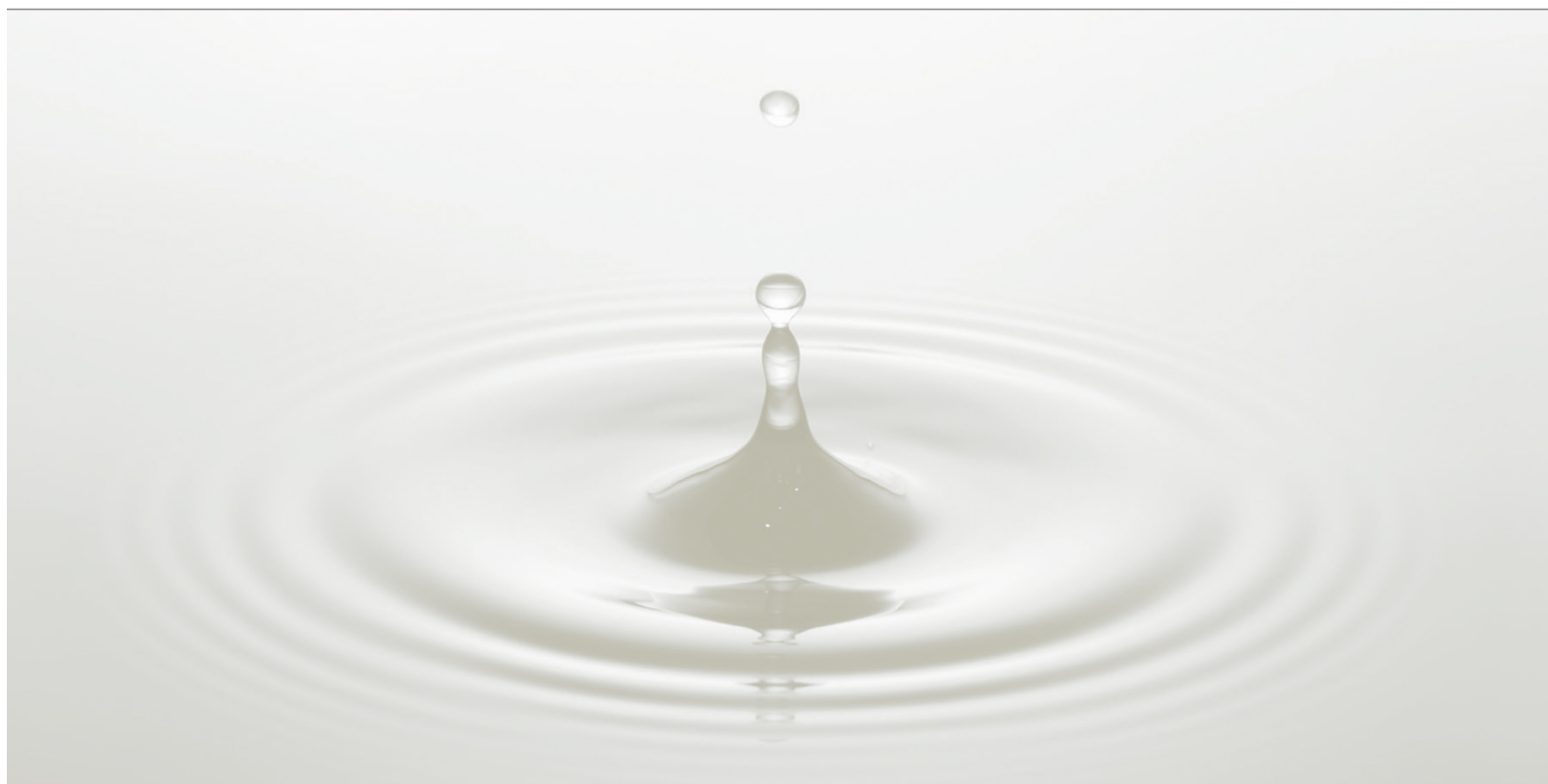




Canada Foundation for Innovation
Fondation canadienne pour l'innovation

SUMMARY OF INSTITUTIONAL ACTIVITIES ON THE COMMERCIALIZATION OF RESEARCH



SECOND ANNUAL REPORT
JULY 2003

Summary of Institutional Activities on the Commercialization of Research

Second Annual Report—July 2003

SUMMARY

This is the second annual report on commercialization activities at universities and hospitals in Canada. The report is divided into two parts. **Part I: Analysis of AUTM Data** is based on a comprehensive analysis by Bruce Clayman of Simon Fraser University of the 2001 data compiled by the Association of University Technology Managers (AUTM). **Part II: Excerpts from Institutional Progress Reports** is a brief report from each of 87 institutions describing their commercialization activities in 2002.

Part I compiles information from American and Canadian universities using a number of indicators. AUTM has used these indicators consistently over a number of years so that it is possible to compare data in the two countries over time.

The indicators compiled by AUTM are:

1. Total sponsored research expenditures (in the U.S. these include indirect costs)
2. Invention disclosures received
3. Licences and options executed
4. Licence income received
5. U.S. patents issued
6. Start-up companies formed

The commercialization productivity patterns are remarkably constant over time, but show that Canadian institutions are making good progress on their commitment to double research activity and triple commercialization activity by 2010.

High start-up company activity and lower (but rising rapidly) licensing revenue both suggest that receptor capacity is a big issue for Canada.

Once again, University of Sherbrooke is by far the most productive university in Canada or the U.S. in terms of licence income, followed by McGill University, University of British Columbia, University of Alberta, University of Montreal, and Queen's University. It is clear that some institutions still have significant opportunity for growth.

It should be noted that it is common for Canadian institutions to hold equity in their spin-off companies. Some have accumulated substantial portfolios but they do not yield revenue until the equity is sold.

A survey by Statistics Canada compiled similar information, although specific institutional data is not available. It is therefore not possible to make an exact comparison with the AUTM data.

But the 19 Canadian institutions in the AUTM database represent the majority of this commercialization activity. Thus, it is possible to show that the Canadian results are similar.

One conclusion of interest is that commercialization activity seems not to be related to the intellectual property (IP) policy of the institution, but more to the aggressiveness with which it pursues IP licensing.

