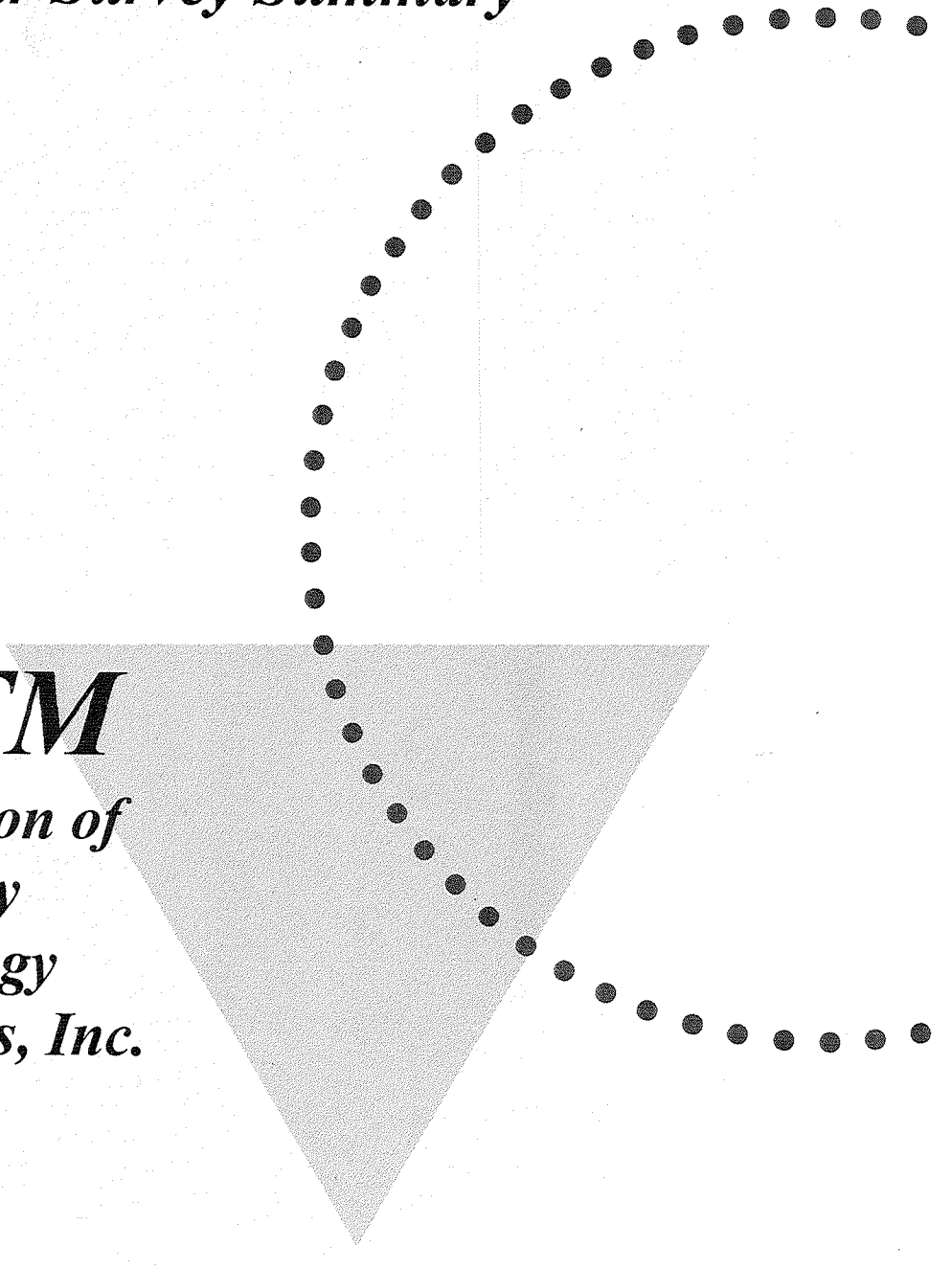
AUTM Licensing Survey FY 1991 - FY 1995

Five-Year Survey Summary



AUTM

Association of University Technology Managers, Inc.

A MESSAGE FROM THE AUTM PRESIDENT

Dear AUTM Members and Interested Friends:

In considering my message to you, I was reminded of a quote from Leland Stanford: "Money has little value to its possessor unless it also has value to others" (ref. 1). When Stanford said these words, he spoke of a truth that has become the very essence upon which academic technology transfer programs operate today.

Although the Survey data contained within these pages attempt to measure performance and productivity in bringing academic research results to the public in a meaningful way through commercial channels, we realize that most readers may focus on the dollars. I expect you will gravitate towards dollar data as well, but as you do, think about what these dollars represent, the details of how they were generated, and how they are used. Remember that these dollars are constantly churned to beget more research and to generate economic and societal benefits, yielding positive value to others that goes well beyond the initial dollar received.

Think about how these data (numbers/dollars) represent formation of new companies and availability of new products based on academic research results and licensing of intellectual property rights. Examples of some of these products are included in this report.

Think about the fact that public benefit is the focus of our business transactions in this profession, and that acting on behalf of the public takes resources. To serve our multiple constituencies well, we must capture a fair return from innovations created with public funds. It is not just our responsibility to seek a fair return on our intellectual property assets, it is irresponsible not to do so.

Think about how dollars generated by university-industry licensing are reinvested to perpetuate programs important to academic interests and to economic development initiatives. Specifically, they are reinvested to pay for research and other academic programs; to cover the expense of patent protection; to provide incentives for innovation; and to support technology transfer operations.

Think about the long timelines for development of these innovations and the fact that royalty returns may reflect the age and continuity of a technology transfer program as well as the sales of products that originated at the academic laboratory.

Think about how equity, royalties, license fees, and sponsored research funding are used to establish value that reflects the contribution of the innovation source to the commercializing entity. Equity is a relatively new way to earn remuneration from academic intellectual property, and may not show up in the form of a cash return for several years. For the second consecutive year, the Survey tracks sponsored research funding directly resulting from a technology license, illustrating the continuity of licensing and technology commercialization efforts with the core

AUTM Licensing Survey FY 1991 - FY 1995

A Five-Year Survey Summary of Technology Licensing (And Related) Performance for U.S. and Canadian Academic and Nonprofit Institutions, and Patent Management Firms

Edited By:

Daniel E. Massing, Chair
AUTM Survey, Statistics, and
Metrics Committee

The Association of University Technology Managers (AUTM) has undertaken this Survey and the reported results herein for the educational benefit of its own members and as a public service to the nonprofit technology licensing community. AUTM has assembled these data using responses obtained from its members representing educational and other nonprofit research organizations. These contributors to the data voluntarily self-reported results to AUTM using the AUTM Licensing Survey instrument. Use of institutional or entity names in the report as Survey respondents is for reference purposes in data presentation only and does not constitute an endorsement or official submission on the part of the institutions or organizations named. AUTM has made no independent verification of the data presented and cautions that the data may not be accurate in all respects.

AUTM LICENSING SURVEY

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FOREWORD

This report is a milestone in the series of statistical surveys performed by AUTM. As a five-year comprehensive report, this volume contains data for the fifth consecutive year of data collection combined with information gathered over the previous four years. The contents form a cumulative record of licensing data for universities, hospitals, nonprofit, and patent management organizations engaged in the process of transferring inventions from academic and related research organizations. In addition, there is a more detailed presentation of data in various summaries intended to examine important results over the five-year time period and across groupings of institutions. Efforts to produce this document have focused on the process of separating key performance indicators for the overall technology transfer process from the very large data set developed to date.

It is both appropriate and timely to discuss the rationale for the scope and purpose of the AUTM Licensing Survey. The principal objective behind AUTM's sponsorship of this Survey has been to collect and report an independent, unbiased, and statistically sound data set that measures the performance of participating institutions. The presentation of these results has progressed from simple tabulations to more comprehensive presentations combined with discussion and interpretation. Throughout the process, it has been the policy of AUTM to maintain neutral ground with respect to individual respondent performance. Moreover, there has been and continues to be a sensitivity to the issue of inferential or direct comparisons among institutions. On balance, the author of this year's analysis as well as authors of previous volumes have maintained the central purpose of the work, which is to provide basic data for the benefit of report users to independently assess their own organizations' relative performance.

This policy may be further paraphrased by the impressions gleaned from informal discussions with Survey users. Many users of this Survey report perform post-process analysis to prepare what may be called an institutional "report card," which compares their performance with other "comparable" organizations. A second user group is represented by the various private and public agencies who interpret data to support investigative and legislative efforts. Some of these interests have carried out studies of the technology licensing process and, as such, rely on AUTM survey data as a means to validate the various "models" that have been proposed.

It is with this vision of user interest that AUTM has maintained the scope of report presentation reflected in this five-year report. To further examine this mission overview, an historical perspective of technology licensing is presented later in this report as a means to chronicle the events that have led to the results reflected by Survey data. In consideration of these results, manifested by the large sums of monetary flow both in the research stimulus (research expenditures) and also in the licensing response to this research (royalty, equity, and other forms of license value), these measures of economic performance suggest that public benefits envisioned by the enabling legislation are indeed meeting expectations. For example, it is evident that although large royalty sums are realized by some institutions in so-called "blockbuster" licenses, most institutions benefit from modest licensing income that, in addition to the shorter term gain (income), leads to a longer term benefit in the maintenance of the academic research infrastructure. Public benefit, as envisioned by the crafters of Bayh-Dole, is being realized by the licensed products and processes increasing the quality of life. This public benefit aspect has two facets, economic income and product availability, and is rooted in the performance figures presented here in the AUTM Survey and in other similar studies of technology transfer.

Daniel E. Massing, Chair
AUTM Survey, Statistics, and
Metrics Committee

FY 1995 Five-Year Survey Summary

Table of Contents

1.0 INTRODUCTION AND OVERVIEW

Two groups are prominent as users of AUTM Survey data. The first is the "internal" group: the institutions as participants (and generally respondents) who are the licensor community. The second group is the "external" community which, as interested observers of technology transfer, monitor performance using metrics and various derived models of the process.

For the internal group, the significance of this five-year report is to make critical examination of individual performance relative to other members of the participant group. For many of these institutions, these analyses represent "report cards" to management and administration, and answer such questions as:

1. How successful are we (the institution) relative to internal goals and objectives? and

2. How do we compare to other comparable institutions or organizations?

As stated earlier, the task of analysis for this purpose is left to the respective institutions and their specific requirements. With regard to the external group, a different perspective, and possibly another motive, may exist with respect to Survey use.

There are two important questions that may be posed by "external" interests, to be answered, in part, through use of this Survey:

1. Is academic research being successfully transferred to commercial interests by the producing and related institutions? and

2. Is there sufficient momentum and sustaining effort to continue the process?

One can presume that, given five years of "good data," it should be possible to draw inference(s) that can provide answers to the foregoing. The first question cannot be fully answered by this Survey; it must be addressed by independent observers of the technology transfer community. These are the investigators and authors of the many studies providing critical examinations of the process. There have been numerous published articles describing "best practices," "models," success stories, etc. related to technology commercialization. A compilation of many of these publications has been prepared by Rosenkrans (ref. 2) as an annotated bibliography of some eighty-seven works. A review of this bibliography reveals that many notable and respected names in the technology transfer field are represented, many of whom have the wherewithal to answer the questions posed above. It is to this community that this Survey is potentially most valuable, in terms of their ability to assess, objectively, (using AUTM Survey data) the degree of success and the prospects for process continuation in the future.

There is no doubt that, based on the sheer magnitude of the numbers involved, the transfer of academic research is viable and robust. As will be evident in related presentations herein, growth potential and sustaining interest are at work on the technology licensing process. Having stated the above, the task of summarizing results will be addressed in a later section, Section 6.0, Summary of Significant Survey Results. Further presentations to enable inference from the data will be covered in Section 7.0, Interpretation of Selected Data.

Terms from the AUTM Survey are shown in capital letters and are defined on pages 34 and 35. References, i.e., ref. 1-16, and Notes, i.e., i-xx, appear throughout the report and may be found on pages 27 and 28-30, respectively.

Since the passage of the Bayh-Dole Act and the establishment of the U.S. Court of Appeals for the Federal Circuit, there have been many other legislative efforts that catalyzed technology transfer. P.L. 98-620 amended P.L. 96-517 by eliminating the term limitation on exclusive licenses. The Stevenson-Wydler Technology Innovation Act (P.L. 96-480), later amended by the Federal Technology Transfer Act of 1986 (the "Act" or "FTTA"), authorized government-operated federal laboratories to enter into Cooperative Research and Development Agreements ("CRADAs") with eligible parties (ref. 7). (The FTTA was the direct progeny of the Bayh-Dole Act and much of its language is identical.)

Still other important legislation followed. The Omnibus Trade and Competitiveness Act, signed into law by President Reagan (1988), plugged a leak in the protection of intellectual property. Through provisions of this law, a company can no longer go off-shore and practice a patented process, importing the resulting product into the United States without a license, without paying royalties, and without fear of patent infringement liability. Section 337 of the Tariff Act helps intellectual property owners to more easily block imports that infringe patents, copyrights, registered trademarks, and mask works. Section 301 of the Trade Act is used to exert pressure on foreign countries to respect and enforce rights in intellectual property. (ref. 7.)

Other laws affecting intellectual property continue to be passed. These include: the Canada-United States Free Trade Agreement (the "FTA"), (1987); North American Free Trade Agreement (NAFTA), (1992); and General Agreement on Tariffs and Trade (GATT-Uruguay Round)—TRIPs Portion (Agreement on Trade-Related Aspects of Intellectual Property Rights, Including Trade and Counterfeit Goods), (1995). The effects of these statutes and agreements were perhaps the most strongly felt by the passage of GATT-TRIPs, which changed the life of a patent from seventeen years from date of issuance to twenty years from date of filing; allows for the filing of a "provisional application;" adjusted the manner in which continuation-in-part and divisional applications may be viewed by the U.S. PTO; and modified the language regarding acceptable procedures to establish a "date of invention" by foreign inventors. (ref. 8.)

2.2 Brief History of Growth of Technology Transfer in Canada (ref. 9)

Technology transfer and intellectual property management in Canada have evolved over several decades, resulting in approaches almost as diverse as the number of institutions involved. While the Canadian federal government began the earliest organized efforts at managing intellectual property on behalf of its own agencies, universities, and colleges, over time each institution eventually assumed the responsibilities for managing its own inventions. Each institution developed its intellectual property policies independently as the need arose, without guidance from or regulation by provincial or federal governments.

Canadian Patents and Development Limited (CPDL) was formed in 1947 by the Canadian federal government to exploit technologies arising out of the National Research Council, the government's main applied research institute. The services of CPDL were made available to other government agencies, including universities and colleges. By the 1970s, university research offices were using CPDL or other foreign organizations to manage their growing patent and licensing activities. In the 1980s, some of the larger universities were able to take on the responsibilities directly through their newly-established technology transfer programs. CPDL was to support these government agencies and universities until 1991, when it was dissolved. The vacuum created by the dissolution of CPDL led to the creation of a number of technology transfer programs within the larger federal government departments and those smaller universities that had not yet established their own programs. As these new programs were established, different intellectual property policies were evolving in each institution to address their growing technology transfer activities.

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To carry out its mission, AUTM hosts several meetings each year and conducts professional training courses for members and nonmembers in the management of intellectual property. It also publishes a wide selection of educational materials and publications, including its *Journal* and the *AUTM Technology Transfer Practice Manual*, which is regarded as the most comprehensive document available on the management of intellectual property. AUTM's membership has increased from a handful of members in 1974 to 1,500 members today. A third of this increase has occurred over the last five years, representing the heightened awareness of the need for, and benefits of, technology transfer activities.

In addition to professional development, AUTM as an organization has focused on legislative issues and coordination of activities with other organizations with common constituencies.

AUTM has gained recognition for its efforts in the United States for education in the management of intellectual property and, as such, is receiving requests worldwide for assistance in the development of training programs and educational materials pertinent to specific countries.

AUTM has also met the demands of ever-changing new technology through the development of its own World Wide Web site (http://autm.rice.edu/autm/), which has already been visited by over 100,000 persons worldwide.

3.0 TECHNOLOGY TRANSFER PROGRAMS

3.1 Challenges of Managing a Technology Transfer Program

In the past, a tradition prevailed, especially in the United States, where scientific product development was corporate-based. This practice isolated corporate scientific effort from the academic research community. This process deprived America of the synergy that could have resulted from an effective cooperation between the corporate-academic communities (ref. 14). This practice has changed over time and was brought about by improved liaison efforts by academic technology transfer programs with industrial partners who have helped to shape a stronger collaboration between corporate interests and the academic research community.

The environment within which technology transfer programs operate has also changed significantly over the past two decades. In the 1970s, technology transfer offices focused on the gradual infiltration of federally financed technology into society by publication and training. Programs formed in the early 1980s established university-industry liaison offices encouraging transfer of technology to industry through intensive collaborations with corporate scientists. In the late 1980s, in response to external influences such as venture capital and state economic development efforts, technology transfer offices participated in the establishment of research parks, incubators, and new company start-ups in unprecedented numbers. With the approach of the turn of the century, technology transfer programs must continue to support all of these objectives. (ref. 15.)

3.2 Elements Common to Successful Technology Transfer Programs

The mission of the academic institution is education, research, and public service. Consistent with the foregoing is the creation, dissemination, and transfer of research results to the public. With the passage of several public laws and internal policy changes, universities and other nonprofit organizations now have an obligation to transfer, in the most efficient manner, institution-generated knowledge to the public. (ref. 16.)

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Faculty inventors enjoy an opportunity to work with the private sector in the development of an idea and, if successful, will see their ideas develop into reality. Peer recognition may be increased inside and outside the institution. Industrial collaboration may also lead to consulting arrangements for the faculty and access to state-of-the-art equipment and leading-edge technologies. (ref. 16.) This in turn allows the faculty to share in the rewards from their inventions without having to resign from the institution, depriving it of their expertise in teaching and research, in order to join industry.