Part II of this report is based on brief progress reports received from institutions across Canada describing their commercialization activities in 2002. There are reports from 87 institutions that cover most of the research-performing institutions in Canada. Several things become clear on reading these updates:

1. Institutions are seriously pursuing and developing their commercialization activities. We can expect significant developments in the coming years.
2. When hospitals are linked with their affiliated universities, there are several institutions that have now stimulated 100 or more start-up companies. They are being added at an increasing rate (McMaster and Waterloo report start-ups for the first time).
3. There is very significant participation with the local community and incubators are being established in all parts of the country, often with municipal support.
4. A number of technology transfer offices are now significant profit centres (even after their costs are dealt with) and contributing to the research at the institutions.
5. A number of start-up or evolving technology transfer centres are being established often with inter-institutional links (e.g. Atlantech) and often with support from the Tricouncil Intellectual Property Management Program (IPM).

David W. Strangway
Canada Foundation for Innovation

PART I: ANALYSIS OF AUTM DATA

Part I compiles information from American and Canadian universities using a number of indicators. AUTM has used these indicators consistently over a number of years so that it is possible to compare data in the two countries over time.

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TABLE 1

Technology Transfer at Canadian Universities: FY 2001 Update

FY2001 AUTM Survey Results for Responding Canadian Universities (Top 19)
Survey Results Normalized by Sponsored Research Expenditures (All figures in US\$)

	Total		Invention		License &		License		U.S.		Start-up	
	Sponsored Research Expenditures	Invention Disclosures Received	Disclosures Received per \$1M	Options Executed	Options Executed per \$1M	License Income Received	License Income Received per \$1M	U.S. Patents Issued	U.S. Patents Issued per \$1M	Start-up Companies Formed	Start-up Companies Formed per \$1M	
1 University of Toronto*	\$312,034,059	132	0.423	17	0.054	\$1,926,033	\$6,173	13	0.042	6	0.019	
2 Université de Montréal*	\$225,796,380	19	0.084	18	0.080	\$2,766,826	\$12,254	11	0.049	4	0.018	
3 University of Alberta*	\$139,534,062	53	0.380	15	0.108	\$4,916,654	\$35,236	13	0.093	8	0.057	
4 University of British Columbia*	\$129,050,007	135	1.046	42	0.325	\$5,585,186	\$43,279	29	0.225	13	0.101	
5 McGill University*	\$122,591,229	81	0.661	28	0.228	\$6,404,573	\$52,243	28	0.228	5	0.041	
6 University of Calgary/UTL, Inc.	\$86,892,479	137	1.577	29	0.334	\$1,964,752	\$22,611	13	0.150	3	0.035	
7 McMaster University*	\$85,775,141	34	0.396	27	0.315	\$584,983	\$6,820	1	0.012	1	0.012	
8 Université Laval*	\$82,959,320	31	0.374	8	0.096	\$108,879	\$1,312	5	0.060	2	0.060	
9 University of Western Ontario*	\$74,548,400	23	0.309	25	0.335	\$133,086	\$1,785	3	0.040	5	0.027	
10 University of Ottawa	\$62,855,800	20	0.318	3	0.048	\$59,626	\$949	4	0.064	2	0.032	
11 Queen's University*	\$51,873,800	44	0.848	3	0.058	\$2,709,737	\$52,237	17	0.328	1	0.019	
12 University of Waterloo*	\$50,323,400	5	0.099	21	0.417	\$755,820	\$15,019	4	0.079	1	0.020	
13 University of Saskatchewan	\$45,155,400	38	0.842	13	0.288	\$530,553	\$11,749	0	0.000	3	0.066	
14 University of Manitoba	\$35,062,835	21	0.599	12	0.342	\$1,222,755	\$34,873	3	0.086	1	0.029	
15 Université de Sherbrooke	\$28,424,000	16	0.563	30	1.055	\$10,594,400	\$372,727	2	0.070	0	0.035	
16 Memorial University	\$27,778,000	31	1.116	4	0.144	\$145,350	\$5,233	2	0.072	1	0.000	
17 Simon Fraser University	\$17,171,991	22	1.281	5	0.291	\$170,050	\$9,903	3	0.175	6	0.349	
18 Concordia University	\$16,604,205	11	0.662	0	0.000	\$31,008	\$1,867	1	0.060	2	0.120	
19 University of New Brunswick	\$13,188,373	13	0.986	6	0.455	\$13,687	\$1,038	0	0.000	1	0.076	
A Can. Totals & Cumulative: Top 19	\$1,607,618,881	866	0.539	306	0.190	\$40,623,958	\$25,270	152	0.095	65	0.040	
B Can. Average: Top 19	\$84,611,520	45.6	0.661	16.1	0.262	\$2,138,103	\$36,174	8.0	0.096	3.4	0.059	
C Can. Median: Top 19	\$62,855,800	31	0.599	15	0.288	\$755,820	\$11,749	4	0.070	2	0.035	
D Can. Standard Deviation: Top 19	\$76,591,446	43.2	0.404	11.7	0.237	\$2,858,824	\$83,366	8.9	0.087	3	0.077	
E Can. Totals & Cumulative: Top 10	\$1,322,036,877	665	0.503	212	0.160	\$24,450,598	\$18,495	120	0.091	49	0.037	
F Can. Totals & Cumulative: Last 9	\$285,582,004	201	0.704	94	0.329	\$16,173,360	\$56,633	32	0.112	16	0.056	
G "G-10" (*) Totals & Cumulative	\$1,274,485,798	557	0.437	204	0.160	\$25,891,777	\$12,332	124	0.097	46	0.036	
H Non-G-10 Totals & Cumulative	\$333,133,083	288	0.865	102	0.306	\$14,732,181	\$47,860	28	0.084	19	0.057	

Table 1 shows these data for 2001 for the 19 Canadian universities that have reported to AUTM. It is interesting to note the total research funds received by the University of Toronto and its affiliated research hospitals. If an equivalent amount for indirect costs were to be added, U of T would be the largest research performing institution in Canada—significantly larger than even the National Research Council.

TABLE 2

Technology Transfer at Canadian Universities: FY 2001 Update
FY2001 AUTM Survey Results for Responding U.S. Universities (Top 19)
Survey Results Normalized by Sponsored Research Expenditures (All figures in US\$)

	Total Sponsored Research Expenditures	Invention Disclosures Received	Invention Disclosures Received per \$1M	License & Options Executed per \$1M	License Income Received	License Income Received per \$1M	U.S. Patents Issued per \$1M	U.S. Patents Issued per \$1M	Start-up Companies Formed	Start-up Companies Formed per \$1M		
1	University of California System	\$2,319,003,000	957	0.413	262	0.113	\$72,899,000	\$31,435	298	0.129	25	0.011
2	Johns Hopkins University	\$1,218,888,300	360	0.295	78	0.064	\$7,043,458	\$5,779	95	0.078	6	0.005
3	Massachusetts Inst. of Technology	\$787,700,000	446	0.566	119	0.151	\$77,040,976	\$97,805	163	0.207	29	0.037
4	University of Illinois	\$627,242,760	204	0.325	63	0.100	\$9,451,228	\$15,068	33	0.053	6	0.010
5	University of Washington	\$622,054,438	145	0.233	101	0.162	\$26,446,297	\$42,514	49	0.079	4	0.006
6	University of Wisconsin	\$604,143,000	333	0.551	118	0.195	\$24,230,361	\$40,107	81	0.134	3	0.005
7	University of Michigan	\$591,702,514	182	0.308	64	0.108	\$8,199,000	\$13,857	65	0.110	12	0.020
8	Stanford University	\$514,020,574	277	0.539	150	0.292	\$41,167,000	\$80,088	109	0.212	6	0.012
9	Harvard University	\$487,249,600	162	0.332	95	0.195	\$24,793,720	\$50,885	37	0.076	5	0.010
10	SUNY	\$477,730,136	174	0.364	39	0.078	\$14,666,539	\$30,700	52	0.109	5	0.010
11	Penn State University	\$472,482,000	203	0.340	37	0.082	\$803,782	\$1,701	65	0.138	4	0.008
12	University of Minnesota	\$462,011,000	229	0.496	76	0.164	\$16,727,250	\$36,205	37	0.080	11	0.024
13	North Carolina State University	\$444,487,786	211	0.475	44	0.099	\$3,545,000	\$7,975	27	0.061	6	0.013
14	Cornell University	\$414,600,000	190	0.458	76	0.183	\$12,260,000	\$29,571	115	0.277	1	0.002
15	Washington University in St. Louis	\$406,642,000	76	0.187	45	0.111	\$7,687,253	\$18,904	74	0.182	1	0.002
16	University of Pittsburgh	\$386,371,000	85	0.220	20	0.052	\$1,494,542	\$3,868	49	0.127	4	0.010
17	California Institute of Technology	\$384,000,000	476	1.240	48	0.125	\$13,552,000	\$35,292	132	0.344	12	0.031
18	University of Florida	\$379,500,000	196	0.516	37	0.097	\$28,683,282	\$75,582	68	0.179	3	0.008
19	University of Colorado	\$367,665,087	79	0.215	13	0.035	\$2,238,792	\$6,089	27	0.073	3	0.008
1	U.S. Totals & Cumulative: Top 19	\$11,967,493,195	4,985	0.417	1,485	0.124	\$392,929,480	\$32,833	1,576	0.132	146	0.012
J	U.S. Average: Top 19	\$629,868,063	262.4	0.430	78.2	0.127	\$20,680,499	\$32,812	82.9	0.139	7.7	0.012
K	U.S. Median: Top 19	\$477,730,136	203	0.413	64	0.111	\$13,552,000	\$30,700	65	0.127	5	0.010
L	U.S. Standard Deviation: Top 19	\$454,531,778	202.1	0.231	57.3	0.062	\$21,930,296	\$27,418	64.2	0.078	7.5	0.009
M	U.S. Totals & Cumulative: Top 19 adjusted for indirect costs @52.3%	\$7,811,679,631	4,985	0.638	1,485	0.190	\$392,929,480	\$50,300	1,576	0.202	146	0.019
FY2001 AUTM Survey Results for All Responding U.S. Institutions (N = 168)												
N	U.S. Totals & Cumulative: N=168	\$29,969,349,415	12,215	0.408	3,625	0.121	\$1,009,006,694	\$33,668	3,453	0.115	420	0.014
	U.S. Totals & Cumulative: N=168 adjusted for indirect costs @52.3	\$19,562,238,522	12,215	0.624	3,625	0.185	\$1,009,006,694	\$51,579	3,453	0.177	420	0.021

Table 2 shows the comparable 2001 data for the top 19 U.S. universities. It also shows summaries which incorporate a correction factor for indirect costs so that the results can be compared between the two countries on an even basis.

Research support to the U.S. universities is much greater than that to the Canadian universities. In fact, the University of Toronto is only 27th when compared to its U.S. counterparts. Although Canadian universities have had significant research support increases, they are still far behind their U.S. counterparts.

TABLE 3

Total of Various Commercialization Indicators - 1999-2001

	<u>Research \$</u>	<u>Disc.</u>	<u>Licence & Options</u>	<u>Licence Income \$</u>	<u>U.S. Patents</u>	<u>New Start-up Companies</u>
2001 (19 inst.)	1,608 M (U.S.)	860	306	40.6M (U.S.)	152	65
2000 (15 inst.)	1,266 M (U.S.)	876	280	23.9M (U.S.)	135	58
1999 (15 inst)	1,052M (U.S.)	671	201	12.7M (U.S.)	153	47
	<i>adjusted for indirect costs</i>					
United States						
2001 (19)	7,812M (U.S.)	4 985	1 485	392.9M (U.S.)	1 576	146
2000 (15)	6,292M (U.S.)	1 464	4 015	231.6M (U.S.)	1 294	136
1999 (15)	5,668M (U.S.)	3 773	1 378	231.6M (U.S.)	1 234	93

Table 3 shows the commercialization activity in institutions from both Canada and the U.S., and the changes from 1999 to 2001. In Canada we see a 50% rise in research support, a 50% increase in licences and options executed, a 200% rise in licence income and a 40% increase in spin-off companies formed.

In the U.S. we see a continuing rise in research support, a steady rise in the other totals and a sharp rise of about 70% in licensing income.

TABLE 4

Commercialization Productivity Indicators - 1999-2001
(per research \$1M U.S.)