Institutions benefit from the internal use of unrestricted royalty income, which helps to build new research capability. Royalties are shared according to varying institutional policies with a percent going to inventor groups, and balances distributed to campuses depending on institutions' internal policies. Fresh ideas and solutions to problems may result through university and industry collaboration. The institution may find itself in a better position to attract new faculty, and graduate placement may also be stimulated. (ref. 16.)

b) To the Public

Benefits of technology transfer programs also flow into the community. There is opportunity for new business development when organizations exist in the area that can assist with commercialization. Encouraging new business development and licensing inventions locally are consistent with the public service aspect of the institution's mission. (ref. 16.)

Industry, of course, profits from the commercial sale of licensed technologies, but may also gain advantages through collaboration with active academic technology transfer programs. The company is afforded access to some of the best minds in academia, thereby effectively broadening its array of researchers. (ref. 16.)

c) Benefits Stream

A benefits stream is created by active technology transfer programs. Society benefits from the use of the discoveries that are successfully transferred from the public sector to the private sector for the public good (ref. 16). Such a stream may be characterized by the basic attributes of the participants (universities, nonprofits, and patent management firms), licensors, licensees, and the public.

For the Licensor:

- Income (royalty) used internally leverages research capability
- External use (wages, services, etc.) flows into the community

For the Licensee:

- Resulting product or service produces profit
- Wages and services stimulate economic growth

For the Public:

- Public benefits from use of new product or service
- Economic benefits (jobs) leverage other processes

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Universities, U.S. Hospitals and Research Institutes, Canadian Institutions, and Patent Management Firms, respectively. Also included are subtotals for the institutions, summarized by the four categories of organizations noted above.

Included in the *Full Report* is a series of tables that compare the year-to-year responses on selected questions of those institutions that have provided five full years of data for the Survey.[vi] A discussion of "benchmarks," which have been developed using ratio analysis techniques and recurrent respondent data, follows these tables and is provided for the first time in the *Full Report*. These ratios are recognized metrics that may provide supplementary information in non-dimensional or normalized format. The ratio analysis results are presented in the *Full Report* as follows:

Ratio Analyses (5-Year Historical Tabulations)

1. Royalties Received per $1 million of Total Research Expenditures
2. Royalties Received as a percent of Total Research Expenditures
3. Total Research Expenditures per Invention Disclosure
4. Invention Disclosures per Professional FTE for Licensing
5. Licenses Executed per Professional FTE for Licensing
6. Total U.S. Patent Applications Filed per Professional FTE for Licensing
7. New U.S. Patent Applications Filed per Professional FTE for Licensing
8. Invention Disclosures as a percent of New U.S. Patent Applications Filed
9. Number of Invention Disclosures Received per License/Option Executed
10. Invention Disclosures as a percent of Licenses/Options Executed

The *Full Report* also includes a listing of the products and processes provided by the FY 1995 participants, as mentioned above.

The Table of Contents for the *Full Report* and a listing of the tables contained in each section can be found in Attachments B and C (pp. 39-42) of the *FY 1995 Five-Year Survey Summary*.[vii]

4.2 Use of the Survey Information

The AUTM Licensing Survey is intended to provide the members of AUTM with useful data from which they may evaluate their own programs. This information is often used for internal purposes in preparing management reports and for external purposes for other presentations. The information contained in the Survey reports is best used as a starting place or as a point of departure for more extensive analysis.

The findings presented here may also be of interest to government officials and policy makers who work in the field. The trends and highlights noted may aid in understanding the contributions academic institutions, nonprofit organizations, and patent management firms have made in the transfer of technologies.

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The *Full Report* presents the data reported by every participating institution in each year surveyed, providing information on 197 organizations. However, as noted throughout the reports, some of the reported comparisons are based on data provided by the five-year recurrent respondents, who consistently participated over all five years surveyed. The five-year recurrent respondents include approximately 65% of the top 100 U.S. Universities and 85% of the top 50 U.S. Universities.[x]

6.0 SUMMARY OF SIGNIFICANT SURVEY RESULTS

The presentations of summary data are intended to highlight significant results in a format and sequence consistent with the technology transfer sequence: invention disclosure, patent application, issued patents, licenses executed, and licensing result (royalty income).

Two approaches were used to segregate data for the presentations in this section. One parameter is the five-year aggregate of TOTAL RESEARCH EXPENDITURES, referred to as *cumulative* TOTAL RESEARCH EXPENDITURES. A group classification was derived from sorting data by *cumulative* TOTAL RESEARCH EXPENDITURES and dividing group membership at break points of greater than $1 billion, $100 million to $1 billion, and less than $100 million *cumulative* TOTAL RESEARCH EXPENDITURES over the five-year interval. TOTAL RESEARCH EXPENDITURES was selected as being representative of the input or catalyst to the university and nonprofit research process and is, therefore, an indicator by which the process response (licensing results) may be examined. These break points were chosen for convenience and simplicity. The second approach divides the respondents into groups representing similar institutional characteristics. This process was enabled through results of the Survey, and divides the institutions by those with medical schools and those without medical schools, or by sample population, i.e., universities, hospitals and research institutes, etc. These groups were used to develop several tables in this section that provide insight to various group-related licensing results.[xi]

The data are reviewed for all respondents in each year and/or by five-year recurrent respondents, depending on which group makes the most accurate statement. For example, trend analysis and comparison of data from one year to the next is limited to the five-year recurrent sample population to ensure that the same institutions are represented in each year. In addition, data from participating third-party patent management firms are excluded from analyses due to the small sample size (3), inconsistent reporting of some data across all years, and to avoid a possible double-count in the data.

6.1 Important Trends over Five-Year Span

Survey results presented in this section reflect selected data and data grouped by the two methods described previously. These data are arranged in certain tables to reflect the consecutive five-year aggregate.

To begin with a measure representative of the measure of process initialization (INVENTION DISCLOSURE), Figures 2A and 2B show the respective trends from earliest to latest within institutional and group classifications for five-year recurrent respondents. Percentage changes reflect modest increase in the influx of new technologies with licensing potential.

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categories, patent protection activity has increased steadily over the years. Figure 3B presents information for U.S. PATENTS ISSUED for these respondents, using the same categorical divisions.

Note that TOTAL U.S. PATENT APPLICATIONS FILED shows a dramatic increase in FY 1995 as a result of the signing of the General Agreement on Tariffs and Trade (GATT), as applicants attempted to file by June 8, 1995, in order to receive the patent term of seventeen years from issuance. (See Section 7.1 for more discussion on TOTAL and NEW U.S. PATENT APPLICATIONS FILED.)

Figure 3A:

TOTAL U.S. PATENT APPLICATIONS FILED
BY *CUMULATIVE* TOTAL RESEARCH EXPENDITURES
(Five-Year Recurrent Respondents that Provided Data for both U.S. Total Patent Applications Filed and Total Research Expenditures for All Years, N=92)

		DATA GROUPED BY DESIGNATED RANGES:		
		CUMULATIVE TOTAL RESEARCH EXPENDITURES		
Fiscal Year	Total U.S. Patent Applications Filed, *Annually*	Greater than $1 Billion (N=18)	$100 Million to $1 Billion (N=66)	Less than $100 Million (N=8)
		TOTAL U.S. PATENT APPLICATIONS FILED, ANNUALLY		
FY 1991	2,201	979	1,189	33
FY 1992	2,435	1,088	1,294	53
FY 1993	2,829	1,275	1,503	51
FY 1994	3,320	1,604	1,662	54
FY 1995	4,771	2,445	2,266	60
Totals	15,556	7,391	7,914	251

U.S. PATENTS ISSUED are shown below for the same five-year recurrent respondents in Figure 3A. (U.S. PATENTS ISSUED data were not surveyed until FY 1993; thus, only three years of data are available for this five-year recurrent respondent sample.)

Figure 3B:

U.S. PATENTS ISSUED
BY *CUMULATIVE* TOTAL RESEARCH EXPENDITURES
(Five-Year Recurrent Respondents that Provided Data for both U.S. Total Patent Applications Filed and Total Research Expenditures for All Years, N=92)

		DATA GROUPED BY DESIGNATED RANGES:		
		CUMULATIVE TOTAL RESEARCH EXPENDITURES		
Fiscal Year	Total U.S. Patents Issued, *Annually*	Greater than $1 Billion (N=18)	$100 Million to $1 Billion (N=66)	Less than $100 Million (N=8)
		TOTAL U.S. PATENTS ISSUED, ANNUALLY		
FY 1993	1,131	548	546	37
FY 1994	1,354	645	670	39
FY 1995	1,275	645	611	19
Totals	3,760	1,838	1,827	95

Moving to the next process measure, Figure 4 charts the pattern of growth in licensing activity among the five-year recurrent respondents that have consistently provided AUTM with their level of activity in this area.

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6.2 Significant Results in the 5th year (Basic Survey) Compared to Previous Years

Survey results tabulated in this section reflect recent findings and may be considered significant in that the results are uniquely attributed to the factors at work that influence the licensing process.

As may be seen in the tabulation in Figure 6, *license-related research funding*, defined as research funding committed in conjunction with the execution of license and option agreements,[xiv] increased slightly from the last Survey period. Respondents were asked to provide the amount of funding committed, even if it was to be spent over several years, related to license/option agreements negotiated during the Fiscal Year. Those who reported these amounts represent approximately 75% to 80% of total respondents (15% to 25% of those respondents included a zero response). The remaining institutions, ranging from 20% to 25% of respondents, reported that these data are not available. Others indicated that although these amounts may include multi-year funding amounts, their institutions only record these data on an annual basis, and thus were reporting only a portion of the research funding. Because of the difficulty in tracking these data, the reported amount of research funding linked to a license is believed to be understated.

START-UP activity declined slightly from FY 1994 to FY 1995, but is significant in these combined last two years, with 464 companies initiated during Fiscal Years 1994 and 1995. This is 28% of all START-UP COMPANIES formed since 1980, which were reported at 1,633.

Figure 6:

LICENSE-RELATED INCOME AND START-UP COMPANIES
(Number of Respondents Reporting These Data for FY 1994 and FY 1995:
FY 1994: N=159; FY 1995: N=173.)

	FY 1994	FY 1995
License-Related Research Funding, ($ million)	$ 133.7	$ 147.3
Start-up Companies	241	223

Also significant in FY 1995 is the rise in license-related equity activity.[xv] Figure 7 notes the number of LICENSES WITH EQUITY reported under the Survey. As of FY 1994, there were 592 LICENSES WITH EQUITY reported by 100 institutions. This number is *cumulative* for all years, including FY 1994 and prior years, where prior years may pre-date the start of this Survey. In FY 1995, there were an additional 142 licenses executed with equity by 70 institutions; this number of licenses executed with equity is an *annual* number and represents 19% of total equity activity over all years. (See Figure 13 for a discussion of LICENSES WITH EQUITY for five-year recurrent respondents by *cumulative* TOTAL RESEARCH EXPENDITURES.)

Figure 7:

LICENSES WITH EQUITY
(All Respondents in FY 1995, N=173; and FY 1994, N=159)

FY 1995		FY 1994	
Number of Institutions Reporting Response	***Annual* No. of Licenses Executed with Equity in FY 1995**	**Number of Institutions Reporting Response**	***Cumulative* Licenses with Equity, FY 1994 and Prior Years**
70	142	100	592
100	0	53	0
3	N.A.	6	N.A.
173	142	159	592

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Figure 9B:

RANGE OF PROFESSIONAL FTE STAFF MEMBERS IN TECHNOLOGY TRANSFER OFFICE

Range of FTE Staff Members in Office	NUMBER OF OFFICES WITHIN SPECIFIED RANGE			
	Professional FTEs for Technology Transfer		Professional FTEs for Licensing Activities	
	FY 1992	FY 1995	FY 1992	FY 1995
5.1 FTE or more	13	14	5	9
2.1 FTE < x < 5.0 FTE	25	26	20	15
1.1 FTE < x < 2.0 FTE	24	23	26	26
1.0 FTE or less	28	27	39	40
Total Institutions	90	90	90	90

Figure 9C:

RANGE OF SUPPORT STAFF FTE STAFF MEMBERS IN TECHNOLOGY TRANSFER OFFICE

Range of FTE Staff Members in Office	NUMBER OF OFFICES WITHIN SPECIFIED RANGE			
	Support Staff FTEs for Technology Transfer		Support Staff FTEs for Licensing Activities	
	FY 1992	FY 1995	FY 1992	FY 1995
5.1 FTE or more	8	11	5	4
2.1 FTE < x < 5.0 FTE	25	21	16	13
1.1 FTE < x < 2.0 FTE	13	19	10	18
1.0 FTE or less	44	39	59	55
Total Institutions	90	90	90	90

7.0 INTERPRETATION OF SELECTED DATA

The presentations in this section are intended to illustrate results that demonstrate mission success. Through a display of five-year trending and group performance results, it is possible to examine, for example, royalty data on a year-to-year basis and on the basis of group contribution classified by a measure of research volume (*cumulative* TOTAL RESEARCH EXPENDITURES).

Figure 10, shown on the next page, provides such a measure wherein the results indicate gross correlation between *cumulative* TOTAL RESEARCH EXPENDITURES (5-Year Total of TOTAL RESEARCH EXPENDITURES) and gross royalty income (5-Year cumulative total of ROYALTIES RECEIVED) as a percentage contribution across the three *cumulative* TOTAL RESEARCH EXPENDITURE classifications. Figure 10 identifies that the 19 institutions who reported over $1 billion in *cumulative* TOTAL RESEARCH EXPENDITURES account for 38% of the gross *cumulative* ROYALTIES RECEIVED reported under the Survey for all years. Additional conclusions can be drawn in review of these data, such as: *cumulative* ROYALTIES RECEIVED are 1.9% of *cumulative* TOTAL RESEARCH EXPENDITURES for institutions reporting *cumulative* TOTAL RESEARCH EXPENDITURES between $100 million to $ 1 billion. Data in Figure 10 also indicate that five-year recurrent respondents represent approximately 73% and 81% of royalty and research expenditure data, respectively.

Terms from the AUTM Survey are shown in capital letters and are defined on pages 34 and 35. References, i.e., ref. 1-16, and Notes, i.e., i-xx, appear throughout the report and may be found on pages 27 and 28-30, respectively.

annual licenses executed for this group using FY 1995 data is at 17 LICENSES EXECUTED (not shown in Figure). An average *annual* rate of change is also included in Figure 12 to track growth rate.

Figure 12:

LICENSE COUNT BY INSTITUTION GROUP

(Five-Year Recurrent Respondents that Provided Data for both Licenses Executed and Cumulative Active Licenses for All Years, N=95: Insts. with Medical Schools, N=54; Insts. w/o Med. Schools, N=41)

	Institutions with Medical Schools			Institutions without Medical Schools		
	Annual Licenses Executed	License *Annual* Average	*Cumulative* Active Licenses	*Annual* Licenses Executed	License *Annual* Average	*Cumulative* Active Licenses
FY 1991	823	15		305	8	
FY 1992	1,043	19	4,492	442	11	1,564
FY 1993	1,114	21	5,240	455	11	1,773
FY 1994	1,303	24	6,016	474	12	1,970
FY 1995	1,379	26	6,696	436	11	2,105
Average *Annual* Licenses Executed		21			11	
Average *Annual* Growth Rate			14%			10%

Another important performance measure related to licensing success is equity participation (often taken in lieu of other license income). A comparison of the historical distribution as a function of institutional *cumulative* TOTAL RESEARCH EXPENDITURES is provided in Figure 13. From this Figure, one can observe a high concentration of LICENSES WITH EQUITY per institution associated with the highest (greater than $1 billion) *cumulative* TOTAL RESEARCH EXPENDITURES grouping. Also evident from Figure 13 is that 106 LICENSES WITH EQUITY were executed in FY 1995, which is 19% of the total equity activity for these five-year recurrent respondents.

Figure 13:

DISTRIBUTION OF EQUITY LICENSING
BY *CUMULATIVE* TOTAL RESEARCH EXPENDITURES

(Five-Year Recurrent Respondents that Provided Data for both Licenses Executed with Equity in FY 1994 and FY 1995, and for Total Research Expenditures for All Years, N=94)

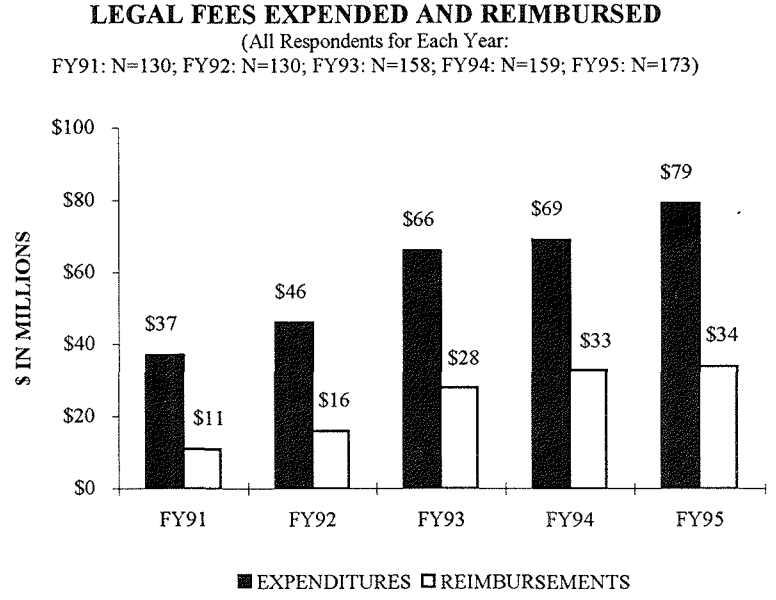
DATA GROUPED BY DESIGNATED RANGES:

	Total Licenses w/ Equity	*CUMULATIVE* TOTAL RESEARCH EXPENDITURES		
		Greater than $ 1 Billion	$ 100 Million to $ 1 Billion	Less than $ 100 Million
		TOTAL LICENSES WITH EQUITY		
***Cumulative* Total Licenses with Equity for FY 1994 and Prior Years**	455	154	281	20
Licenses with Equity for FY 1995	106	35	68	3
Total Licenses with Equity for 5 Years	561	189	349	23
No. of Institutions, (N=94)		18	68	8
Average *Annual* Licenses with Equity per Institution		2.1	1.0	0.6

Terms from the AUTM Survey are shown in capital letters and are defined on pages 34 and 35. References, i.e., ref. 1-16, and Notes, i.e., i-xx, appear throughout the report and may be found on pages 27 and 28-30, respectively.