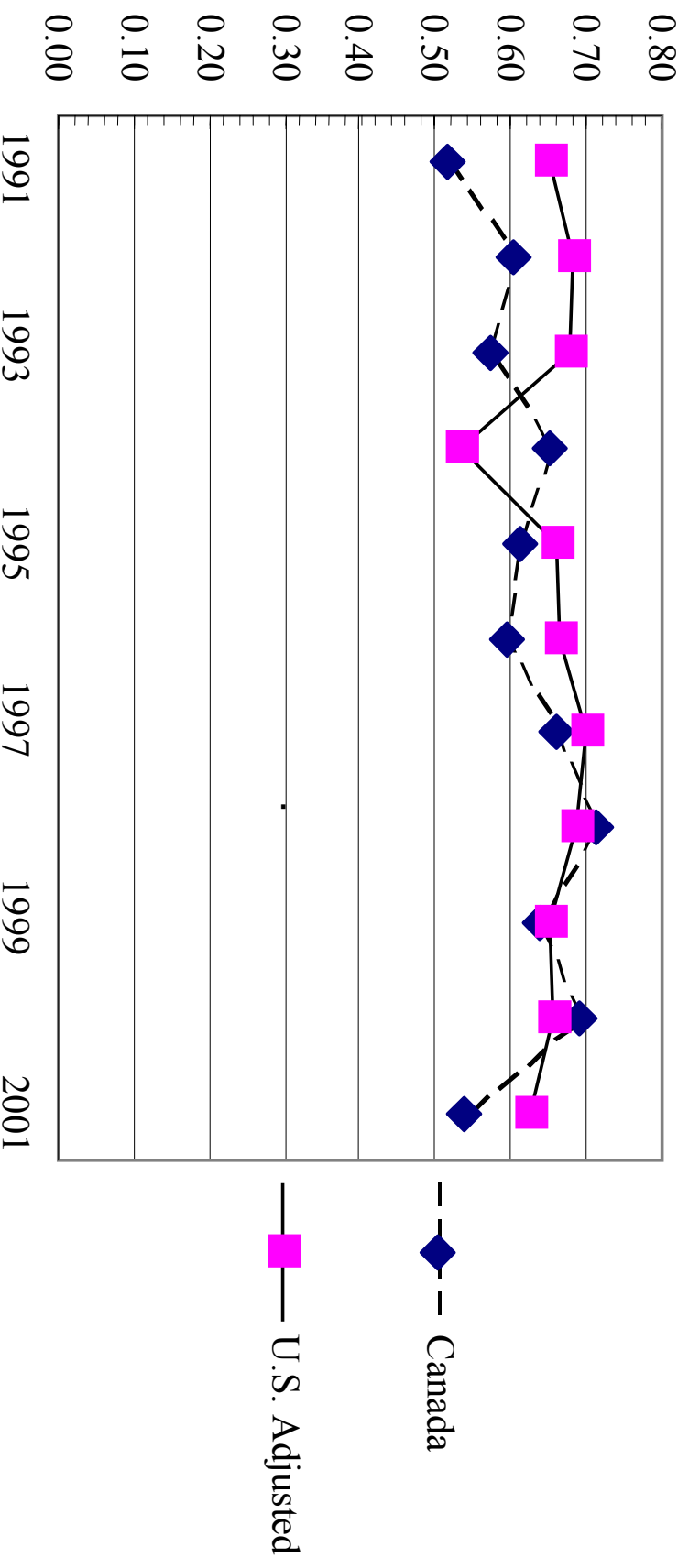
	<u>Invention Disclosures</u>	<u>Licence & Options</u>	<u>Licence Income</u>	<u>U.S. Patents</u>	<u>New Start-up Companies</u>
Canada					
2001 (19 inst.)	.539	.190	25,270	.095	.040
2000 (15 inst.)	.692	.221	18,864	.107	.046
1999 (15 inst)	.638	.191	12,087	.145	.045
United States					
2001 (19)	.638	.190	50,300	.202	.019
2000 (15)	.638	.233	36,810	.206	.022
1999 (15)	.663	.242	40,715	.217	.016

Tables 4 & 5 convert these figures to commercialization activity per \$1M (U.S.) of research support. These tables are particularly instructive in documenting commercialization productivity. Of particular note:

1. Invention disclosures per research dollar are almost constant over time and between countries. In fact, the figures show the constancy from 1991 to 2001. This linear relationship is quite stable.
2. Licences and Options per research dollar executed are constant over time and essentially the same between the two countries.
3. Licensing Income per research dollar has doubled in Canada and has increased by 25% in the U.S. Because of time lags and the rapidity of increasing research, this is expected to rise even further.
4. U.S. patents issued per research dollar are roughly constant over time, but are twice as high in the U.S. as in Canada.
5. Start-up companies per research dollar remain roughly constant over time, but the Canadian rate is more than double the U.S. rate.

TABLE 5

Technology Transfer at Canadian Universities: FY 2001 Update
Invention Disclosures per \$1M Research Expenditure



PART II: EXCERPTS FROM INSTITUTIONAL PROGRESS REPORTS

WEST

1. University of British Columbia

The University of British Columbia is one of Canada's top research universities and British Columbia's single largest research and development performer. In the 2001-2002 fiscal year, UBC received over \$259M in external research funding supporting 4,600 research projects. The University-Industry Liaison Office (UILO) facilitates the exchange between industry and the University's academic researchers by negotiating collaborative research agreements with industry and government and by commercializing the technologies that arise from the research conducted at the University and affiliated teaching hospitals.

In 2001-2002, \$45.5M (of the \$259M total external research budget) came from companies in support of over 900 projects; 125 invention disclosures were received bringing UBC's portfolio of active and licensed technologies to over 600; 227 new patents applications were filed in over 20 countries around the world and 56 patents were granted; 35 new licence and assignment agreements were executed and revenues from royalties and liquidated equity for the year totalled \$11.8M. Despite the dismal financing environment, five new companies were created bringing the total number of UBC spin-off companies to 109.

The following are a few additional highlights from 2002. The UILO expanded operations and established a satellite office located at Vancouver Hospital to serve their five affiliated teaching hospitals. The UILO also took over the responsibility for negotiating all government agreements from the Office of Research Services. Total UILO staff complement grew to 35 full-time equivalents. Researcher education programs were launched focusing on both faculty and graduate students. The technology transfer group was successful in securing \$681,000 for eight projects in the life sciences under the Canadian Institute of Health Research's Proof of Principle program. An online service for licensing software called FlintBox™ was launched, and in partnership with Westlink Innovation Network it is being deployed to other universities across Western Canada. Finally, in partnership with Discovery Parks, UBC's third multi-tenant facility (TEF III), is now under construction and will provide an additional 100,000 square feet of multi-tenant facility space to the heart of the UBC campus for use by UBC spin-off companies.

2. BC Cancer Agency

The BC Cancer Agency (BCCA) continues to build clinical and research infrastructure to encourage translational research. A combination of research infrastructure, existing clinical infrastructure, and a "hands-on" Technology Development Office (TDO) positions BCCA for quick application of new technology in the clinic. The research infrastructure functions with an annual budget of over \$30M last year, 2001-02, with over half the funding derived from industry

sponsored research. The BC Cancer Agency houses over 45 senior scientists across a wide spectrum of research departments located in Vancouver and Victoria, including:

- BC Cancer Research Centre, Vancouver, BC:
- Advanced Therapeutics
- Cancer Control Research
- Cancer Endocrinology
- Cancer Genomics
- Cancer Imaging
- Genome Sciences Centre
- Medical Biophysics
- Terry Fox Laboratory
- Vancouver Island Research Centre (2002)
- Tumour Tissue Repository

A new research centre in Vancouver is in the building phase and at completion in 2005, it is expected to double the BCCA's research space to over 200,000 square feet.