As would be expected, the increase in patent prosecution activity was accompanied by an increase in LEGAL FEES EXPENDITURES, which rose to $79 million in FY 1995.[xix] These costs are partially offset by the recovery of these expenses from licensees (LEGAL FEES REIMBURSEMENTS). This reimbursement has risen significantly since FY 1991, to 43% in FY 1995 (see Figure 15).

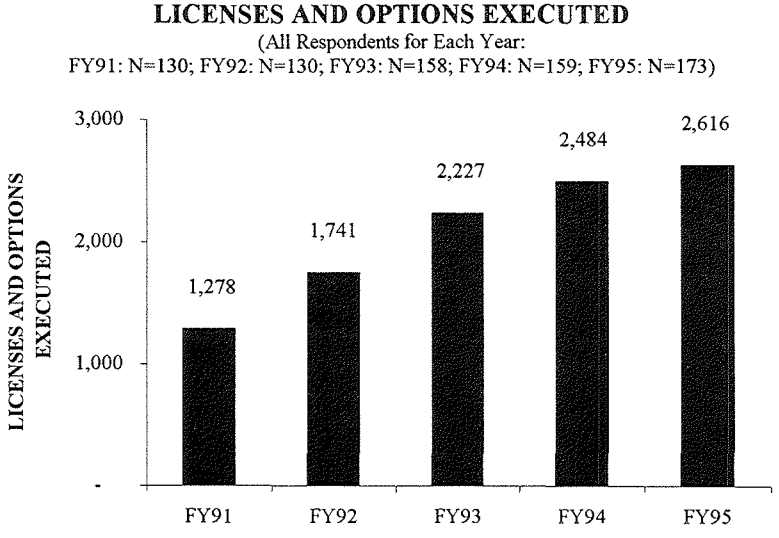
Figure 15:



7.2 Licensing

FY 1995 also saw a continuation in the growth of licensing activity. Respondents executed 2,616 licenses and options in FY 1995, yielding a cumulative total of 10,346 LICENSES AND OPTIONS EXECUTED since FY 1991.

Figure 16:



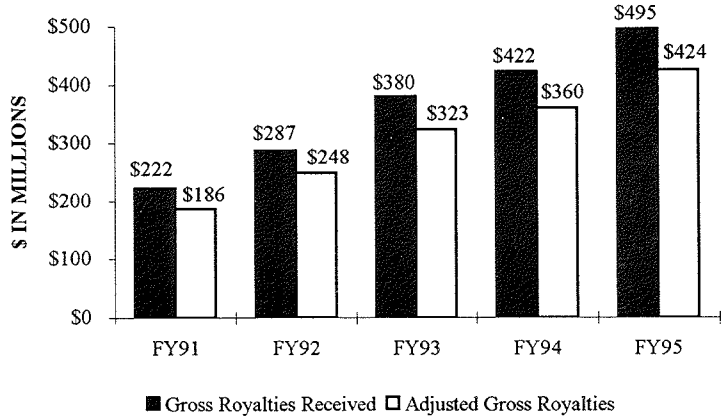
Terms from the AUTM Survey are shown in capital letters and are defined on pages 34 and 35. References, i.e., ref. 1-16, and Notes, i.e., i-xx, appear throughout the report and may be found on pages 27 and 28-30, respectively.

Figure 18 graphs the aggregate data from Figure 17 for gross ROYALTIES RECEIVED and *adjusted gross royalties,* for All Respondents for each year. It should be noted that, by charter, the third-party patent management firms return a significant percentage of royalty income they receive back to the institution from which the licensed invention originated. The return of these funds is reflected in the Survey as part of ROYALTIES PAID TO OTHER INSTITUTIONS.

Figure 18:

GROSS ROYALTIES RECEIVED AND ADJUSTED GROSS ROYALTIES

(All Respondents for Each Year:
FY91: N=130; FY92: N=130; FY93: N=158; FY94: N=159; FY95: N=173)



Shown below in Figure 19 is a frequency distribution of gross ROYALTIES RECEIVED for Survey participants in each year. With the rise in the number of institutions participating in the Survey and success experienced by many programs, the number of institutions reporting gross royalties of $1 million or more on an annual basis increased from 26 institutions in FY 1991 to 60 institutions in FY 1995.

Figure 19:

ROYALTY RANGES FOR GROSS ROYALTIES RECEIVED AND NUMBER OF INSTITUTIONS IN EACH RANGE

(All Respondents for Each Year:
FY91: N=130; FY92: N=130; FY93: N=158; FY94: N=159; FY95: N=173)

DESIGNATED RANGES FOR GROSS ROYALTIES RECEIVED (GRR)	NUMBER OF INSTITUTIONS				
	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
GRR ≥ $20 M	2	4	6	6	7
$ 10 M ≤ GRR < $ 20 M	6	6	4	2	3
$ 5 M ≤ GRR < $ 10 M	1	1	3	6	6
$ 1 M ≤ GRR < $ 5 M	17	27	35	40	44
$ 0.5 M ≤ GRR < $ 1 M	22	16	24	26	25
GRR < $ 0.5 M	82	76	86	79	88
Total Participants	130	130	158	159	173

Terms from the AUTM Survey are shown in capital letters and are defined on pages 34 and 35. References, i.e., ref. 1-16, and Notes, i.e., i-xx, appear throughout the report and may be found on pages 27 and 28-30, respectively.

heart attack patients; and Factor VIII for treating hemophilia. It has also been used in the development of drugs to treat cystic fibrosis, Gauchier Disease, and multiple sclerosis.

DNA Sequencer, Basic instrument for DNA Sequencing. Basis for entire Human Genome Project.

EHEC Diagnostic, Enterohemorrhagic E.coli clinical diagnostic (EHEC) is believed to be the only FDA-approved test capable of detecting multiple E.coli serotypes that are implicated in HUS, also known as "Hamburger Syndrome."

Easy Eggs™, This technology created an entirely new market. Current sales of Easy Eggs™ are roughly $100 million. This product is an aseptically packaged, pasteurized, liquid, whole-egg product that allows for extended refrigerated shelf-life.

Enzymatic Deinking of Waste Paper, This product provides a technology for deinking a wide range of potentially recyclable paper.

ET-2000 Guardrail End Treatment, This device slows an errant vehicle to a safe and stable stop when the guardrail is impacted head-on; the kinetic energy of the vehicle is absorbed by the force required to flatten the guardrail. More than 24,000 installations have been made since 1990, and more continue each month.

Genetically Engineered Human Growth Hormone, Collaboration between an academic institution's researchers with those of the licensee resulted in the development of the genetically engineered human growth hormone, which resulted in a significant increase of this hormone's safety when administered to children suffering from a severe growth disorder.

Granulocyte-Colony Stimulating Factor (G-CSF), sold as Neupogen®, G-CSF stimulates production of neutrophils and has been used since 1991 to treat neutropenia resulting from chemotherapy and to speed engraphment of bone marrow transplants in conjunction with cancer treatment. G-CSF was approved in the U.S. to support peripheral blood progenitor cell transplants, which may replace bone marrow transplants.

Leustatin, Leustatin is a chemotherapy drug used to treat Hairy Cell Leukemia (and other Off Label Leukemias). It has a very low toxicity and very high cure rates.

Lycos, Inc., The formation of Lycos, Inc., had a significant economic impact on the university (which holds an equity position), the inventor, and community. Valued at approximately $230 million at its IPO, Lycos employs more than 100 people. Lycos, Inc., develops and provides on-line guides to the Internet's World Wide Web.

Osteomark®, The Osteomark® test kit is a urine test that measures the rate of bone resorption by detecting protein fragments (peptides). This test can diagnose osteoporosis, which affects more than 40 million people in the U.S. alone.

Prostate-Specific Antigen Test, The prostate-specific antigen test is now a routine component of cancer screening programs. The test allows earlier detection, monitoring of treatment response, and prediction of disease recurrence.

Solvent/Detergent Method for Viral Inactivation of Protein Containing Formulations, The Solvent/Detergent Process is the most effective method known for the inactivation of lipid enveloped viruses such as HIV or Hepatitis B. Since its initial use in 1985, not a single confirmed case of HIV-1 transmission has been found in an S/D treated product. The S/D process has dramatically improved the safety of coagulation factors used by Hemophiliacs worldwide.

V-Chip, also known as ViewControl™, A novel, cost-effective innovation that gives individual families control over the nature of the TV programs on their own TV sets. In 1996, both the U.S. Congress and the European Parliament passed laws making the V-Chip mandatory in all new TV sets. (Canadian broadcasters had already

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Terms from the AUTM Survey are shown in capital letters and are defined on pages 34 and 35. References, i.e., ref. 1-16, and Notes, i.e., i-xx, appear throughout the report and may be found on pages 27 and 28-30, respectively.

10.0 REFERENCES

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12. Willey, Teri F., "AUTM Reorganizes in Response to Its Changing Role," *AUTM Newsletter*, April 1994.

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15. Leahey, H.S. (Duke), "Philosophy of Licensing for Nonprofit Research Institutions," *AUTM Technology Transfer Practice Manual*, Volume I, Part II, Chapter 1, February 1994.

16. Willey, Teri F., "A Study of Selected University Technology Licensing and Technology Transfer Programs," Research and Sponsored Programs, Indiana University-Purdue University at Indianapolis, funded by a grant from the Indiana Corporation for Science and Technology.

[viii] *Institutions surveyed are members of AUTM and include universities and colleges, teaching hospitals, not-for-profit research firms, and third-party patent management firms that manage intellectual property for these institutions.*

[ix] *Represents the maximum number for five-year recurrent respondents: 104 minus 2 PMFs, or 102.*

[x] *Follow-up efforts were heavily concentrated toward the top 50 universities for FY 1991 and FY 1992. Beginning with FY 1993, these efforts were expanded to include the top 100 universities. There is greater representation in the five-year recurrent respondents sample, therefore, of the universities that fall within the top 50 than of those that are among the top 100.*

[xi] *The sample population, Third-Party Patent Management Firms, was excluded from these analyses because of its small sample size (3), and because total research expenditures were not reported consistently across all years of the Survey.*

[xii] *Unlike U.S. institutions, research expenditures reported for Canadian institutions generally do not include principal investigators' salaries and benefits costs, or indirect costs.*

[xiii] *Two Canadian institutions experienced a significant increase in Royalties Received in FY 1995.*

[xiv] *License-related income is research funding committed to the institution in conjunction with the execution of license and option agreements in the surveyed fiscal year. This includes multi-year funding, i.e., even if it is to be spent over several years. Some institutions only track data on an annual basis and others do not track this funding; therefore, this value may be understated.*

[xv] *University involvement in starting new companies and taking equity (holding stock) in those companies may be the only way to support development and commercialization of ideas that are too novel to attract interest from existing companies. The number of Licenses/Options with Equity reported under this Survey for FY 1994 and Prior Years, and then for FY 1995, is reflective of this entrepreneurial activity. The amount of revenue received from these equity holdings is included in gross royalties received, only when the equity is cashed-in. The reporting of cashed-in equity has been infrequent and irregular over the life of this Survey. In addition, the amount of cashed-in equity, while perhaps significant to the reporting institution, has been insignificant when compared to the aggregate data. As more institutions take on these challenges and/or cash-in current equity holdings, future years may show more significant activity in this area.*

[xvi] *Staffing levels were requested the first year that the Survey was distributed; however, because the first Survey was distributed in 1993 and requested data for both FY 1991 and FY 1992, it was assumed that the staffing levels reported applied to FY 1992, and hence are referred to as FY 1992 data.*

[xvii] *Two U.S. Hospitals and Research Institutes reported a disproportionately high amount of Royalties Received to Total Research Expenditures.*

[xviii] *U.S. Patents Issued was added to the Survey after the Survey's implementation the first year. These data have only been accrued for FY 1993, FY 1994, and FY 1995.*

[xix] *Legal Fees Expended and Reimbursed include the amount spent by the institutions in external legal fees for patents and/or copyrights and the amount reimbursed by licensees for these fees, respectively. Direct payment of patenting costs by licensees is not included in the legal fees expended and legal fees reimbursed data.*

[xx] *Gross Royalties Received include: license issue fees, payments under options, annual minimums, running royalties, termination payments, the amount of equity received when cashed-in, and software end user license fees*

Attachment A

AUTM Licensing Survey
(FY 1995)

TRANSMITTAL FORM:

TO: Diane C. Hoffman, Inc.
23 Perrine Path
Cranbury, NJ 08512
FAX: (609) 799-5247

FROM: _____
(Contact Name)

_____
(Institution)

_____
(Phone, Fax, and E-mail)

Enclosed you will find the: (check as many that apply)

- ☐ AUTM Licensing Survey for FY 1995
- ☐ Additional Data Request
- ☐ Optional Addendum

8. How many **LICENSES/OPTIONS** did your institution execute in the year indicated? How many of the **LICENSES/OPTIONS** executed included **EQUITY**? How many **LICENSES/OPTIONS** are **ACTIVE**?

# of licenses here and in question 9 should exclude software end-user licenses under $1,000.

Year	*# of Licenses/Options Executed*	*# of Licenses/Options Executed w/Equity*	*Total # of Active Licenses/Options*
Fiscal 1995	_____	_____	
Cumulative for All Years			_____

9. What was the amount of **ROYALTIES RECEIVED** at your institution and the total number of **LICENSES/OPTIONS** yielding **ROYALTIES RECEIVED** in the year indicated? How much of the **ROYALTIES RECEIVED** was **PAID TO OTHER INSTITUTIONS**? How much of the **ROYALTIES RECEIVED** was **RECEIVED FROM OTHER INSTITUTIONS**?

Year	*Royalties Received ($)*	*Total # of Licenses/Options Yielding Royalties*	*Royalties Paid to Other Institutions*	*Royalties Rec'd from Other Institutions*
Fiscal 1995	_____	_____	_____	_____

10. How much did your institution spend in external legal fees (**LEGAL FEES EXPENDITURES**) for patents and/or copyrights? How much did your institution receive in reimbursements for these fees from licensees (**LEGAL FEES REIMBURSEMENTS**)?

Year	*Amount Spent in External Legal Fees*	*Amount Reimbursed by Licensees*
Fiscal 1995	_____	_____

11. How many **INVENTION DISCLOSURES** were received, **U.S. PATENT APPLICATIONS FILED**, and **U.S. PATENTS ISSUED** to your institution in the year indicated? Of the total **U.S. PATENT APPLICATIONS** filed, how many of these filings were **NEW U.S. PATENT APPLICATIONS FILED**?

Year	*Invention Disclosures Received*	*Total U. S. Patent Applications Filed*	*New U. S. Patent Applications Filed*	*U.S. Patents Issued*
Fiscal 1995	_____	_____	_____	_____

Return Survey to: Diane C. Hoffman, Inc., Attn: AUTM Licensing Survey, 23 Perrine Path Cranbury, NJ 08512, Phone: (609) 799-6187, Fax: (609) 799-5247, dchoffinc@aol.com

LICENSES/OPTIONS	LICENSES/OPTIONS may be counted by counting the number of LICENSE or OPTION AGREEMENTS that were executed in the year indicated for all technologies. Each agreement, exclusive or nonexclusive, should be counted separately. Licenses for software end-user licenses of $1,000 or more may be counted per license, or as 1 or 1/each for each major software product (at manager's discretion) if the total number of end-user licenses would unreasonably skew the institution's data.
LICENSES/OPTIONS EXECUTED WITH EQUITY	The number of LICENSES/OPTIONS that were executed in the year requested that included EQUITY, where EQUITY is defined as an institution taking stock in a company.
ACTIVE LICENSES/OPTIONS	The cumulative number of LICENSES/OPTIONS over all years that had not terminated by the end of the survey's fiscal year requested.
ROYALTIES RECEIVED	ROYALTIES RECEIVED include: license issue fees, payments under options, annual minimums, running royalties, termination payments, the amount of equity received when cashed-in, and software end-user license fees equal to $1,000 or more, but not research funding, patent reimbursement fees, a valuation of equity not cashed-in, software end-user license fees < $1,000, or trademark licensing royalties from university insignia.
LICENSES/OPTIONS YIELDING ROYALTIES	The number of LICENSES/OPTIONS that generated ROYALTIES RECEIVED in the year requested.
INSTITUTIONS	INSTITUTIONS include other organizations that might participate in this Survey, such as universities, hospitals, and research institutes.
ROYALTIES PAID TO OTHER INSTITUTIONS	ROYALTIES PAID TO OTHER INSTITUTIONS is a subset of ROYALTIES RECEIVED and should not be subtracted from the total. This number will be used to better define the double-count of ROYALTIES RECEIVED reported under this Survey.
ROYALTIES RECEIVED FROM OTHER INSTITUTIONS	ROYALTIES RECEIVED FROM OTHER INSTITUTIONS is a subset of ROYALTIES RECEIVED and should not be subtracted from the total. This number will be useful to AUTM in the development of future surveys.
LEGAL FEES EXPENDITURES	LEGAL FEES EXPENDITURES include the amount spent by an institution in external legal fees for patents and/or copyrights. They do not include direct payment of patenting costs by licensees.
LEGAL FEES REIMBURSEMENTS	LEGAL FEES REIMBURSEMENTS include the amount reimbursed by licensees to the institution for LEGAL FEES EXPENDITURES.
INVENTION DISCLOSURES	INVENTION DISCLOSURES include the number of disclosures, no matter how comprehensive, that are made in the year requested and are counted by the institution.
TOTAL U.S. PATENT APPLICATIONS FILED	TOTAL U.S. PATENT APPLICATIONS FILED includes any filing made during the year requested, including provisional applications, new filings, CIPs, continuations, divisionals, and reissues.
NEW U.S. PATENT APPLICATIONS FILED	NEW U.S. PATENT APPLICATIONS FILED is a subset of TOTAL U.S. PATENT APPLICATIONS FILED. It does not include continuations, divisionals, or reissues, and typically does not include CIPs. A CIP may only be counted as a new invention if filed with substantially new matter. A provisional application may be counted as new.
U.S. PATENTS ISSUED	U.S. PATENTS ISSUED includes the number of U.S. patents issued or reissued to your institution in the year requested.

OPTIONAL ADDENDUM

AUTM Licensing Survey (FY 1995)

In AUTM's continuing effort to document and describe the economic impact of our programs, AUTM is trying to accrue data that are more descriptive of the data supplied by the AUTM Licensing Survey. The following questions are *optional*, and will be used to help AUTM better understand your ability and willingness to describe your data in greater detail. If a sufficient number of responses are received to this addendum, these data may also provide for additional analysis of the survey data.

NOTE: The data provided through this Optional Addendum will be used only in aggregate to help describe, analyze, and summarize the AUTM Licensing Survey data. They will not be published by institution or be made available electronically.

1. **Name of Institution:** _____

2. Did **ROYALTIES RECEIVED** reported for your institution in previous years contain an amount for cashed-in equity? ☐ Yes ☐ No

   If so, indicate the year and amount of cashed-in equity included in **ROYALTIES RECEIVED** for that year: ☐ FY91/92 $_____, ☐ FY93 $_____,
   ☐ FY94 $_____.

3. Detail of **ROYALTIES RECEIVED** for FY 1995 (The categories a-g noted below reflect those that are included in the definition for **ROYALTIES RECEIVED**. Fill in as many categories as possible, even if you cannot respond to all designations.):

a)	License issue fees	$_____
b)	Payments under options	$_____
c)	Annual minimums	$_____
d)	Running royalties	$_____
e)	Termination payments	$_____
f)	Amount of equity received when cashed-in	$_____
g)	Software end-user license fees equal to $1,000 or more	$_____
h)	Other (please describe): _____	$_____
	Total **ROYALTIES RECEIVED** for FY 1995 (Same as Question 9 on Survey):	$_____

4. Detail of **ROYALTIES RECEIVED** for FY 1995 by exclusive and nonexclusive **LICENSES/OPTIONS**:

FY 1995		**Exclusive LICENSES/ OPTIONS**	**Non-Exclusive LICENSES/ OPTIONS**	**Total as reflected on Survey (Question 9)**
a)	**ROYALTIES RECEIVED** in FY 1995			
b)	**# of LICENSES/OPTIONS that generated ROYALTIES RECEIVED**			

Attachment B

TABLE OF CONTENTS
(*FULL REPORT*)*

* ***As stated in the Foreword, the Full Report is available separately.***

LIST OF TABLES, CONTINUED
*(FULL REPORT)**

LIST OF TABLES FOR FIVE-YEAR RECURRENT RESPONDENTS FOLLOWS ON THE NEXT PAGE...

ALL RESPONDENTS:

Attachment D

	U.S. UNIVERSITIES	U.S. HOSPITALS & RESEARCH INSTITUTES	CANADIAN INSTITUTIONS (U.S. $)	PATENT MANAGEMENT FIRMS	TOTAL
Professional FTEs:					
Technology Transfer	374.43	60.15	60.20	19.00	513.78
Licensing Activities	244.09	36.55	39.30	30.00	349.94
Staff Support FTEs:					
Technology Transfer	293.88	36.75	32.70	8.00	371.33
Licensing Activities	175.81	21.99	23.40	5.00	226.20
Research Expenditures: Industrial Sources	$1,362,478,058	$246,060,722	$129,459,787	N.A.	$1,737,998,567
Research Expenditures: Federal Govt. Sources	$11,380,770,352	$1,012,833,188	$440,374,340	N.A.	$12,833,977,880
Total Sponsored Research Expenditures	$17,211,913,185	$1,749,635,279	$943,247,718	N.A.	$19,904,796,182
Licenses/Options Executed	2,142	247	172	55	2,616
Start-up Companies Formed	169	18	31	5	223
Gross Royalties Received	$299,148,128	$116,740,155	$10,540,012	$68,273,928	$494,702,223
Royalties Paid to Other Institutions	$25,621,678	$510,820	$942,187	$43,739,196	$70,813,881
Legal Fees Expended	$60,233,235	$15,332,539	$2,859,472	$495,851	$78,921,097
Legal Fees Reimbursed	$25,870,778	$7,067,253	$1,300,294	$179,030	$34,417,355
Licenses/Options Generating Royalties	4,272	586	300	238	5,396
Invention Disclosures Received	7,427	974	578	810	9,789
Total U.S. Patent Applications Filed	5,100	952	290	131	6,473
New U.S. Patent Applications Filed	2,373	301	157	41	2,872

TABLE 1

Attachment E

(Ranked by FY 1995 Royalties Received)

U.S. UNIVERSITIES: Name of Institution	FY 1995 Royalties Received	FY 1995 Licenses Generating Royalties	FY 1995 Professional FTEs for Licensing	FY 1995 Legal Fees Expended	FY 1995 Legal Fees Reimbursed	FY 1995 Invention Disclosures Received	FY 1995 U.S. Patent Applications Filed	FY 1995 U.S. Patents Issued	FY 1995 Licenses & Options Executed	Total Active Licenses & Options
Duke University	$1,790,375	22	4.00	$877,795	$361,520	95	139	32	22	150
Texas A&M University System	$1,729,528	79	3.00	$403,374	$281,909	76	37	21	36	160
Univ. of Colorado	$1,718,839	35	1.00	$426,462	$25,000	83	57	17	25	83
Univ. of Georgia	$1,548,015	26	1.75	$500,571	$312,935	35	27	9	20	89
Carnegie Mellon University	$1,441,000	17	1.00	$343,944	$40,000	80	22	5	17	45
Univ. of Pennsylvania	$1,400,000	45	4.00	$2,100,000	$585,000	136	102	29	45	135
Ohio State University	$1,275,550	20	1.50	$277,191	$165,550	56	30	13	32	80
Purdue Research Foundation	$1,212,758	135	2.50	$532,000	$382,000	141	30	14	38	165
Univ. of Michigan	$1,202,000	69	4.50	$1,078,000	$596,000	129	147	33	38	131
Univ. of Kentucky Research Fndtn	$1,153,144	8	0.50	$160,000	$0	41	27	5	14	54
Georgetown University	$1,137,000	13	2.00	$450,000	$180,000	40	9	11	2	28
Univ. of Pittsburgh	$1,056,889	28	0.70	$593,327	$399,024	41	45	9	16	43
Univ. of Alabama/Birmingham	$984,251	75	1.50	$377,816	$66,763	127	46	9	35	100
Univ. of North Carolina/ Chapel Hill	$982,543	49	2.50	$607,391	$424,918	92	113	17	14	107
Penn State University	$961,988	50	3.00	$429,897	$196,629	120	58	18	34	60
Univ. of Tennessee Research Corp.	$935,000	26	1.30	$416,000	$74,000	77	41	17	10	48
Virginia Tech Intellectual Properties, Inc.	$872,329	51	0.75	$29,254	$21,528	51	42	30	18	86
Oregon Health Sciences University	$872,066	28	1.80	$178,639	$95,902	36	43	10	14	72
Northwestern University	$863,579	29	1.00	$358,147	$228,517	81	37	20	13	53
Univ. of Illinois at Chicago	$817,302	34	2.00	$205,280	$159,930	47	19	4	16	49
New York University	$800,000	15	N.A.	$728,000	$434,000	50	30	N.A.	N.A.	N.A.
Univ. of Maryland, College Park	$765,407	62	4.00	$336,640	$170,528	74	28	16	42	166
Univ. of Iowa Research Fndtn	$742,968	38	2.60	$335,100	$145,924	53	25	19	17	71
Indiana University	$729,000	21	2.25	$258,000	$180,000	80	45	8	25	66
Iowa State University	$723,000	103	5.80	$1,300,000	$200,000	141	77	34	136	275
Univ. of Texas Hlth Sci Ctr, San Antonio	$719,208	22	1.50	$363,361	$70,469	18	10	10	13	67
Univ. of Chicago-ARCH Dev. Corp.	$684,327	25	2.00	$1,359,835	$654,831	46	17	11	8	81
Brown University Research Fndtn	$665,000	12	0.80	$97,197	$1,397	29	21	3	4	16
Univ. of Southern California	$661,363	26	2.00	$516,405	$89,779	95	36	10	13	42
SUNY Research Foundation	$610,846	68	6.25	$1,015,783	$167,614	157	83	31	38	199
Thomas Jefferson University	$540,000	24	2.00	$684,000	$273,000	92	80	12	17	48

TABLE 1

Attachment E

(Ranked by FY 1995 Royalties Received)

U.S. UNIVERSITIES: Name of Institution	FY 1995 Royalties Received	FY 1995 Licenses Generating Royalties	FY 1995 Professional FTEs for Licensing	FY 1995 Legal Fees Expended	FY 1995 Legal Fees Reimbursed	FY 1995 Invention Disclosures Received	FY 1995 U.S. Patent Applications Filed	FY 1995 U.S. Patents Issued	FY 1995 Licenses & Options Executed	Total Active Licenses & Options
Mississippi State University	$109,403	2	0.25	$45,692	$0	18	20	2	1	4
Florida Atlantic University	$107,500	2	1.00	$26,000	$0	7	1	0	1	3
Michigan Technological University	$91,000	3	0.50	$67,000	$20,000	17	3	3	3	22
Auburn University	$85,304	5	0.75	$92,228	$0	17	12	3	4	12
Univ. of Denver	$80,000	1	0.10	$40,644	$0	6	6	3	0	0
Univ. of Hawaii	$67,928	9	1.00	$181,174	$1,544	18	20	3	6	11
Univ. of Oklahoma Health Science Ctr.	$57,000	3	0.25	$97,641	$56,019	15	2	6	1	5
Univ. of Akron	$56,800	7	1.00	$390,000	$0	36	14	6	5	15
Univ. of Kansas	$56,761	5	2.25	$75,316	$112,438	62	19	7	20	43
Univ. of Oregon	$55,000	19	0.50	$34,116	N.A.	5	12	4	10	33
Medical College of Ohio	$50,311	4	0.25	$80,276	$0	8	4	4	2	10
Ball State University	$47,879	13	0.75	N.A.	N.A.	17	3	1	2	13
Univ. of Maryland, Baltimore	$35,000	11	2.35	$56,620	$10,900	52	N.A.	5	8	25
Univ. of Central Florida	$29,534	5	1.00	$77,905	$0	41	23	4	1	7
Univ. of Alabama in Huntsville	$28,000	4	0.20	$29,000	$0	11	6	1	2	5
New York Medical College	$22,864	3	0.25	$10,460	$8,724	8	3	1	4	6
Northern Illinois University	$20,000	3	0.50	$22,000	$0	6	5	1	0	4
Stevens Institute of Technology	$20,000	1	0.75	$50,000	$5,000	6	3	2	1	2
Univ. of New Orleans	$20,000	7	0.03	$0	$0	7	3	0	1	1
New Mexico State University	$19,869	3	0.25	$63,560	$15,900	15	4	1	4	11
Univ. of New Hampshire	$18,194	2	0.04	$0	$0	6	1	0	0	6
Ohio University	$12,503	1	0.50	$81,550	$0	17	13	6	5	25
New Jersey Institute of Technology	$11,115	2	1.00	$53,383	$0	20	9	3	3	4
Wright State University	$11,111	3	0.00	$8,753	$0	3	0	0	1	4
Univ. of South Carolina	$6,994	4	0.50	$28,266	$0	15	6	0	0	7
Univ. of North Carolina/Charlotte	$6,885	2	0.30	$68,645	$7,738	13	4	1	2	11
Univ. of Nebraska Medical Center	$5,000	3	1.50	$290,000	$10,000	36	20	10	3	N.A.
Illinois State University	$2,000	1	0.25	$0	$0	4	0	0	0	1
Hunter College of CUNY	$0	0	0.00	$0	$0	0	0	0	0	0
Marquette University	$0	0	0.10	$0	$0	6	4	2	6	10
Marshall University Research Corp.	$0	0	0.00	$0	$0	2	0	0	0	0

TABLE 1

Attachment E

(Ranked by FY 1995 Royalties Received)

U.S. HOSPITALS & RESEARCH INSTITUTES: Name of Institution	FY 1995 Royalties Received	FY 1995 Licenses Generating Royalties	FY 1995 Professional FTEs for Licensing	FY 1995 Legal Fees Expended	FY 1995 Legal Fees Reimbursed	FY 1995 Invention Disclosures Received	FY 1995 U.S. Patent Applications Filed	FY 1995 U.S. Patents Issued	FY 1995 Licenses & Options Executed	Total Active Licenses & Options
Sloan Kettering Institute for Cancer Res.	$33,114,102	18	2.50	$1,409,696	N.A.	59	76	7	15	61
City of Hope National Medical Ctr.	$31,610,345	19	1.50	$949,513	$436,132	11	15	6	3	42
New York Blood Center	$22,000,000	30	1.00	$400,000	$100,000	15	12	3	10	50
Brigham & Women's Hospital	$5,500,000	33	1.50	$1,000,000	$568,000	54	53	13	18	54
Health Research, Inc.	$5,219,000	29	0.50	$286,596	$5,000	18	9	8	10	54
Mayo Foundation	$4,754,700	97	5.00	$459,826	$52,783	72	25	8	45	261
Wistar Institute	$3,093,000	26	3.00	$218,000	N.A.	8	30	3	8	92
Dana-Farber Cancer Institute	$3,050,000	32	2.00	$941,120	$218,469	83	95	9	19	88
SRI International	$2,500,000	14	2.00	$1,000,000	$350,000	110	43	25	6	55
Salk Institute	$1,459,495	92	1.80	$1,538,000	$1,042,000	25	92	7	16	153
Massachusetts General Hospital	$1,043,791	32	3.50	$3,438,080	$2,873,743	117	201	26	35	117
Children's Hospital, Boston	$939,442	18	2.00	$611,550	$245,310	73	69	6	11	55
Fred Hutchinson Cancer Res. Ctr.	$795,092	55	1.50	$219,741	$46,778	25	40	1	12	72
Cleveland Clinic Foundation	$514,303	20	1.00	$120,500	$49,300	70	11	2	7	23
New England Medical Center	$383,000	16	0.80	$345,000	$202,000	11	16	4	7	34
St. Jude Children's Research Hospital	$204,290	25	0.50	$267,476	$26,768	29	14	0	13	31
National Jewish Center	$125,663	11	0.00	$240,294	$7,834	12	13	0	1	15
New England Deaconess Hospital	$120,000	3	0.10	$265,000	$95,700	17	13	3	2	17
Fox Chase Cancer Center	$106,200	5	1.00	$158,945	$46,496	21	10	3	1	12
California Pacific Medical Ctr. Res. Inst.	$75,000	1	0.05	$17,000	$0	3	3	0	1	1
Children's Hospital of Philadelphia	$50,000	2	1.00	$221,000	$0	6	6	2	0	3
La Jolla Cancer Research Fndtn.	$33,032	1	0.75	$780,000	$625,000	90	88	4	2	9
Woods Hole Oceanographic Inst.	$30,700	2	0.50	$24,800	$0	7	3	3	1	6
Allegheny Health Educ. & Res. Fndtn.	$19,000	5	1.00	$251,000	$40,000	16	6	3	2	8
Albert Einstein Healthcare Network	$0	0	0.50	$5,000	$0	8	0	0	0	0
Houston Advanced Research Center	$0	0	1.30	$109,402	$35,940	10	6	0	0	4
John Wayne Cancer Institute	$0	0	0.25	$55,000	$0	4	3	0	2	2
TOTAL U.S. HOSPITALS & RESEARCH INSTITUTES	**$116,740,155**	**586**	**36.55**	**$15,332,539**	**$7,067,253**	**974**	**952**	**146**	**247**	**1,319**

TABLE 1

Attachment E

(Ranked by FY 1995 Royalties Received)

PATENT MANAGEMENT FIRMS: Name of Institution	FY 1995 Royalties Received	FY 1995 Licenses Generating Royalties	FY 1995 Professional FTEs for Licensing	FY 1995 Legal Fees Expended	FY 1995 Legal Fees Reimbursed	FY 1995 Invention Disclosures Received	FY 1995 U.S. Patent Applications Filed	FY 1995 U.S. Patents Issued	FY 1995 Licenses & Options Executed	Total Active Licenses & Options
Research Corporation Technologies	$63,043,800	152	16.00	N.A.	N.A.	632	119	31	24	294
Competitive Technologies, Inc. (CTI)	$4,880,000	65	13.00	$179,786	$0	87	12	5	27	97
Center for Innovative Technology	$350,128	21	1.00	$316,065	$179,030	91	N.A.	14	4	40
TOTAL PATENT MNGMNT. FIRMS	**$68,273,928**	**238**	**30.00**	**$495,851**	**$179,030**	**810**	**131**	**50**	**55**	**431**

Attachment F

U.S. UNIVERSITIES:	FY 1995 Aggregate Totals	FY 1994 Aggregate Totals	FY 1993 Aggregate Totals	FY 1992 Aggregate Totals	FY 1991 Aggregate Totals
Research Expenditures: Industrial Sources	$1,362,478,058	$1,362,913,750	$1,223,033,233	$1,005,061,043	$879,253,640
Research Expenditures: Federal Govt. Sources	$11,380,770,352	$10,705,391,435	$10,104,906,668	$9,111,906,382	$8,119,977,073
Total Sponsored Research Expenditures	$17,211,913,185	$16,058,644,323	$14,875,677,330	$12,799,045,236	$11,479,381,778
Licenses/Options Executed	2,142	2,049	1,737	1,461	1,079
Gross Royalties Received	$299,148,128	$265,932,578	$242,269,815	$172,359,459	$129,981,898
Royalties Paid to Other Institutions	$25,621,678	$20,774,204	$19,522,671	N.A.	N.A.
Licenses/Options Generating Royalties	4,272	3,560	3,413	2,809	2,210
Legal Fees Expended	$60,233,235	$53,345,200	$50,250,423	$33,533,436	$27,046,840
Legal Fees Reimbursed	$25,870,778	$25,600,573	$22,450,374	$11,331,212	$7,783,826
Invention Disclosures Received	7,427	6,697	6,598	5,700	4,880
Total U.S. Patent Applications Filed	5,100	3,477	3,099	2,339	1,926
New U.S. Patent Applications Filed	2,373	2,015	1,993	1,608	1,335
U.S. Patents Issued	1,550	1,596	1,307	N.A.	N.A.