The BCCA's TDO, established in October 1998, has a unique approach to commercialization. TDO has embarked on an aggressive program to foster relationships with local venture capitalists in the local and international pharmaceutical sector to explore potential investment and collaborations for the cultivation of translational research. Additionally, the TDO has built a team with scientific, business and agreement/contract expertise to assist researchers in the development of their intellectual property from the laboratory to the marketplace. Previous to the establishment of the TDO, BCCA researchers have been involved with entrepreneurial activities having actively taken part in the creation of over 14 BCCA spin-off companies. BCCA spin-off companies in the past year have been successful in raising financing despite the tight venture capital conditions:

- Three newly established spin-off companies have an investment commitment of over \$10M over the next three years
- Existing spin-offs have been successful in raising follow-on financing, Xillix Technologies Corp (\$12M in 2002) and Celator Technologies have recently closed mezzanine financing rounds.

It is expected that with a concentrated effort, the commercialization activity will grow due to an increasing number of invention disclosures and funding for proof of principle funding. The CIHR Proof of Principle grants are judged based on innovative science as well as commercial potential and thus only disclosures with a promising future will be considered. So far this year, 2002-03, the TDO has received 11 invention disclosures and has applied for 4 CIHR Proof of Principle grants. In the last fiscal year, 2001-02, the TDO received 15 invention disclosures and was successful in obtaining 3 (~ over \$275,000) of the 4 CIHR Proof of Principle grants it applied for.

3. British Columbia Institute of Technology

With CFI support, BCIT has reinforced three areas:

- i) Centre for Rehabilitation Engineering and Technology that Enables (CREATE). This project helps Canadians with disabilities, and is a partnership with the Research Division of the Neil Squire Foundation. A recent achievement is the development of a novel patient lift device. The research is being supported by the WCB of BC, and the device will be commercialized through a manufacturer based in Ontario (Waverley Glen).
- ii) Photovoltaic Energy Applied Research Lab (PEARL). The focus is on solar photovoltaic power generation, with demonstration projects and industry partners. Projects planned for 2003 include development of modular wiring solutions to simplify construction of building integrated photovoltaics, and the use of the solar array simulator equipment to investigate hydrogen production for fuel cells.
- iii) Internet Engineering Lab (IEL). This lab contains equipment that is unique to Canada, to allow advanced testing of high performance networks. Recent achievements include assisting two local start-up companies to complete development of products that provide valuable network information. One product allows users to view impairments on the network; the other is a wireless short-haul communications system. The lab is also evaluating security issues for companies that operate their control systems over internet infrastructure. Considerably more work is anticipated in this field.

4. Forintek

Forintek is Canada's national research institute for wood products, and its foundation is scientific discovery, innovation and technology transfer. The \$24M budget of this private, not-for-profit institute is funded by a member-based industry/government partnership. A globally competitive Canadian forest products industry needs to build on knowledge and innovation and technology can open up new opportunities for diversification--new products, new applications, new markets. To lever the funds contributed by members, Forintek has alliances with Feric, Paprican, and universities and research institutes in Canada, and around the world. As an example of co-operation with universities, Forintek has partnered with NSERC to set up five Research Chairs (University of Toronto, Carleton University, Laval University [2] and UBC). These are educating specialists who will work in the forest products industry.

Technology transfer is a vital part of Forintek's mandate. It is built around a national network of industry advisors and scientists who carry out mill visits, undertake non-proprietary contracts, offer workshops and seminars, and publish research results for the benefit of industry.

Forintek works with suppliers to the industry to take inventions and innovations to the commercialization or spin-off stage. In 2002, seven Patent applications were submitted and one Patent was issued, making a total of 45. Independent evaluations have confirmed that Forintek's research has a major impact on the competitiveness of Canada's wood products industry.

Forintek has received two CFI grants and has been a partner in several other successful applications. In 2002, these grants totalled \$8.5M. Installation of the Computed Tomography scanner (the first proposal funded) is now nearing completion at Forintek's Vancouver laboratory. This equipment is the first of its kind to be used in the wood products industry in North America and will provide the opportunity to carry out leading-edge research on value recovery in wood product manufacturing.

5. Malaspina University College

Building on its strengths as a regional university and a history of applied research, Malaspina University-College (MUC) is developing a major new strategic initiative in the establishment of an Institute for Coastal Studies. This Institute will have an interdisciplinary research mandate focusing on coastal communities of the British Columbia and the Pacific North West. The Institute for Coastal studies seeks to conduct internationally respected, interdisciplinary research involving the natural sciences, the social sciences and the humanities. The focus is on understanding and promoting the resilience of "communities on the edge".

The Institute of Coastal Studies is a research commons, a hub from which many spokes radiate. An existing spoke is the newly established Applied Environmental Research Lab specializing in state-of-the-art water quality and other environmental chemical analysis. A second phase is the Centre for Shellfish Research (CSR). The CSR will conduct interdisciplinary research that seeks to answer the question of whether the shellfish industry in B.C. can be helped to expand in such a way that coastal communities benefit by the expansion. The CSR is seen as taking a multidisciplinary approach to shellfish research, an approach which is based on answering technical and environmental questions but recognizing that the broader questions inherent in addressing the viability and sustainability of a shellfish industry on the West Coast cannot be answered without examining the economic, social, political and cultural ramifications of such an industry. Each of these initiatives received significant CFI support. In addition, MUC has a Technology Transfer Office that connects faculty with local businesses.

6. University of Northern British Columbia

The principal focus of commercial activities at UNBC in the coming year will be to increase the utilization of the collective knowledge of the UNBC community to support local industry, governmental organizations in northern B.C. and community groups. UNBC hopes to implement a service to encourage faculty, staff, and students to engage in consultancies. The service would provide basic administrative functions (contracts, GST, etc.), insurance, a common identity, and some marketing and referral services. In conjunction with this service UNBC is developing a strategic plan for greater commercial utilization of laboratory resources. It is expanding laboratory resource in areas that can support basic research while also serving local industry particularly new and innovative companies working with new technologies. For example, UNBC is creating a renewable fuels lab to aid the growth of the nascent bio-fuels industry cluster in the Prince George region.

UNBC expects to continue patenting activity and will continue prosecution of three pending applications. One technology has been identified as having patent potential and it is expected

that application(s) will be filed in 2003. It is likely that other inventions will be disclosed and patents filed. As the patent portfolio increases (3 issued), the formation of spin-off companies from UNBC should begin. The process has been started around results from one research area and there is a strong potential of a second company in 2003.

7. Royal Roads University

Royal Roads University submitted its final report on its first project on innovative wastewater treatment entitled *Process Optimization and Control of Wastewater Biodegradation in an Advanced System Treatment Plant*. A practical spin-off has been that the results of a number of small scale experiments at the RRU facility were used by the industrial partner, Hydroxyl, in the design of innovative wastewater treatment systems that have installed, or will be installed shortly, on several of the BC Ferries ships. Over the coming year, continued efforts will be made to expand their research capability regarding the wastewater treatment research centre that over the longer term they anticipate will lead to commercialization activity.

The second project, *Initiation of the Pacific North West Node of a Global Atmospheric Monitoring Network and Ecological Indicators in Assessing the Effects of Global Climate Change and Pollutants on Ecosystem and Human Health* has just recently started. A number of agencies and firms have expressed interest in various research opportunities, which will be acted upon in the coming year now that the infrastructure is being assembled.

8. Simon Fraser University

Simon Fraser University has a long history of successful exploitation of intellectual property developed through research by faculty, students and staff. The UILO plays a key role. Its context, configuration and a number of input and output measures are presented below:

Personnel: A Director, Associate Director, three technology managers, one manager of communications and information and an administrative support person staff the SFU UILO. The services of the Industry Contracts Officer and Contracts Assistant, who report to the Director of the Office of Research Services, are available to the UILO for legal advice concerning licenses, contracts and intellectual property.

Organization Structure: The UILO operates within the portfolio of the Vice-President, Research, which also includes:

The Office of Research Services, which comprises a Director and four support staff, and whose services are available to the UILO.

SF Univentures Corporation - a wholly-owned, for-profit company that is used where it is advantageous or required, such as in managing or holding equity positions on behalf of the university or to access funding programs that require a corporate partner. The corporation is managed by UILO staff, under the direction of the corporation's Board of Directors.

SFU's Discovery Park - a research park adjacent to SFU's Burnaby campus that houses research-driven businesses, many with close working relationships with the University, and the Business Development Centre - an incubation centre for SFU spin-off companies and research-driven businesses working in close relationship with the University for the purpose of research and development activity.

An incubator facility at the TIME (Technology, Innovation, Management and Entrepreneurship) Centre called TIME Ventures Innovations. The facility is located at SFU's Harbour Centre campus in downtown Vancouver and houses new companies, including SFU spin-off companies, on a low-risk basis, where they can receive the benefit of the services offered by the UILO's technology transfer staff assigned to the TIME Centre.

The SFU UILO is a member of WestLink Innovation Network, a not-for-profit organization that was formed to facilitate communication, interaction, collaboration and technology development and commercialization among the Western Canada universities and their affiliated research institutions.

Intellectual Property Policies: SFU's patent policy designates the inventor as owner of patentable innovations unless specified by contractual agreement with a research sponsor. The University's copyright policy contains varying provisions for ownership of copyright works depending on the circumstances surrounding development. In the case of software produced during research endeavour, the University and the author are joint owners. In all cases, disclosure is required.

Financial Support: Financial support is from SFU base operating funds, grants from the Ministry of Competition, Science and Enterprise, Government of British Columbia, and from the three national granting councils' Intellectual Property Management Program. The UILO receives one-half of the net revenue to SFU from commercialization of SFU intellectual property.

9. Vancouver Aquarium Marine Science Centre

The *Vancouver Aquarium Marine Science Centre* has a strong focus on communication and has developed a major research centre in support of this mandate. With CFI's support in 2001, the *North Pacific Marine Mammals Species-at-Risk Centre* was built to support the work of a Consortium (UBC, U of Alaska, U of Washington, and Oregon State U) of researchers studying the patterns/ causes of decline and abundance of marine mammals. Through the communication of this research to the public, the *Vancouver Aquarium Marine Science Centre* has been able to:

- Introduce the public to the importance of the Consortium's work
- Include other institutions in their research

In 2003, the *Vancouver Aquarium Marine Science Centre* is evaluating BC groundfish for closed-containment culture for the Asian live market. This research will enable sustainable, diversification of the BC aquaculture industry and alleviate a fishery conservation crisis. The institution is planning to submit an application to CFI's Innovation Fund to help build the *Pacific*

Aquaculture Diversification Laboratory (PADL) at the Aquarium to conduct the research for this commercialization.

10. University of Victoria

The Innovation and Development Corporation (IDC) is the technology transfer office for the University of Victoria. In close co-operation with the VP Research Office, IDC offers a full range of services to support research enhancement and commercialization activities. These services can be summarized in two broad categories:

i) General technology transfer services to the UVic community: The enhanced support in this area continues to be driven by the consistent demand from the UVic research community. There are several research areas that are experiencing increased growth in both industrial collaborations and commercial activities such as licensing and spin-off company formations. Some of these areas of growth at UVic include:

- Fuel cell and related energy technologies
- Disease resistance in plants
- Biocontrol agents for agriculture and other applications
- New aquaculture technology
- Courseware and information technology commercialization
- New genomics-based research
- New chemical compounds and applications
- Proteomics related technologies and service opportunities
- Innovative cancer treatment methodologies

New areas of research opportunities include:

- Marine and Ocean technologies
- Watershed management and related environmental technologies
- Climate studies

Many of these key research areas have received CFI support as well as support from other federal and provincial sources. In addition IDC has been very active in supporting student projects, developing prototype development funding, providing assistance with industry contract negotiations, developing an innovative patent management database and promoting UVic opportunities to the local community.

ii) Development of the role of UVic in local economic development: In recognition of the importance of the role of UVic in developing a regional innovation strategy, IDC has facilitated discussions with local industry to co-ordinate cluster-building activities and create more effective mechanisms for the transfer of research excellence to commercialization opportunities. IDC continues to assist with the development of partnerships with local colleges and university colleges, research institutions and other organizations to insure that UVic research will result in productive partnerships and further opportunities. IDC also runs a small incubator facility to assist both UVic and other entrepreneurs to develop their early

stage ideas and UVic is working with Discovery Parks International to develop a new multi-tenant facility on campus to facilitate the growth of these new ventures.

11. Okanagan University College

It is important to remember that CFI has not only supported the activities of established universities; it has also contributed to developing capacity and focus in new institutions serving regions that were previously left out of the national research and development agenda.