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CANADIAN INSTITUTIONS:	FY 1995 Aggregate Totals (U.S. $)	FY 1994 Aggregate Totals (U.S $)	FY 1993 Aggregate Totals (U.S. $)	FY 1992 Aggregate Totals (U.S. $)	FY 1991 Aggregate Totals (U.S. $)
Research Expenditures: Industrial Sources	$129,459,787	$64,273,110	$55,746,806	$46,953,659	$46,045,723
Research Expenditures: Federal Govt. Sources	$440,374,340	$310,482,872	$300,586,085	$262,775,142	$267,509,935
Total Sponsored Research Expenditures	$943,247,718	$684,158,438	$687,047,338	$472,420,978	$484,021,929
Licenses/Options Executed	172	141	177	54	49
Gross Royalties Received	$10,540,012	$5,770,558	$5,299,502	$4,153,048	$3,314,127
Royalties Paid to Other Institutions	$942,187	$243,174	$35,398	N.A.	N.A.
Licenses/Options Generating Royalties	300	242	182	111	109
Legal Fees Expended	$2,859,472	$2,327,310	$1,933,584	$698,829	$524,337
Legal Fees Reimbursed	$1,300,294	$903,228	$649,969	$235,950	$286,521
Invention Disclosures Received	578	445	393	284	250
Total U.S. Patent Applications Filed	290	157	92	94	73
New U.S. Patent Applications Filed	157	98	65	80	59
U.S. Patents Issued	87	52	73	N.A.	N.A.

Attachment F

ALL RESPONDENTS:	FY 1995 Aggregate Totals	FY 1994 Aggregate Totals	FY 1993 Aggregate Totals	FY 1992 Aggregate Totals	FY 1991 Aggregate Totals
Research Expenditures: Industrial Sources	$1,737,998,567	$1,666,379,989	$1,561,864,199	$1,166,399,938	$1,022,219,553
Research Expenditures: Federal Govt. Sources	$12,833,977,880	$11,923,991,870	$11,338,492,446	$9,958,811,887	$8,908,379,157
Total Sponsored Research Expenditures	$19,904,796,182	$18,213,718,418	$17,103,947,203	$14,175,517,520	$12,767,181,588
Licenses/Options Executed	2,616	2,484	2,227	1,741	1,278
Gross Royalties Received	$494,702,223	$422,367,605	$380,212,419	$287,384,577	$221,607,337
Royalties Paid to Other Institutions	$70,813,881	$61,576,496	$57,366,590	N.A.	N.A.
Licenses/Options Generating Royalties	5,396	4,534	4,198	3,377	2,711
Legal Fees Expended	$78,921,097	$69,218,996	$66,214,161	$45,629,290	$37,250,399
Legal Fees Reimbursed	$34,417,355	$33,237,433	$28,383,312	$15,732,830	$10,845,638
Invention Disclosures Received	9,789	8,743	8,581	7,345	6,337
Total U.S. Patent Applications Filed	6,473	4,320	3,835	2,968	2,469
New U.S. Patent Applications Filed	2,872	2,429	2,433	1,951	1,643
U.S. Patents Issued	1,833	1,874	1,603	N.A.	N.A.

Attachment G

U.S. HOSPITALS & RESEARCH INSTITUTES: (Five-Year Recurrent Respondents)	FY 1995 Selected Totals	FY 1994 Selected Totals	FY 1993 Selected Totals	FY 1992 Selected Totals	FY 1991 Selected Totals
Research Expenditures: Industrial Sources	$140,580,147	$132,107,374	$130,833,435	$107,307,236	$92,907,190
Research Expenditures: Federal Govt. Sources	$719,762,150	$676,038,666	$632,913,745	$564,518,363	$512,044,149
Total Sponsored Research Expenditures	$1,180,938,318	$1,063,014,230	$1,014,016,820	$858,946,306	$776,661,881
Licenses/Options Executed	193	172	173	186	110
Gross Royalties Received	$83,135,620	$71,771,974	$62,108,185	$45,412,582	$32,029,066
Licenses/Options Generating Royalties	453	412	338	287	241
Legal Fees Expended	$9,433,289	$9,482,800	$8,411,081	$8,011,900	$6,217,379
Legal Fees Reimbursed	$5,272,847	$5,572,511	$4,504,236	$3,879,324	$2,682,612
Invention Disclosures Received	597	552	585	563	464
Total U.S. Patent Applications Filed	727	485	439	422	411
New U.S. Patent Applications Filed	213	234	233	231	217

Attachment G

ALL RESPONDENTS: (Five-Year Recurrent Respondents, Excluding Patent Management Firms)	FY 1995 Selected Totals	FY 1994 Selected Totals	FY 1993 Selected Totals	FY 1992 Selected Totals	FY 1991 Selected Totals
Research Expenditures: Industrial Sources	$1,193,225,975	$1,181,385,943	$1,092,538,022	$998,141,206	$891,672,489
Research Expenditures: Federal Govt. Sources	$10,113,277,627	$9,598,394,161	$9,056,954,623	$8,834,402,129	$8,165,369,990
Total Sponsored Research Expenditures	$15,060,148,333	$14,476,112,765	$13,295,289,719	$12,393,344,214	$11,526,438,296
Licenses/Options Executed	1,917	1,859	1,620	1,532	1,148
Gross Royalties Received	$368,148,928	$318,602,608	$285,196,739	$214,245,658	$162,889,442
Licenses/Options Generating Royalties	4,084	3,587	3,325	2,822	2,369
Legal Fees Expended	$58,193,917	$50,188,297	$45,295,280	$39,308,850	$32,535,603
Legal Fees Reimbursed	$26,150,319	$23,240,079	$19,802,424	$14,558,728	$10,379,384
Invention Disclosures Received	6,800	6,240	6,226	5,971	5,259
Total U.S. Patent Applications Filed	4,915	3,424	2,904	2,503	2,258
New U.S. Patent Applications Filed	2,164	1,978	1,833	1,674	1,484

Suggested Citation

The Association of University Technology Managers, Inc., report entitled, *AUTM Licensing Survey, FY 1991 - FY 1995: A Five-Year Survey Summary of Technology Licensing (And Related) Performance for U.S. and Canadian Academic and Nonprofit Institutions, and Patent Management Firms*. The report may also be referenced by its abbreviated title, *AUTM Licensing Survey, FY 1991 - FY 1995: FY 1995 Five-Year Survey Summary*.

Availability of Publication

For information on the price and availability of the *FY 1995 Five-Year Survey Summary* report or the *Full Report*, contact Ms. Penny Dalziel, 49 East Avenue, Norwalk, CT 06851, Phone: (203) 845-9015, Fax: (203) 847-1304, autm@ix.netcom.com.

Prepared by Diane C. Hoffman, Inc. for AUTM, 12/96.

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CANADIAN INSTITUTIONS (U.S. $): (Five-Year Recurrent Respondents)	FY 1995 Selected Totals	FY 1994 Selected Totals	FY 1993 Selected Totals	FY 1992 Selected Totals	FY 1991 Selected Totals
Research Expenditures: Industrial Sources	$68,795,113	$44,073,175	$38,578,619	$40,003,200	$40,338,332
Research Expenditures: Federal Govt. Sources	$238,635,645	$200,083,226	$209,844,947	$223,093,600	$228,744,999
Total Sponsored Research Expenditures	$494,030,202	$520,426,662	$545,348,837	$396,752,800	$407,207,501
Licenses/Options Executed	75	84	90	47	43
Gross Royalties Received	$7,576,827	$4,329,610	$4,082,835	$4,153,048	$3,314,127
Licenses/Options Generating Royalties	165	169	141	111	109
Legal Fees Expended	$1,659,183	$1,256,326	$1,223,395	$638,877	$495,004
Legal Fees Reimbursed	$882,504	$580,725	$550,619	$235,950	$286,521
Invention Disclosures Received	333	344	284	275	235
Total U.S. Patent Applications Filed	153	122	74	93	71
New U.S. Patent Applications Filed	90	72	43	71	50

Attachment G

U.S. UNIVERSITIES: (Five-Year Recurrent Respondents)	FY 1995 Selected Totals	FY 1994 Selected Totals	FY 1993 Selected Totals	FY 1992 Selected Totals	FY 1991 Selected Totals
Research Expenditures: Industrial Sources	$983,850,715	$1,005,205,394	$923,125,968	$850,830,770	$758,426,967
Research Expenditures: Federal Govt. Sources	$9,154,879,832	$8,722,272,269	$8,214,195,931	$8,046,790,166	$7,424,580,842
Total Sponsored Research Expenditures	$13,385,179,813	$12,892,671,873	$11,735,924,062	$11,137,645,108	$10,342,568,914
Licenses/Options Executed	1,649	1,603	1,357	1,299	995
Gross Royalties Received	$277,436,481	$242,501,024	$219,005,719	$164,680,028	$127,546,249
Licenses/Options Generating Royalties	3,466	3,006	2,846	2,424	2,019
Legal Fees Expended	$47,101,445	$39,449,171	$35,660,804	$30,658,073	$25,823,220
Legal Fees Reimbursed	$19,994,968	$17,086,843	$14,747,569	$10,443,454	$7,410,251
Invention Disclosures Received	5,870	5,344	5,357	5,133	4,560
Total U.S. Patent Applications Filed	4,035	2,817	2,391	1,988	1,776
New U.S. Patent Applications Filed	1,861	1,672	1,557	1,372	1,217

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PATENT MANAGEMENT FIRMS:	FY 1995 Aggregate Totals	FY 1994 Aggregate Totals	FY 1993 Aggregate Totals	FY 1992 Aggregate Totals	FY 1991 Aggregate Totals
Research Expenditures: Industrial Sources	N.A.	$5,428,773	$14,057,779	$1,785,000	$1,600,000
Research Expenditures: Federal Govt. Sources	N.A.	$0	$20,000,000	N.A.	N.A.
Total Sponsored Research Expenditures	N.A.	$5,428,773	$34,057,779	$1,785,000	$1,600,000
Licenses/Options Executed	55	83	61	34	31
Gross Royalties Received	$68,273,928	$66,104,159	$58,673,994	$50,648,801	$43,055,673
Royalties Paid to Other Institutions	$43,739,196	$39,938,894	$37,369,565	N.A.	N.A.
Licenses/Options Generating Royalties	238	241	194	142	124
Legal Fees Expended	$495,851	$584,306	$2,722,169	$3,071,586	$3,250,640
Legal Fees Reimbursed	$179,030	$177,896	$417,585	$156,671	$25,995
Invention Disclosures Received	810	852	818	784	735
Total U.S. Patent Applications Filed	131	111	105	97	54
New U.S. Patent Applications Filed	41	29	78	18	29
U.S. Patents Issued	50	58	50	N.A.	N.A.

Attachment F

U.S. HOSPITALS & RESEARCH INSTITUTES:	FY 1995 Aggregate Totals	FY 1994 Aggregate Totals	FY 1993 Aggregate Totals	FY 1992 Aggregate Totals	FY 1991 Aggregate Totals
Research Expenditures: Industrial Sources	$246,060,722	$233,764,356	$269,026,381	$112,600,236	$95,320,190
Research Expenditures: Federal Govt. Sources	$1,012,833,188	$908,117,563	$912,999,693	$584,130,363	$520,892,149
Total Sponsored Research Expenditures	$1,749,635,279	$1,465,486,884	$1,507,164,756	$902,266,306	$802,177,881
Licenses/Options Executed	247	211	252	192	119
Gross Royalties Received	$116,740,155	$84,560,310	$73,969,108	$60,223,269	$45,255,639
Royalties Paid to Other Institutions	$510,820	$620,224	$438,956	N.A.	N.A.
Licenses/Options Generating Royalties	586	491	409	315	268
Legal Fees Expended	$15,332,539	$12,962,180	$11,307,985	$8,325,439	$6,428,582
Legal Fees Reimbursed	$7,067,253	$6,555,736	$4,865,384	$4,008,997	$2,749,296
Invention Disclosures Received	974	749	772	577	472
Total U.S. Patent Applications Filed	952	575	539	438	416
New U.S. Patent Applications Filed	301	287	297	245	220
U.S. Patents Issued	146	168	173	N.A.	N.A.

TABLE 1

Attachment E

ALL RESPONDENTS:	FY 1995 Royalties Received	FY 1995 Licenses Generating Royalties	FY 1995 Professional FTEs for Licensing	FY 1995 Legal Fees Expended	FY 1995 Legal Fees Reimbursed	FY 1995 Invention Disclosures Received	FY 1995 U.S. Patent Applications Filed	FY 1995 U.S. Patents Issued	FY 1995 Licenses & Options Executed	Total Active Licenses & Options
U.S. UNIVERSITIES	$299,148,128	4,272	244.09	$60,233,235	$25,870,778	7,427	5,100	1,550	2,142	9,287
U.S. HOSPITALS & RESEARCH INSTITUTES	$116,740,155	586	36.55	$15,332,539	$7,067,253	974	952	146	247	1,319
CANADIAN INSTITUTIONS (U.S. $)	$10,540,012	300	39.30	$2,859,472	$1,300,294	578	290	87	172	769
PATENT MANAGEMENT FIRMS	$68,273,928	238	30.00	$495,851	$179,030	810	131	50	55	431
TOTAL ALL RESPONDENTS	**$494,702,223**	**5,396**	**349.94**	**$78,921,097**	**$34,417,355**	**9,789**	**6,473**	**1,833**	**2,616**	**11,806**

TABLE 1 **Attachment E**

(Ranked by FY 1995 Royalties Received)

CANADIAN INSTITUTIONS: Name of Institution	FY 1995 Royalties Received (U.S. $)	FY 1995 Licenses Generating Royalties	FY 1995 Professional FTEs for Licensing	FY 1995 Legal Fees Expended (U.S. $)	FY 1995 Legal Fees Reimbursed (U.S. $)	FY 1995 Invention Disclosures Received	FY 1995 U.S. Patent Applications Filed	FY 1995 U.S. Patents Issued	FY 1995 Licenses & Options Executed	Total Active Licenses & Options
Univ. of Toronto	$2,250,726	29	3.00	$261,722	$130,596	91	21	3	8	33
Mount Sinai Hospital	$1,950,000	10	1.00	$174,000	$106,400	16	12	2	6	18
Univ. of Waterloo	$1,300,000	31	1.50	$149,000	$15,000	N.A.	8	11	5	60
UTI Inc./University of Calgary	$1,283,790	51	4.50	$222,200	$128,230	76	20	4	45	148
Univ. of British Columbia	$930,480	46	4.50	$612,874	$342,948	115	38	16	20	122
Univ. of Alberta	$721,377	22	7.90	$352,700	$129,734	60	44	8	26	70
McGill University	$400,700	30	5.00	$109,300	$72,900	71	50	5	13	75
Queen's University	$398,579	21	2.00	$361,358	$157,826	36	28	11	6	34
Univ. of Manitoba	$392,877	13	2.00	$251,116	$87,816	11	18	4	9	55
Univ. de Montreal	$329,000	10	1.00	$109,000	$89,900	19	13	3	9	69
Univ. of Guelph	$288,500	8	0.10	$127,700	$21,200	30	19	12	3	18
Univ. de Sherbrooke	$158,094	14	1.00	$58,300	$10,200	16	9	2	10	24
Simon Fraser University	$94,196	8	4.00	$39,851	$7,544	20	3	2	7	17
Concordia University	$16,028	1	0.20	$2,900	$0	2	0	1	1	2
Carleton University	$14,765	4	0.60	$9,251	$0	5	2	0	4	23
Univ. of Western Ontario	$10,900	2	1.00	$18,200	$0	10	5	3	0	1
TOTAL CANADIAN INSTITUTIONS	**$10,540,012**	**300**	**39.30**	**$2,859,472**	**$1,300,294**	**578**	**290**	**87**	**172**	**769**

TABLE 1

Attachment E

(Ranked by FY 1995 Royalties Received)

U.S. UNIVERSITIES: Name of Institution	FY 1995 Royalties Received	FY 1995 Licenses Generating Royalties	FY 1995 Professional FTEs for Licensing	FY 1995 Legal Fees Expended	FY 1995 Legal Fees Reimbursed	FY 1995 Invention Disclosures Received	FY 1995 U.S. Patent Applications Filed	FY 1995 U.S. Patents Issued	FY 1995 Licenses & Options Executed	Total Active Licenses & Options
San Diego State University	$0	0	0.00	$21,000	$0	3	1	0	0	0
Univ. of South Alabama	$0	0	N.A.	$42,832	$0	0	0	0	0	1
Univ. of Tulsa	$0	0	0.20	$0	$0	2	0	0	0	0
TOTAL U.S. UNIVERSITIES	**$299,148,128**	**4,272**	**244.09**	**$60,233,235**	**$25,870,778**	**7,427**	**5,100**	**1,550**	**2,142**	**9,287**

TABLE 1

Attachment E

(Ranked by FY 1995 Royalties Received)