During the past five years, CFI has provided critical impetus to developing the research profile and capacity of OUC in terms of both funding and approach. This young institution serves the southern interior of British Columbia, and with the aid of federal funding has established its role as catalyst in developing the research and development activities key to the economic and social development of the region. Multi-sector partnerships have been established to support CFI applications in areas of activity that are core clusters in the Okanagan. The CFI process has allowed OUC to highlight the importance of working together in a region of small and medium sized enterprises, just as it has provided a practical context for discussion of research, application and commercialization.

In 2002, OUC continued to work with industry, business and other organizations to create opportunities and pathways for commercialization of research. Many OUC researchers were individually involved in contracts that had immediate commercialization potential, including work in forestry, software development, viticulture and oenology, and water quality. Institutionally, OUC's Technology Access Centre, to be housed within the OUC Innovation Centre, worked with several private sector clients and faculty members to facilitate further research and development. (An example of one project is the development of a solar-powered device to extract potable water from the air - a project that has significant implications for many third-world countries.) The Technology Access Centre has been involved with environmental technologies, freshwater and watershed management, radio engineering, agri-food sciences and health sciences projects.

OUC has also been working closely with industry and business in the region to develop new partnerships and strategies that will facilitate commercialization. One of the most high profile has been the Okanagan Innovation Forum, which resulted from an Innovation Roundtable jointly sponsored by OUC and NRC in 2000. The Forum will aid strategic development of several key economic clusters in the region. OUC also spearheaded the establishment of a new agency, the British Columbia Freshwater Institute, which has been incorporated federally. In part, its mandate will include commercialization of freshwater research, facilitation of client-based research and knowledge transmission through training. New endeavours with the Pacific Agri-Food Research Centre in Summerland and the Dominion Radio-Astrophysical Observatory in White Lake will also create new opportunities for research and commercialization thereof.

OUC is also in the process of establishing an Innovation Centre, which will bring together partners in the innovation agenda (including Venture B.C., a venture capital organization) to blend capacities for project management, industry liaison and commercialization.

In summary, the above particulars sketch some of the advances made by OUC within the past five years. All have been prompted by the institutional opportunities created by the CFI, and all have grown to some extent as a result of a new awareness of the importance and benefits of partnerships and problem-solving that are fundamental elements of CFI process

12. University of Alberta

The University of Alberta continues to be very active and successful in technology transfer. This includes the evaluation, protection, marketing and licensing of technologies resulting from their research. In 2001-02 they managed:

- \$283.6M of total sponsored research
- \$46M in industry sponsored research
- 63 reports of inventions
- 26 licenses and options
- 153 Agreements (material transfers, confidential disclosures)
- 25 new technologies licensed
- 143 patents filed (in all countries)
- 38 patents issued (in all countries)
- 1,024 Research Agreements executed
- \$2.1M in licensing revenues, and,
- 9 new spin-off companies formed

Since 1963, 76 spin-off companies have been formed, 83% are still active, 95% remain in Alberta and 9 are publicly traded with a total market capitalization of over \$1 billion. The University holds equity in 36 spin-off companies with an estimated value of around \$45M.

The University operates a successful Research Transition Facility on-campus as an incubator centre – 40,000 sq. ft. charging market lease rates with the expectation that the companies will eventually move on to either the Edmonton Research Park or other commercial space off campus. The University of Alberta is a founding member of InnoCentre Alberta and is a key partner with Economic Development Edmonton (EDE) in the Deal Generator and Venture Prize, both activities designed to facilitate greater success and opportunities for spin-off companies.

In February 2002, the University hosted a highly successful International Conference on Innovation and Commercialization of University Research (ICUR).

In August 2002, the Industry Liaison Office consolidated with the Research Grants Office and most of Research and Trust Accounting to form the new Research Services Office.

13. University of Calgary

Benefits to Canada include:

- i) research to increase quality of life
- ii) actively pursuing commercialization

- iii) participating in discovery networks across the country, and
- iv) developing partnerships with government and industry to contribute to economic growth and diversification as well as educating the next generation of researchers and citizens.

Quality of life - health (cancer, genomics, osteoarthritis, nutrition, human performance and basic biomedical research).

- biotechnology, energy, information and communications technology (ICT)
- social and human sciences - language training, public policy research, military and strategic studies.

The University of Calgary maintains a generous intellectual property policy in which the intellectual property is creator owned and the creator is entitled to no less than 50 per cent of the net revenue from commercialization. This serves both to encourage commercialization of research discoveries and attract researchers to campus.

Commercialization is done either through the Research Services Office at the University of Calgary or through the University of Calgary's wholly owned technology commercialization company, University Technologies International Inc. (UTI). UTI, established in 1989, has been one of the top three technology commercialization organizations in Canada for the past seven years. UTI handles most of the commercialization work at the University of Calgary.

For the 2002 fiscal year, the University of Calgary reported 85 disclosures of new research technology, 33 licensing deals signed, five new companies created, 122 patent applications filed, 36 patents issued and \$2,5M generated in licensing revenue.

Industry Linkages - Many activities are under way with local industry including the Advanced Energy Research Initiative.

14. University of Lethbridge

At the University of Lethbridge, the focus of this past year's knowledge transfer activities has been to build relationships – both within the University and the external community. The University of Lethbridge, as a member of the Southern Alberta Technology Council (SATC), is collaborating with Lethbridge Community College (LCC), the City of Lethbridge and local businesses to develop an incubator facility. In January 2003, SATC will conduct a survey of the academic and business communities to assess their specific needs for an incubator facility. LCC has commercial space that could be used to house an incubator.

The University has invested heavily in training technology transfer staff and recently hired a full time Technology Transfer Officer to lead commercialization activities at the University. In collaboration with WestLink Innovation Network the University hosted an IP 101 course in November 2002. The course was open to the academic and business community throughout Lethbridge and was so successful that there is now a waiting list for the course.

The University had one invention disclosure this year and is working with faculty members to encourage knowledge transfer activities.

Knowledge transfer activities at the University of Lethbridge were initiated through funding support from NSERC and the Alberta Science and Research Authority (ASRA). Thanks to a recent investment from Western Economic Diversification and the funding of the indirect costs of research, the University has the level of support necessary to build and sustain technology transfer activities.

15. Athabasca University

In addition to its wide range of disciplinary research, Athabasca University has a special mandate for e-learning. The research agenda is focused on e-learning as a business, specifically on pedagogical, cost-effectiveness, and scalability issues. Through its participation in national and international consortia, the University is actively developing markets worldwide. Examples of products include:

- On-line scholarly journal publishing systems,
- Online writing skills software, and
- Supply chain management systems.