U.S. UNIVERSITIES: Name of Institution	FY 1995 Royalties Received	FY 1995 Licenses Generating Royalties	FY 1995 Professional FTEs for Licensing	FY 1995 Legal Fees Expended	FY 1995 Legal Fees Reimbursed	FY 1995 Invention Disclosures Received	FY 1995 U.S. Patent Applications Filed	FY 1995 U.S. Patents Issued	FY 1995 Licenses & Options Executed	Total Active Licenses & Options
Louisiana State University	$508,935	11	1.00	$195,700	$36,112	33	32	12	6	27
Vanderbilt University	$457,808	16	0.75	$325,312	$161,452	38	22	9	18	56
Univ. of Connecticut	$456,845	8	1.00	$293,000	$53,025	44	25	4	6	24
Temple University	$456,725	19	3.00	$404,860	$82,670	29	20	12	9	20
Univ. of Delaware	$416,985	10	0.30	$136,434	$10,291	12	5	6	3	39
Univ. of Arkansas, Fayetteville	$406,660	10	0.50	$76,093	$7,793	14	10	4	2	18
Dartmouth College	$406,376	33	0.00	$154,249	$94,490	10	22	2	9	33
Wayne State University	$403,386	11	1.20	$242,209	$221,971	36	17	9	9	16
Colorado State University	$373,179	19	0.50	$107,539	$12,912	35	16	2	2	29
Oregon State University	$356,208	26	0.30	$194,486	$25,639	24	6	7	5	39
Oklahoma Medical Research Fndtn.	$347,249	13	1.00	$514,238	$162,126	51	41	5	3	17
Princeton University	$340,000	10	1.00	$194,000	$105,000	59	23	13	10	53
Kansas State University Research Fndtn.	$339,195	28	2.00	$333,328	$114,487	21	24	11	10	40
North Dakota State University	$331,997	8	0.50	$157,095	$110,880	6	3	2	2	9
Univ. of Dayton	$299,031	7	1.00	$98,117	$32,963	20	8	8	5	69
Univ. of Rhode Island	$297,000	7	1.00	$90,000	$35,000	20	3	2	4	7
Univ. of Texas Houston Hlth. Sci. Ctr.	$286,586	9	2.00	$317,692	$172,723	20	10	6	3	18
Wake Forest University	$262,339	9	1.60	$298,769	$112,071	33	18	5	10	21
Univ. of South Florida	$251,000	13	0.50	$368,500	$250,000	35	28	5	8	28
Arizona State University	$237,621	5	1.00	$424,826	$79,123	22	20	8	1	10
Case Western Reserve University	$217,358	12	2.00	$181,403	$32,347	45	14	8	15	22
Univ. of Massachusetts Medical Center	$213,665	N.A.	0.00	$365,164	N.A.	33	23	0	3	24
Univ. of Arizona	$206,512	22	1.00	$105,752	$46,891	99	9	7	8	85
Univ. of Texas M.D. Anderson Cancer Ctr.	$174,000	9	N.A.	$850,000	$396,000	48	31	23	12	88
Syracuse University	$170,413	16	1.00	$73,619	$25,304	15	2	2	1	18
Washington State University	$154,895	24	1.50	$188,458	$206,682	27	15	7	14	45
Univ. of Massachusetts/Amherst	$154,569	9	0.05	$3,075	$0	11	2	4	8	21
Tufts University	$128,547	11	1.00	$160,000	$0	24	10	5	7	22
Montana State University	$128,308	15	2.00	$45,026	$20,185	12	5	3	4	24
Lehigh University	$122,775	6	N.A.	$32,500	$500	28	13	4	3	11
Brandeis University	$120,000	11	0.30	$40,500	$14,000	11	9	4	2	30

TABLE 1 **Attachment E**

(Ranked by FY 1995 Royalties Received)

U.S. UNIVERSITIES: Name of Institution	FY 1995 Royalties Received	FY 1995 Licenses Generating Royalties	FY 1995 Professional FTEs for Licensing	FY 1995 Legal Fees Expended	FY 1995 Legal Fees Reimbursed	FY 1995 Invention Disclosures Received	FY 1995 U.S. Patent Applications Filed	FY 1995 U.S. Patents Issued	FY 1995 Licenses & Options Executed	Total Active Licenses & Options
Univ. of California System	$57,272,000	548	36.55	$8,209,000	$5,852,000	525	634	122	117	768
Stanford University	$38,900,000	220	9.00	$1,900,000	$1,000,000	157	124	70	104	875
Columbia University	$34,194,811	150	6.02	$1,614,022	$194,362	114	138	25	68	355
Michigan State University	$15,279,521	42	2.50	$541,406	$104,394	96	53	15	20	61
W.A.R.F./Univ. of Wisconsin-Madison	$12,380,000	101	5.25	$1,757,000	$0	167	155	57	39	198
Univ. of Washington/Wash. Res. Fndtn.	$10,085,000	118	10.50	$983,000	$124,000	142	161	19	71	210
Florida State University	$9,838,431	9	0.20	$401,744	$253,477	24	17	7	2	9
Harvard University	$6,826,073	149	7.80	$2,477,789	$2,001,217	113	161	18	55	266
Univ. of Florida	$5,597,178	64	2.50	$1,082,946	$474,713	84	100	24	36	141
Univ. of Virginia Patents Fndtn.	$5,590,424	36	1.00	$204,832	$128,450	49	32	8	10	55
Tulane University	$4,904,824	14	1.25	$173,574	$94,483	21	22	5	5	58
Massachusetts Inst. of Technology (MIT)	$4,800,000	183	8.40	$3,120,000	$1,300,000	260	258	96	65	333
Clemson University	$4,373,582	11	0.50	$139,215	$18,201	30	4	11	3	13
Univ. of Rochester	$4,104,449	10	0.50	$179,191	$79,445	39	11	4	4	44
Washington University	$3,600,000	88	2.60	$1,000,000	$247,000	24	72	23	43	165
Boston University	$3,260,180	13	1.00	$927,064	$163,000	62	42	16	9	32
Univ. of Texas Southwestern Med. Ctr.	$3,185,000	42	1.05	$1,047,140	$417,514	54	65	19	12	63
Univ. of Illinois, Urbana, Champaign	$3,111,993	102	0.75	$312,311	$98,151	60	39	18	68	N.A.
Emory University	$3,100,000	13	0.90	$585,400	$431,100	49	39	3	3	41
Rutgers, The State University of NJ	$3,021,385	55	4.50	$761,191	$443,537	118	55	21	41	70
California Institute of Technology	$2,730,000	37	1.50	$800,000	$200,000	339	99	40	19	80
Yale University	$2,660,000	59	1.00	$340,000	$120,000	95	29	20	18	165
Brigham Young University	$2,606,009	38	1.50	$141,399	$73,482	23	5	4	19	67
Univ. of Missouri System	$2,353,563	19	0.50	$328,050	$190,426	59	29	13	28	73
Baylor College of Medicine	$2,248,064	70	3.50	$502,000	N.A.	89	93	9	19	133
Univ. of Utah	$1,941,000	56	3.00	$406,368	$78,998	134	54	21	40	128
Georgia Institute of Technology	$1,920,950	26	2.00	$325,322	$42,156	129	35	19	10	88
Univ. of Minnesota	$1,905,582	88	2.00	$1,226,848	$573,064	201	105	25	69	287
Univ. of Cincinnati	$1,901,972	9	1.00	$234,191	$10,150	48	28	7	8	41
Johns Hopkins University	$1,877,387	89	5.25	$1,217,723	$774,166	181	166	30	41	255
North Carolina State University	$1,823,353	23	3.25	$949,095	$527,725	108	45	26	26	180

LIST OF TABLES
FOR
FIVE-YEAR RECURRENT RESPONDENTS
(*FULL REPORT*)*

**** As stated in the Foreword, the Full Report is available separately.***

Attachment C

LIST OF TABLES
(*FULL REPORT*)*

CONTINUES ON NEXT PAGE...

ADDITIONAL DATA REQUEST

AUTM Licensing Survey
(FY 1995)

In AUTM's continuing effort to document and describe public benefits of our programs, AUTM is requesting that *each respondent* provide one product or process that was derived from technologies licensed by your institution. This is an opportunity for you to report one invention from your institution that you believe has made a significant contribution to society. The products and processes listed in "A Message from the AUTM President" in the *FY 1994 Survey Summary* are good examples of products and processes that would meet this request. They are also a good source to help you describe your selected invention.

NOTE: The product/process information provided through this Additional Data Request will be printed in alphabetical order by product/process name. It will not be published by institution or be made available electronically.

1. **Name of Institution**: _____

2. Name of **Product/Process** (please print clearly or type):

_____

3. Description of the **Public-Benefit(s)** and/or **Economic Impact** of the **Product/Process**:

_____

_____

_____

_____

_____

_____

INSTRUCTIONS AND DEFINITIONS

Please answer each question carefully. Every question has been worded to attempt to reduce ambiguities. If you are not able to provide an exact response to a question, we would like you to provide your *best estimate* to the question, as opposed to providing no answer at all. Recognizing that misinterpretations may still occur, you are encouraged to contact Ms. Diane Hoffman at (609) 799-6187 if clarification is required. The survey requests data for a complete year regardless of your reporting year, i.e., Fiscal 1995 may be 10/94-9/95 or 7/94-6/95 or 1/1/95-12/31/95.

Do not leave any question blank and do not use a hyphen to respond. If the data are not available, note "N.A.". If the data are zero, be sure to note "0".

DEFINITIONS:

RESEARCH FUNDING	RESEARCH FUNDING includes the total amount of research support committed to your institution (even if the funds are to be spent over several years) that was related to LICENSE or OPTION AGREEMENTS executed in the survey period.
LICENSE OR OPTION AGREEMENTS	A LICENSE AGREEMENT formalizes the transfer of technology between two parties, the licensor and the licensee, where the owner of the technology permits the other party to share the rights to use the technology. An OPTION AGREEMENT includes customary terms for a license agreement that enables the potential licensee to evaluate a technology and decide if more substantive development is warranted. An OPTION AGREEMENT is *not* constituted by an Options clause on future discoveries included in a research agreement, unless an option has been exercised.
START-UP COMPANIES	As used in this survey, START-UP COMPANIES are companies that were dependent upon licensing the institution's technology for initiation.
TECHNOLOGY TRANSFER	TECHNOLOGY TRANSFER includes those activities associated with both TECHNOLOGY LICENSING (see definition below) and industry research agreements.
TECHNOLOGY LICENSING	TECHNOLOGY LICENSING includes activities associated with the evaluation and marketing of technology (including trademarks but not university's insignia) and intellectual property management, and those of license administration. It does <u>not</u> include activities associated with industry research agreements.
FTEs	FTEs include persons employed in the office of technology transfer and, in rare instances, those whose duties are *specifically assigned* to supporting technology transfer activities, i.e., an industrial liaison, intellectual property counsel, but <u>not</u> other persons employed in an office of sponsored programs.
TOTAL RESEARCH EXPENDITURES	TOTAL RESEARCH EXPENDITURES include expenditures made by the institution in support of its research activities that are funded by all sources including the federal government, local government, industry, foundations, voluntary health organizations (i.e., AHA, ACS, etc.), and other nonprofit organizations.
RESEARCH EXPENDITURES: FEDERAL GOVT. SOURCES	RESEARCH EXPENDITURES: FEDERAL GOVT. SOURCES include expenditures made by the institution in support of its research activities that are funded by the federal government.
RESEARCH EXPENDITURES: INDUSTRIAL SOURCES	RESEARCH EXPENDITURES: INDUSTRIAL SOURCES include expenditures made by the institution in support of its research activities that are funded by *corporations*, but <u>not</u> expenditures supported by other sources such as foundations and other nonprofit organizations.

AUTM Licensing Survey
(FY 1995)

☐ *We encourage you to fully disclose your institution's name and data. If confidential treatment of your institution's name is essential, however, you may request anonymity by checking here.*

1. **Name of Institution:** _____

2. Does your institution include a **Medical School**? ☐ Yes ☐ No

(The following should reflect the appropriate individual to be contacted should clarification of the survey results be required:)

Name: _____
Office: _____
Title: _____
Address: _____
_____
City *State* *Zipcode*

_____
Phone # *E-mail address* *FAX #*

3. How much **RESEARCH FUNDING** was committed to your institution that was related to **LICENSE** or **OPTION AGREEMENTS** executed in Fiscal Year 1995? _____.

4. How many **START-UP COMPANIES** were formed during Fiscal Year 1995 that were dependent upon the licensing of your institution's technology for initiation? _____.

5. How many individuals employed at your institution provide professional services for **TECHNOLOGY TRANSFER**? _____ **FTE(s)**. What full-time equivalent is spent on **TECHNOLOGY LICENSING**? _____ **FTE(s)**.

6. How many individuals employed at your institution provide staff support for **TECHNOLOGY TRANSFER**? _____ **FTE(s)**. What full-time equivalent is spent on **TECHNOLOGY LICENSING**? _____ **FTE(s)**.

7. What was the annual amount of **RESEARCH EXPENDITURES** (include both direct and indirect costs) for your institution for the following categories:

Year	*Total Research Expenditures*	*Research Expenditures: Federal Govt. Sources*	*Research Expenditures: Industrial Sources*	
Fiscal 1995	_____	_____	_____	**Research Expenditures funded by Federal Govt. and Industrial Sources may not equal Total Research Expenditures.**

equal to $1,000 or more, but not research funding, patent reimbursement fees, a valuation of equity not cashed-in, software end user license fees less than $1,000, or trademark licensing royalties from university insignia. Adjusted gross royalties are derived by deducting the amount of Royalties Paid to Other Institutions from gross Royalties Received. It is noteworthy that there has been a change in the manner in which these data were derived. In FY 1991 and FY 1992, Royalties Paid to Other Institutions included only those paid by Research Corporation Technologies to universities for whom it managed technologies at $29 million and $32 million, respectively, and by Stanford University to the University of California for the Cohen-Boyer licenses at $7 million for each year. In FY 1993, a new question was added to the Survey to request these data from all institutions participating in the Survey, which resulted in a higher amount of reported Royalties Paid to Other Institutions (see Table 12 in the Full Report).

NOTES

[i] *See Attachment A for the AUTM Licensing Survey and its Definitions and Instructions page.*

[ii] *The definitions for Total Sponsored Research Expenditures, Research Expenditures: Federal Government Sources, and Research Expenditures: Industrial Sources were modified beginning with FY 1993 to request annual expenditure amounts as opposed to annual sponsored funding levels. In addition, industrial support provided for clinical trial studies could not be excluded from industrial support expenditures due to the institutions' tracking systems. Therefore, in FY 1993 and thereafter, this exclusion was dropped from the Survey. To help managers identify if clinical trial studies might be included in the reported figure for research expenditures from industrial sources, a new question was added to the Survey in FY 1993 to determine if the participating institution includes a Medical School.*

[iii] *Royalties Paid to Other Institutions and the number of U.S. Patents Issued are examples of questions that were added to the Survey after the Survey's implementation the first year. These data have only been accrued for FY 1993, FY 1994, and FY 1995. Research funding related to a license (Table 9 of the Full Report) was requested for the first time in FY 1994, and then again in FY 1995.*

[iv] *Five-year recurrent respondents are those institutions, excluding third-party patent management firms (PMFs), that have participated in all five years of the AUTM Licensing Survey. Because the five-year recurrent respondents sample is used to identify trends, patent management firms were excluded from this category to avoid double-counting in the data. Attachment G includes summary totals for selected data elements for the five-year recurrent respondents by sample population, excluding PMFs. (The criteria for Attachment G differs from Attachment F, which includes all responses provided for all participating institutions, even if those institutions responded to the Survey in only one year.) The total number of maximum five-year recurrent respondents is 102: 104 minus 2 PMFs (see Figure 1). When five-year recurrent respondents are studied, "N=x," where "x" representing the sample size, will never be greater than 102, but could be less depending on the number of five-year recurrent respondents that provided a response to the data element being analyzed. ("N.A." responses are also excluded from the five-year recurrent respondents.)*

[v] *Research expenditure and licensing data for the Massachusetts Institute of Technology (MIT) does not include the Lincoln Laboratory: a federal laboratory managed by MIT. In the first year of the survey, MIT requested that its licensing data, i.e., royalties received and all other variables (with the exception of start-up companies), be multiplied by 80% (attributing 20% of activity to the Lincoln Laboratory) to make its data comparable with that of other Survey respondents. This adjustment was made in each year. To adjust MIT's data to include the Lincoln Laboratory, Total Research Expenditures and Research Expenditures: Federal Government Sources would be increased by $389 million, $364 million, $354.3 million, $341.9 million, and $339 million for FY 1991 - FY 1995, respectively, and licensing data (with the exception of start-up companies) would be increased by a factor of 1.25 for all variables for all years.*

[vi] *The comparable tables included in the Full Report list the five-year recurrent respondents and their respective values reported from year to year for each of the selected data elements shown in Attachment G.*

[vii] *Tables showing data for FY 1991 - FY 1995 reflect all organizations that participated in the AUTM Licensing Survey for any of these years. Tables presenting data for only one year or a few years reflect only those institutions that participated in the Survey for the year(s) shown.*

adopted it on a voluntary basis.) The V-Chip led to a spin-off company of significant value and has positioned Canada as an early leader in the fledgling V-chip industry.

9.0 CONCLUSION

Academic technology transfer has been evolving for over half a century. The passage of federal legislation accelerated this evolution, thus providing the incentives needed to elicit collaboration between the academic community and industry in the transformation of research results into commercially available products and processes. The efforts of key individuals from the academic community committed to the growth of this industry cannot be overlooked in their importance. The products and processes reported under the Survey this year provide concrete examples of the contributions that academic institutions have made in this field. New diagnostic and therapeutic products have saved lives, reduced suffering and disability, and improved the world's ability to prevent disease. Royalties derived from these technologies have been reinvested to enhance existing research programs, preserve and build research infrastructure, and to seed new ventures.

These results must, of course, bring credit to the corporate community, without which little, if any, of the process of technology transfer could have been completed. The combined financial and physical resources of this licensee group is the "critical mass" that powers the entire process. Where no company existed, new enterprises have been formed to embrace emerging technologies, often in the absence of a recognized market.

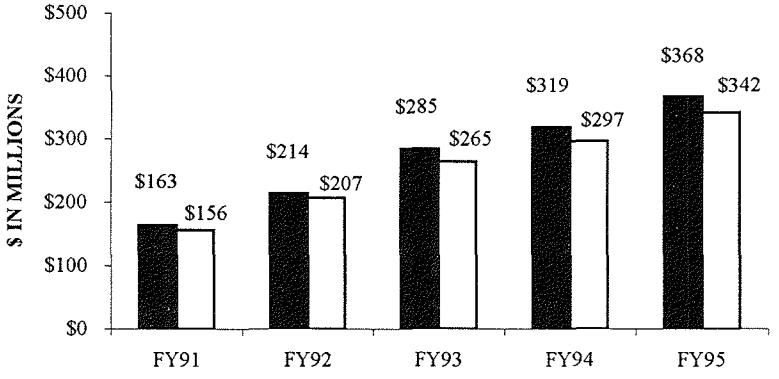
Remarkably, so much of this activity has flourished just since the passage of the Bayh-Dole Act, less than twenty years ago. Crucial to this success has been an environment where government, industry, and academia have all been willing to work together for the betterment of our nation's economy and advancement of science.

Terms from the AUTM Survey are shown in capital letters and are defined on pages 34 and 35. References, i.e., ref. 1-16, and Notes, i.e., i-xx, appear throughout the report and may be found on pages 27 and 28-30, respectively.

Figure 20 reflects the growth in royalty income from FY 1991 - FY 1995 for five-year recurrent respondents that provided royalty information for all five years of the Survey. Recall that five-year recurrent respondent data exclude third-party patent management firms (see Note *iv*, page 28). Royalty income for this group rose from $163 million in FY 1991 to $368 million in FY 1995 for gross royalties received, representing a 126% increase over the five years studied.

Figure 20:

GROSS ROYALTIES RECEIVED AND ADJUSTED GROSS ROYALTIES
(Five-Year Recurrent Respondents, N=99)



8.0 OTHER SELECTED FINDINGS

To better demonstrate the tangible public benefits of academic licensing programs, AUTM requested additional data to obtain information in FY 1995 for a single product or process discovered at the institution that the respondent believed would illustrate successful technology commercialization. Not every institution responded to this request, and those that did were limited to providing only one technology when, in fact, most had many more that could have been reported. The listing of the product and process information should therefore be considered a snapshot of technologies discovered at academic institutions; just one picture from an album filled with many examples. The following is a sampling of technologies selected from those reported, along with an abbreviated description of their benefits. A complete listing of these products and processes is available in the *Full Report*.

AIDS Antiviral - 3TC", The basic research for 3TC, an AIDS antiviral developed and commercialized by a major pharmaceutical company, was carried out by a professor at an academic institution.

Artificial Lung Surfactant, A doctor at an academic institution identified the lung secretion needed for normal breathing. An artificial version of the secretion was then created that could be administered to babies as needed, saving 20,000 infants each year.

Citracal, The commercial availability of Citracal has provided the public with a superior calcium supplement with higher bioavailability. Royalties derived from this product have been reinvested to enhance research by the academic institution and to increase manufacturing potential by the licensee.

Co-Transformation Process, Co-transformation made possible the availability of a number of new pharmaceutical products, including Erythropoietin (EPO) for treating anemia; tissue plasminogen activator (TPA) for treating

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7.3 Royalties

Gross ROYALTIES RECEIVED in FY 1995 increased to $495 million, while *adjusted gross royalties* increased to $424 million. Cumulative gross ROYALTIES RECEIVED by participating institutions since FY 1991 topped $1.8 billion, and cumulative *adjusted gross royalties* exceeded $1.5 billion.[xx]

Figure 17 lists the gross ROYALTIES RECEIVED by sample population for each year. It identifies the amount of ROYALTIES PAID TO OTHER INSTITUTIONS and provides the *adjusted gross royalties*, which are calculated by subtracting ROYALTIES PAID TO OTHER INSTITUTIONS from gross ROYALTIES RECEIVED. When reviewing ROYALTIES RECEIVED for a single institution, the reader may wish to account for the ROYALTIES PAID TO OTHER INSTITUTIONS for that institution, as well, to compute *adjusted gross royalties* for the respective institution. These data, ROYALTIES RECEIVED and ROYALTIES PAID TO OTHER INSTITUTIONS on an institution-by-institution basis, are available through Tables 10 and 12 in the *Full Report.*

Figure 17:

GROSS ROYALTIES RECEIVED AND ADJUSTED GROSS ROYALTIES

(All Respondents for Each Year:
FY91: N=130; FY92: N=130; FY93: N=158; FY94: N=159; FY95: N= 173)

	FY 1991 [(a)]	FY 1992 [(a)]	FY 1993	FY 1994	FY 1995
U.S. Universities					
Gross Royalties Received	$129,981,898	$172,359,459	$242,269,815	$265,932,578	$299,148,128
Royalties Paid to Other Insts.	$7,000,000	$7,000,000	$19,522,671	$20,774,204	$25,621,678
Adjusted Gross Royalties	$122,981,898	$165,359,459	$222,747,144	$245,158,374	$273,526,450
U.S. Hospitals & Research Institutes					
Gross Royalties Received	$45,255,639	$60,223,269	$73,969,108	$84,560,310	$116,740,155
Royalties Paid to Other Insts.	N.A.	N.A.	$438,956	$620,224	$510,820
Adjusted Gross Royalties	$45,255,639	$60,223,269	$73,530,152	$83,940,086	$116,229,335
Canadian Institutions (U.S. $)					
Gross Royalties Received	$3,314,127	$4,153,048	$5,299,502	$5,770,558	$10,540,012
Royalties Paid to Other Insts.	N.A.	N.A.	$35,398	$243,174	$942,187
Adjusted Gross Royalties	$3,314,127	$4,153,048	$5,264,104	$5,527,384	$9,597,825
Third-Party Patent Management Firms					
Gross Royalties Received	$43,055,673	$50,648,801	$58,673,994	$66,104,159	$68,273,928
Royalties Paid to Other Insts.	$29,000,000	$32,000,000	$37,369,565	$39,938,894	$43,739,196
Adjusted Gross Royalties	$14,055,673	$18,648,801	$21,304,429	$26,165,265	$24,534,732
All Respondents					
Gross Royalties Received	$221,607,337	$287,384,577	$380,212,419	$422,367,605	$494,702,223
Royalties Paid to Other Insts.	$36,000,000	$39,000,000	$57,366,590	$61,576,496	$70,813,881
Adjusted Gross Royalties	$185,607,337	$248,384,577	$322,845,829	$360,791,109	$423,888,342

(a) See Note *xx*, page 29.

7.1 Patenting

Respondents reported that they were issued 1,833 U.S. patents in FY 1995: a count comparable with prior year. [xviii] Patent application activity rose significantly in FY 1995 due to the signing of GATT, as applicants filed divisional applications by June 8, 1995, in order to receive the patent term of seventeen years from issuance. The upward spike in TOTAL U.S. PATENT APPLICATIONS FILED shown below is also due to an increase in the filing of provisional applications, reflecting a new filing format resulting from GATT. Many institutions filed provisional applications to get an early (timely) filing for purposes of maximizing the term of any subsequently issued patent under the new 20-year term. The increased filing of divisional and provisional applications resulted in a disproportionate number of TOTAL U.S. PATENT APPLICATIONS FILED to NEW U.S. PATENT APPLICATIONS FILED in FY 1995, and an overall increase in patent application activity.

Figure 14A:

TOTAL AND NEW U.S. PATENT APPLICATIONS FILED
(All Respondents for Each Year:
FY91: N=130; FY92: N=130; FY93: N=158; FY94: N=159; FY95: N=173)

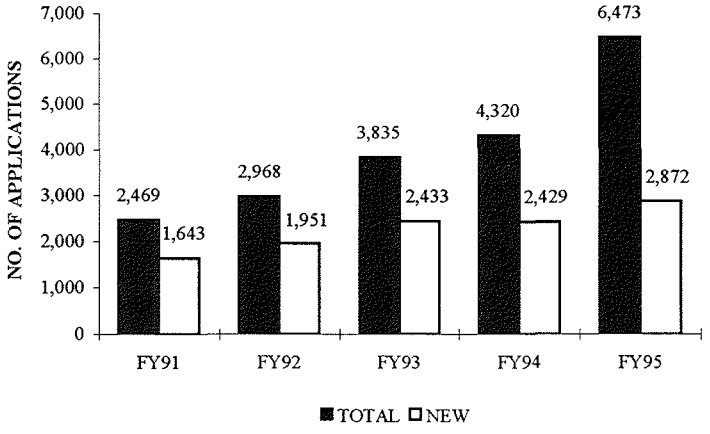
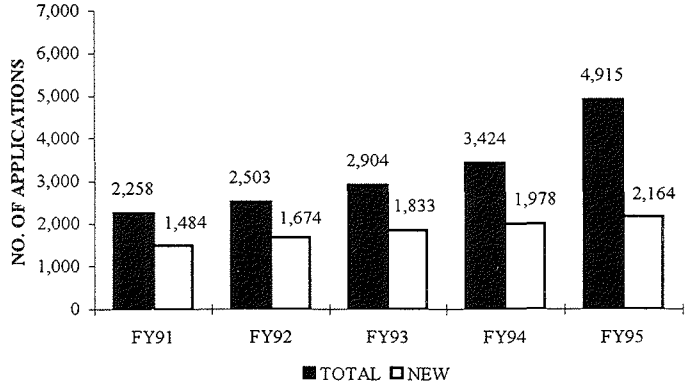


Figure 14B:

TOTAL AND NEW U.S. PATENT APPLICATIONS FILED
(Five-Year Recurrent Respondents, N=97)



Terms from the AUTM Survey are shown in capital letters and are defined on pages 34 and 35. References, i.e., ref. 1-16, and Notes, i.e., i-xx, appear throughout the report and may be found on pages 27 and 28-30, respectively.

Figure 10:

TOTAL RESEARCH EXPENDITURES AND ROYALTIES RECEIVED
***CUMULATIVE* TOTALS FOR FY 1991 - FY 1995**
(Five-Year Recurrent Respondents that Provided Data for both Total Research Expenditures and Royalties Received for All Years, N=94)

Range of *Cumulative* Total Research Expenditures	Number of Institutions in Range	FY91-FY95 *Cumulative* Total Research Expenditures, ($ million)	% of *Cumulative* Total Research Expenditures Over All Respondents	FY91-FY95 *Cumulative* Royalties Received, ($ million)	% of *Cumulative* Royalties Received Over All Respondents
5-Year Recurrent Respondents (N=94) :					
Greater than $ 1 Billion	19	$ 34,637	42.2%	$ 693.4	38.4%
$ 100 Million to $ 1 Billion	67	$ 31,141	37.9%	$ 615.5	34.1%
Less than $ 100 Million	8	$ 531	0.6%	$ 8.7	0.5%
5-Year Recurrent Respondents (N=94):	94	$ 66,309	80.7%	$ 1,317.6	73.0%
Non-Recurrent Respondents (N=103):	103	$ 15,856	19.3%	$ 488.7	27.0%
Respondents who Participated in at Least One Year (N=197):	197	$ 82,165	100.0%	$ 1,806.3	100.0%

Totals for both ROYALTIES RECEIVED and TOTAL RESEARCH EXPENDITURES can also be expressed as a percent to provide a gross performance measurement. Figure 11 tabulates sums using the annual data from Figure 5 to derive aggregate amounts for ROYALTIES RECEIVED and TOTAL RESEARCH EXPENDITURES for FY 1991 through FY 1995. These values are the basis for computing the percent of ROYALTIES RECEIVED to TOTAL RESEARCH EXPENDITURES for the respective respondent groups.

Figure 11:

***CUMULATIVE* GROSS ROYALTIES RECEIVED AS A PERCENT OF *CUMULATIVE* TOTAL RESEARCH EXPENDITURES**
FY 1991 - FY 1995
(Five-Year Recurrent Respondents that Provided Data for both Royalties Received and Total Research Expenditures for All Years, N=94:
U.S. Univs., N=72; Hosps. & Res. Insts., N=15; Canadian Insts., N=7)

	U.S. Universities ($ million)	U.S. Hospitals & Research Institutes ($ million)	Canadian Institutions ($ million)
***Cumulative* Gross Royalties Received**	$ 1,002.1	$ 294.2	$ 21.3
***Cumulative* Total Research Expenditures**	$ 59,052.3	$ 4,893.5	$ 2,363.8
%	1.7%	6.0% [xvii]	0.9%

It is meaningful to also examine the volume of "transactions" carried out by the responding institutions in producing the royalty results seen in this and other sections. Figure 12 is such a summary in which both new LICENSES EXECUTED by year and *cumulative* total existing licenses (TOTAL ACTIVE LICENSES for each year) are tabulated for five-year recurrent respondents and grouped by similar institutional characteristics. An *annual* average for LICENSES EXECUTED is calculated for each group. This average for Institutions with Medical Schools is slightly skewed upward by a few institutions. The midpoint for

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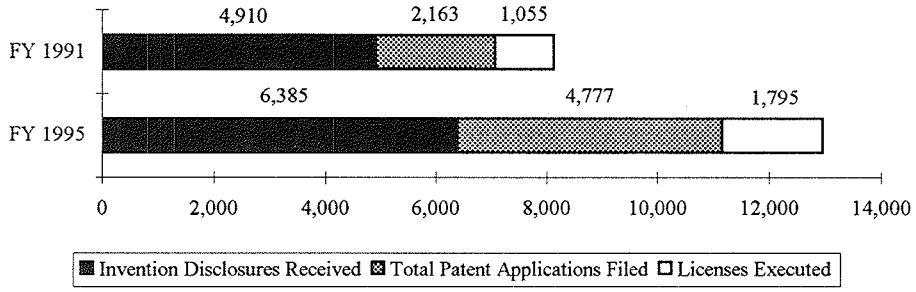
Patent-related transactions have also increased since FY 1991. Shown below in Figure 8 are INVENTION DISCLOSURES RECEIVED, TOTAL U.S. PATENT APPLICATIONS FILED, and LICENSES/OPTIONS EXECUTED for five-year recurrent respondents. Ninety institutions reported data for these variables in both FY 1991 and FY 1995. Each of these activities has increased over the years, for *cumulative* transactions of 8,128 in FY 1991 and 12,957 in FY 1995, respectively.

Figure 8:

PATENT-RELATED ACTIVITY
(Five-Year Recurrent Respondents that Provided Data for Each Variable Shown for All Years, N=90: U.S. Univs., N=70; Hosps. & Res. Insts., N=14; Canadian Insts., N=6)



Staffing levels were also analyzed in conjunction with the increase in patent-transaction activity noted above in Figure 8.[xvi] Figure 9A looks at PROFESSIONAL FTEs and SUPPORT STAFF FTEs for LICENSING ACTIVITIES for the same respondents used in the above Figure. It identifies that the *mode*, defined as the most frequently reported value, for PROFESSIONAL FTEs for LICENSING ACTIVITIES decreases from FY 1992 to FY 1995. It should be noted, however, that 2.0 FTE and 1.0 FTE are reported for almost exactly the same number of institutions in each of these years. For example, in FY 1992, fourteen institutions reported PROFESSIONAL FTEs for LICENSING ACTIVITIES at 2.0 and thirteen institutions reported 1.0 for this same variable. In FY 1995, fifteen institutions reported 1.0 for PROFESSIONAL FTEs for LICENSING ACTIVITIES, making it the most frequently reported value.

Figure 9A:

PROFESSIONAL AND SUPPORT STAFF FTEs FOR LICENSING ACTIVITIES
(Five-Year Recurrent Respondents that Provided Data for the Variables Described in Figure 7, N=90)

Fiscal Year	Prof. FTEs for Licensing Activities	Prof. FTE for Lic. Activities (Average)	Prof. FTE for Lic. Activities (Mode)	Support Staff FTEs for Licensing Activities	Support Staff FTE for Lic. Activities (Average)	Support Staff FTE for Lic. Activities (Mode)
FY 1992	200.15	2.22	2.0	139.61	1.55	1.0
FY 1995	224.10	2.49	1.0	153.28	1.70	1.0

Figures 9B and 9C examine FTE data for the same ninety institutions represented in Figure 9A, using specified ranges to better describe the greatest frequency in the reporting of staffing levels. They describe FTEs for LICENSING ACTIVITIES and for TECHNOLOGY TRANSFER activities. FTEs for LICENSING ACTIVITIES is a *subset* of FTEs for TECHNOLOGY TRANSFER and is briefly defined here as those activities related to the licensing of a discovery, as opposed to technology transfer activities that include some additional tasks. The portion of FTE attributed to licensing activities is determined by the respondent and noted on the Survey.

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Figure 4 shows a the increase in activity for LICENSES AND OPTIONS EXECUTED for both respondent groups in FY 1995 when compared to FY 1991.

Figure 4:

LICENSES AND OPTIONS EXECUTED
(Five-Year Recurrent Respondents that Provided Data for Licenses/Options Executed for All Years, N=96: Insts. with Med. Schools, N=55; Insts. w/o Med. Schools, N=41)

	FY 1991	FY 1995	% Increase
Institutions with Medical Schools	837	1,413	69%
Institutions without Medical Schools	311	504	62%

Royalty income follows in this analysis. The summary presented in Figure 5 reflects the overall performance of the respective institutional groups for both ROYALTIES RECEIVED and corresponding TOTAL RESEARCH EXPENDITURES. [xii]

Figure 5:

GROSS ROYALTIES RECEIVED AND TOTAL RESEARCH EXPENDITURES GROUP PERFORMANCE
(Five-Year Recurrent Respondents that Provided Data for both Royalties Received and Total Research Expenditures for All Years, N=94: U.S. Univs., N=72; Hosps. & Res. Insts., N=15; Canadian Insts., N=7)

ROYALTIES RECEIVED:	U.S. Universities ($ million)	% Change	U.S. Hospitals & Research Institutes ($ million)	% Change	Canadian Institutions (U.S. $; $ million)	% Change
FY 1991	$ 122.9		$ 32.0		$ 3.0	
FY 1992	$ 159.0	29%	$ 45.4	42%	$ 3.6	20%
FY 1993	$ 212.7	34%	$ 62.1	37%	$ 3.6	0%
FY 1994	$ 236.7	11%	$ 71.7	15%	$ 3.9	9%
FY 1995	$ 270.8	14%	$ 83.0	16%	$ 7.2	85% [xiii]
Average *Annual* Rate of Change		22%		28%		29%
Increase Over FY 1991		120%		159%		140%
TOTAL RESEARCH EXPENDITURES:	**U.S. Universities ($ million)**	**% Change**	**U.S. Hospitals & Research Institutes ($ million)**	**% Change**	**Canadian Institutions (U.S. $; $ million)**	**% Change**
FY 1991	$ 10,264.9		$ 776.7		$ 407.2	
FY 1992	$ 11,033.0	7%	$ 858.9	11%	$ 396.8	-3%
FY 1993	$ 11,655.6	6%	$ 1,014.0	18%	$ 545.4	37%
FY 1994	$ 12,801.4	10%	$ 1,063.0	5%	$ 520.4	-5%
FY 1995	$ 13,297.4	4%	$ 1,180.9	11%	$ 494.0	-5%
Average *Annual* Rate of Change		7%		11%		6%
Increase Over FY 1991		30%		52%		21%

The reader is reminded that five-year recurrent respondents are used to determine trend data and year-to-year comparisons. They represent the same institutions across all years, and thus their aggregate totals are comparable across the years. Five-year recurrent respondents exclude patent management firm data and account for approximately 75% to 90% of gross data. By comparison, whereas Figure 5 above uses five-year recurrent respondents to determine the rates of change demonstrated in this Figure, gross data for ROYALTIES RECEIVED for all respondents may be found in Figure 17. Gross data for all variables for all respondents are available in the *Full Report*.

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Figure 2A:

AVERAGE *ANNUAL* INVENTION DISCLOSURE RATE
(Five-Year Recurrent Respondents that Provided Data for
Invention Disclosures for All Years, N=99:
U.S. Univs., N=76; Hosps. & Res. Insts., N=16; Canadian Insts., N=7)

	FY 1991	FY 1995	% Change/Yr.
U.S. Universities	60	77	5.7%
U.S. Hospitals & Research Institutes	29	37	5.5%
Canadian Institutions	34	48	8.2%

Figure 2B:

AVERAGE *ANNUAL* INVENTION DISCLOSURE RATE
(Five-Year Recurrent Respondents that Provided Data for
Invention Disclosures for All Years, N=99:
Insts. with Med. Schools, N=55; Insts. w/o Med. Schools, N=44)

	FY 1991	FY 1995	% Change/Yr.
Institutions with Medical Schools	66	87	6.4%
Institutions without Medical Schools	37	46	4.9%

Figure 2C provides a picture of INVENTION DISCLOSURE reporting for FY 1995, using a frequency distribution within specified ranges for all FY 1995 respondents, excluding patent management firms.

Figure 2C:

**INVENTION DISCLOSURES RECEIVED
BY INSTITUTIONS WITHIN A SPECIFIED RANGE
FOR FY 1995**
(All Respondents for FY 1995, less PMFs, N=170:
U.S. Univs., N=127; Hosps. & Res. Insts., N=27; Canadian Insts., N=16)

Range of Invention Disclosures Received for FY 1995	NUMBER OF INSTITUTIONS WITHIN RANGE		
	U.S. Universities	U.S. Hospitals & Research Institutes	Canadian Institutions
Greater than 75	36	4	3
65 to 75	1	3	1
31 to 64	36	2	2
30 or Less	54	18	9
Not Available	0	0	1
Total Institutions	127	27	16

The next summary is logically placed after disclosure data to reflect the first activity, patent protection. Figures 3A and 3B, shown on the following page, reflect patent data. Figure 3A is arranged by the distribution of *cumulative* TOTAL RESEARCH EXPENDITURES and thus reflects group activity for TOTAL U.S. PATENT APPLICATIONS FILED in relation to *cumulative* TOTAL RESEARCH EXPENDITURE volume. These data demonstrate that in each of the respective research expenditure

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5.0 THE FY 1995 AUTM LICENSING SURVEY

5.1 Data Collection

The FY 1995 AUTM Licensing Survey instrument is included as Attachment A, pp. 31-38. The Survey population for Fiscal Year 1995 consisted of 279 institutions, including: 196 U.S. Universities, 53 U.S. Hospitals and Research Institutes, 25 Canadian Institutions, and 5 Third-Party Patent Management Firms.[viii]

The institutions surveyed were asked to provide a best estimate for each question if an exact response was not known. In a few instances, best estimates were provided, and, at times, responses were rounded to the nearest thousands or millions. Not available data are noted as "N.A."

5.2 Respondents

Follow-up efforts were heavily concentrated toward the top 100 universities, identified in the National Science Foundation's (NSF) report entitled *Federal Support to Universities, Colleges, and Nonprofit Institutions,* Table B-4, "Federal Obligations for Science and Engineering Research and Development to the 100 Universities and Colleges Receiving the Largest Amounts...", resulting in an 87% response rate from these top institutions. Overall, for Fiscal Year 1995, 62% of those contacted responded, representing 173 organizations, including: 127 U.S. Universities, 27 U.S. Hospitals and Research Institutes, 16 Canadian Institutions, and 3 Third-Party Patent Management Firms. A summary of the number of responses by sample population for Fiscal Years 1991 - 1995 is shown in Figure 1.

Figure 1:

SURVEY RESPONSES

	U.S. Univs.	U.S. Hosps. and Res. Insts.	Canadian Insts.	Patent Mngmnt. Firms	Other	Total
FY 1991 and FY 1992						
Surveyed	168	40	22	3	27 *	260
Responded	98	20	10	2	N.A.	130
FY 1993						
Surveyed	186	40	19	5	N.A.	250
Responded	117	26	12	3	N.A.	158
FY 1994						
Surveyed	187	42	21	5	N.A.	255
Responded	120	24	12	3	N.A.	159
FY 1995						
Surveyed	196	53	25	5	N.A.	279
Responded	127	27	16	3	N.A.	173
Participated every year[ix]	78	16	8	2	N.A.	104
Participated in at least one year	145	31	18	3	N.A.	197

* *Note: Twenty-seven institutions were later determined as nonparticipants in the licensing process.*

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4.0 AUTM LICENSING SURVEY: BACKGROUND AND DESCRIPTION

AUTM carries out the Licensing Survey each year, consistent with its objective to collect information on its members' programs to assist in meeting its primary objectives of sharing information with its members. This Survey provides objective information related to the field of academic technology transfer. The Survey gathers data on the technology transfer programs of both U.S. and Canadian institutions. The first AUTM Licensing Survey was conducted in 1993, almost twenty years after AUTM (then SUPA) was formed and thirteen years after the passage of Bayh-Dole. Prior surveys were performed by individual members for the purposes of reporting information at meetings, but none were as extensive as the AUTM Licensing Survey. In 1993, the Licensing Survey captured data for FY 1991 and FY 1992. Since that time, the Survey has been administered on an annual basis.

The data gathering process [i] covers a wide range of topics, including information on activity in such areas as invention disclosures, patenting and licensing, and requests financial information such as royalties received, payments made to other institutions, and legal fees and reimbursements. It also asks for certain organizational information, such as staffing levels and numbers of staff carrying out various kinds of work.

Each question contained in the survey instrument is intended to assure that consistent data are collected from institution to institution. In addition, every effort is made to collect comparable information each year to enable a meaningful analysis of trends within the data collection interval. A few of the questions and definitions on the Survey have been fine tuned over time (see Notes, pp. 28-29, and additional annotations throughout the report). [ii] One or two new questions also have been asked every year that had not been asked previously.[iii] Of special note for the FY 1995 Survey (conducted in 1996) was the addition of two optional addenda: one asked for each participant to report one product or process that is considered to be a significant contribution by the institution to the technology transfer industry (p. 36); the second addendum requested a breakdown of royalty information for FY 1995 and historical information on equity reported under the Survey in previous years (p. 37). A sampling of the reported products may be found in Section 8.0 Other Selected Findings of this report. A full listing of these products is included in the *Full Report*. The response to the second addendum was not sufficient to warrant publication of the data.

4.1 The Survey Reports

The findings of the FY 1995 AUTM Licensing Survey are reported in two documents. The first is entitled *"AUTM Licensing Survey FY 1991 - FY 1995: A Five-Year Survey Summary of Technology Licensing (and Related) Performance by U.S. and Canadian Academic and Nonprofit Institutions, and Patent Management Firms"* and is referred to as the *"FY 1995 Five-Year Survey Summary."* It provides FY 1995 results for all respondents divided into the following institutional categories: U.S. Universities, U.S. Hospitals and Research Institutes, Canadian Institutions, and Third-Party Patent Management Firms (see Attachments D and E, pp. 43-52). It also highlights noteworthy developments in FY 1995 and brings together summary information on all institutions that have ever responded to the AUTM Licensing Survey (see Attachment F, pp. 53-57) as well as the subset of these institutions that provided information for FY 1991-1995, the five years for which AUTM Survey data have been collected (see Attachment G, pp. 58-61). This latter group is referred to as the "**five-year recurrent respondents**." [iv]

The second document is entitled *"AUTM Licensing Survey: Fiscal Year 1991-Fiscal Year 1995,"* and is referred to as the *Full Report.* The *Full Report* includes the *FY 1995 Five-Year Survey Summary,* as well as FY 1991 through FY 1995 institution-by-institution responses to Survey questions. [v]Tables in the *Full Report* are ranked by each major data element surveyed and are reported by institution for U.S.

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The technology transfer program objectives must be integral to the institution's missions. Its goals and responsibilities should be formulated and agreed upon by both the director of the technology transfer program and the institution's administration, in conjunction with the faculty. (ref. 16.)

The organizational structure of the technology transfer office (TTO) within the institution is critical; most technology transfer programs report to a vice president or higher. Personnel in the program should have technical, legal, and business backgrounds. Marketing and management principles are considered to be primary business elements essential to a successful program. Continual funding is essential; in a well-managed program, it will take seven to ten years for income from licensing activities to be considered significant. Internal marketing of the program to faculty is crucial. The program must respond rapidly to disclosures, conduct marketability and patentability assessments quickly, while maximizing deployment of financial and personnel resources. Monitoring license agreements is important. Infringement pursuit, while costly, is essential. Database management, third-party technology brokers, and venture capital and new business development resources can all aid in helping to achieve a successful technology transfer program. (ref. 16.)

3.3 Benefits of Technology Transfer Programs

Someone once wrote, "[technology transfer is] that process in which intellectual property or related rights are transferred by contract from a university [or other nonprofit research organization] to an industrial company, which then makes or sells the products or furnishes services based on the licensed rights" (ref. 4). Technology transfer increasingly has become recognized as important to the economy. The term has become a symbol for the effort to bring back national technological and manufacturing competitiveness, but before that could happen old beliefs needed to change (ref. 4).

a) To the Institution:

Technology transfer programs are integral to the academic institution's mission: education, research, and public service, in that they provide (ref. 16):

- A mechanism for important research results to be transferred to the public;
- Service to faculty and inventors in dealing with industry arrangements and technology transfer issues;
- A method to facilitate and encourage additional industrial research support;
- A source of unrestricted funds available to the institution for additional research;
- A source of expertise in licensing and industrial contract negotiation;
- A method by which the institution can fulfill the requirements of P.L. 96-517 and P.L. 98-620.

The primary service of a technology transfer program is to assist the institution, on behalf of its faculty and inventors, in the dissemination of research results for the public good. For certain types of research results this is best achieved through publication or other forms of public disclosure. Other transfers of important research results may occur only if intellectual property is protected and the protected property commercialized. (ref. 16.)

Terms from the AUTM Survey are shown in capital letters and are defined on pages 34 and 35. References, i.e., ref. 1-16, and Notes, i.e., i-xx, appear throughout the report and may be found on pages 27 and 28-30, respectively.

This growth of technology transfer activities in Canadian universities increased, in part, due to the shift from university-based research being funded solely by government grants to the universities securing a significant proportion of research funds from industry. The granting agencies encouraged this shift early on as was seen by the creation of the Natural Sciences and Engineering Research Council (NSERC) of Canada strategic grants program in the 1970s, which required the endorsement (but not necessarily financial) of industry. Canada now has well-established industrial matching funds programs, supported by the granting councils both on a provincial and federal level, that have fostered the interaction between the universities, colleges, and industry.

As a result of this evolution, intellectual property policies in Canada are extremely varied. If one looks at the ownership of the intellectual property as an example of the diversity, it ranges from the institution retaining sole ownership of inventions, to the researcher owning the invention with no further obligations back to the institution regardless of where the funding came from, with considerable variations within. A chapter has been written in the *AUTM Technology Transfer Practice Manual*, Volume III, entitled "Canadian Universities' and Research Institutions' Technology Transfer Practices: How Canada Differs from the USA," (ref. 10) which details the differences between institutions. This plethora of policies has created a unique culture in Canada whereby institutions have the flexibility to create and develop policies that are conducive to their own environment. However, because of the inconsistencies amongst the institutions, there is the potential for third parties to be confused in this environment. Considerable effort on the part of technology transfer professionals is therefore required with respect to the education and implementation of the policies.

2.3 Formation of a National Association for Technology Managers

In 1972, there were approximately thirty technology transfer offices in the U.S. at nonprofit institutions and many were not full-time programs (ref. 11). Today, there are over 275 programs. There were also many barriers to licensing, the lack of P.L. 96-517 being the most notable. Institutional policies also posed significant barriers. In 1974, with the persistence of some key persons from the academic community, the Society of University Patent Administrators ("SUPA") was formed (ref. 11), and later renamed to the Association of University Technology Managers ("AUTM").

The Association of University Technology Managers (AUTM) was organized as a not-for-profit professional and educational society to assist technology managers at nonprofit research institutions with their technology transfer programs. One of the primary goals of AUTM was the support of legislation that made it possible for universities to retain title to inventions (the Bayh-Dole Act) (ref. 12). Today, AUTM is devoted to (ref. 13):

- Educating members about technology transfer;
- Assisting technology transfer professionals and nonprofit research institutions in managing the licensing of technology, and in encouraging faculty, research personnel, and students to commercialize intellectual property;
- Making recommendations to enhance effective transfer of inventiveness and literary creativity to the public;
- Networking with other professional societies in the area of technology transfer.

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2.0 GROWTH OF ACADEMIC TECHNOLOGY TRANSFER IN THE U.S. AND CANADA

2.1 Brief History of Pertinent Laws and Regulations in the U.S.

At the beginning of the 20th century, little thought was given to the transfer of the results of research carried out at academic institutions other than through the accepted route of publication. Prior to World War II, much research needed by the government was performed by the government, by government full-time employees. Following World War II, however, the rapid technological strides made under the impetus of a wartime footing and the desire for continued technological superiority made it imperative to continue to provide public support for science. In 1950, Congress provided an annual budget limit of $15 million for the National Science Foundation to conduct research at universities. During this same period, hundreds of millions of dollars were appropriated by the government in the area of medical research. (ref. 3.)

As government funding for research increased in academic institutions, so did the challenges of harnessing inventions derived from this research. There were 26 different agency policies covering the subject. In 1968 and later in 1973, the University of Wisconsin succeeded in obtaining an "Institutional Patent Agreement," or IPA, from the Department of Health, Education and Welfare (DHEW), and then from the National Science Foundation (NSF) (ref. 3, ref. 4). The IPA changed the presumption of title in the government to any invention made with federal funds at universities to the presumption of title in the contractor-grantee, providing an impetus to academic institutions to engage in the technology transfer business (ref. 3).

On December 12, 1980, twelve years after the signing of the first IPA, Public Law 96-517, also known as the Bayh-Dole Act, was passed. This law, modeled on the DHEW Institutional Patent Agreements, established a uniform federal patent policy that allowed universities, other nonprofit organizations, and small businesses to retain title to their inventions derived from federally funded research (ref. 3). Bayh-Dole legislation provided the incentive that tipped the scale favorably in the reward/risk analysis performed by industry to justify needed investment to commercialize technologies from the academic community (ref. 4).

The passage of P.L. 96-517 came in the same year the decision of the Supreme Court in the *Chakrabarty* case was delivered. Supreme Court Chief Justice Warren Burger, writing for the majority, stated that "the patentee has produced a new bacterium with markedly different characteristics from any found in nature and one having potential for significant utility. His discovery is not nature's handiwork, but his own; accordingly, it is patentable subject matter under Section 101" (ref. 5). This decision, which stood for the proposition that merely because something was alive it was not precluded from being patented, along with the evolution of genetic engineering concepts, propelled academic institutions into an awareness of the potential economic value of the technology produced by their research (ref. 3).

Another critical step in making patents a more powerful legal instrument came in 1982, with the creation of a separate U.S. Court of Appeals for the Federal Circuit. Prior to the establishment of the Court of Appeals for the Federal Circuit, appeals of patent infringement decisions were heard in the appropriate Circuit Court of Appeals. These Courts were not expert in patent matters and had the general predisposition against monopoly power that is inherent in the U.S. economy and legal system. As a result, the majority of patent infringement cases were decided in favor of the infringer. The U.S. Court of Appeals for the Federal Circuit provided a uniform approach with specialized expertise in patent law for appeal of patent cases with the result that, since its formation, the majority of patent infringement cases that have been contested have been decided in favor of the patent holder (ref. 6). This result indicated the importance of the fundamental enabling patents emerging from university research.

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research activities of the academic institution, and the importance of the relationship between the two.

Think about the growing complexity of the technology licensing field. Markets are in flux; industries are re-aligning; companies are downsizing; patent legislation is increasing; federal funding is decreasing; conflict-of-interest issues loom; litigation based on transactions generated by academe is more prevalent; international interests and collaborations are growing; multiple entities per deal are more common; public scrutiny of our activities is greater than ever; and the demand for the services of academic licensing professionals is increasing, while the resources available to do the job are not. The courage to embrace this complexity yields the results reported on these following pages.

Finally and equally important, please think about how the dollars represent not only the work of innovators in science, but innovators in business, policy, and academic administration. The individual professionals that comprise AUTM's membership act as a crucial interface. They are competent in the management tools to get the job done, and possess the creativity to manage the complexity and to foster the critical relationships so that there *are* incentives for private investment in ideas that will improve and change the course of our lives.

Teri F. Willey
1996 AUTM President