16. The King's University College

CFI support for research infrastructure at The King's University College to date has focused on providing state-of-the art tools for chemistry and biochemistry. With additional funding from Alberta Innovation and Science, and industrial partners, King's has now established the King's Centre for Molecular Structure (KCMS). The Centre was officially opened on March 26, 2003, with the mandate to provide modern instruments and expertise to support basic and applied research in chemistry and biochemistry. The beneficiaries of this research infrastructure include:

- King's faculty and students
- Collaborators from other academic institutions
- Government laboratories
- Private sector
- Non-profit sector

Technology transfer will occur directly, through strengthened research collaborations in the pulp and paper, pharmaceutical, and agricultural sectors, and indirectly, through the extensive research training of undergraduate students in chemistry and biochemistry.

17. Olds College

The Olds College Centre for Innovation (OCCI) is a comprehensive approach to assisting agri-business and resource industries in capturing more market opportunities through the creation of new products and processes, new technologies and in assisting industry to solve other technology related problems.

OCCI now consists of four distinct research divisions:

- i) Composting and Waste Management
- ii) New Products from Crops and Processing
- iii) Livestock Genetics, Nutrition and Breeding
- iv) Environmental Microbiology and Field Studies

OCCI has also established a College Research Integration Group that ensures the active involvement of students and faculty in research projects as members of the technical team. The staff of 17 employees now consists of 5 full time researchers, a postdoctoral placement sponsored by the Alberta Ingenuity fund and 11 other technical and administrative staff.

OCCI's commercialization and applied research activities now include projects from the following areas:

- Biofertilizers
- Compost solutions for contaminated soils
- Biogas technology applications
- Essential fatty acid, lipid and sterol product development
- Automated feed efficiency technology
- Equine embryo transplantation
- Frost resistant fescue grasses

In 2002, Olds College and OCCI received approval from CFI for a \$3.3M microprocessing facility. The facility will consist of primary, secondary and tertiary processing of crops to develop and test new products included in the functional food and nutraceutical categories. The facility will also demonstrate and practice GLP (Good Laboratory Practices) protocol and will provide certification that new products developed in the facility meet specific international standards under the FQA, Functional Quality Assured, banner.

18. Southern Alberta Institute of Technology

SAIT has over 150 partnerships with national and international businesses. With nine centres of technology development including manufacturing and automation, information communication technology, construction, health and safety and energy, SAIT is well positioned to assist Canadian companies with applied research and development initiatives.

SAIT's Innovation Technology Development Office has been created to facilitate applied research projects at SAIT. This includes prototyping, testing, and assistance with the commercialization of new technologies.

Innovation projects SAIT is currently developing in partnership with industry include:

- A cleaner, more efficient heater designed for homes in China
- Development of a new circuit board for oilfield technology

- Remote speech therapy applications allowing students to learn a new language
- Development of a sustainable housing unit for impoverished countries

19. University of Saskatchewan

Established in 1991, University of Saskatchewan Technologies (UST) Inc. assists University of Saskatchewan faculty in transferring technology to the marketplace. The University is strongly committed to boosting its technology transfer activities in keeping with the national innovation agenda. A national search is currently underway for a new president/CEO to lead UST Inc.

In 2001, 33 spin-off companies from U of S research generated revenues totalling \$190M and provided jobs for 1,383 employees. These companies are innovators in areas as diverse as human and animal health, agriculture, manufacturing and engineering. UST has also been active in protecting intellectual property. More than 200 patents have been filed and more than 25 licenses have been negotiated.

Formation of new start-up companies has been UST's main focus in the last few years. Since 1998, some 10 companies originating from U of S research have been formed. These new technologies include a potential new drug treatment to reduce the effects of spinal cord injury, an herbal treatment for erectile dysfunction, a molecular wire with potential application to nanotechnology industries, and a flaxseed-derived compound with pharmaceutical and nutraceutical applications.

A study on U of S spin-offs indicated a healthy entrepreneurial spirit among the U of S faculty. U of S is the province's prime source of innovations. UST has introduced a program to award the most successful U of S innovators. The award is co-sponsored by Innovation Place, one of North America's most successful research parks, which is located on campus.

UST also assists Canadian Light Source Inc., operator of the CFI-funded national synchrotron facility at U of S, in licensing its technologies.

UST is a member of WestLink Innovation Network, a Western Canadian technology transfer network, and participates in the training of WestLink interns.

20. University of Regina

The University of Regina has identified its research activities in 5 clusters:

- Health
- Information Technology
- Social Justice
- Culture and Heritage
- Energy and Environment

Each of these clusters crosses traditional discipline boundaries and each has benefits to Canada.

The University of Regina has recently (July 2002) opened a University-Industry Liaison Office, with fiscal support from the City of Regina. That Office, with support from Western Economic Diversification, is currently engaged in a feasibility study for a Technology Incubator Facility that would house:

- i) an expanded Media Production and Studies Program (2 CFI-equipped labs are to be opened shortly for that program), and,
- ii) a Sustainable Communities Institute, that would build on and integrate existing CFI-equipped labs in Sustainable Heavy Oil Research, Environmental Quality Analysis, Greenhouse Gas, and Carbon Dioxide Capture.

A major renovation to an existing building is complete and Greenhouse Gas and CO₂ labs will be opened shortly. A consortia of 7 companies and various federal and provincial (Alberta and Saskatchewan) departments has been developed to fund the CO₂ research (more than \$1.5M of funding secured). Many of the actors in this consortium are participants in the Weyburn project.

21. Brandon University

Three CFI projects have helped Brandon build capacity in the following areas:

Nuclear Magnetic Resonance is preparing people in academe, agriculture, and ultimately diagnostic medicine.

Microscopy and Molecular Systems Research Lab is helping to characterize fungal strains with significance nationally and internationally.

Resource Geology Lab is leading to discoveries of new mineral deposits with a focus on specialty minerals and rare earth elements as well as understanding the geology of specific oil and gas fields.

22. University of Manitoba

The Vice President Research Office at the University of Manitoba has the responsibility to provide intellectual property and technology assessment services and technology commercialization programs to the University's research community. It also provides technology assessment services to The University of Winnipeg, CancerCare Manitoba, Brandon University and the Winnipeg Health Sciences Centre under strategic affiliation agreements.

The University has developed a much more rigorous intellectual property and technology assessment process. It has also established four new programs or initiatives to develop technology commercialization opportunities;

- i) LicensePro is a program specifically designed to maximize the licensing potential of technologies recommended for commercialization. Licensees are first sought locally, provincially, and then nationally. The University has a strong record of technology

commercialization through licensing. It holds more than 70 patents for technologies and annual royalty income from 53 licenses and options totalling \$2M in 2001/2002.

- ii) VentureBox is a comprehensive program designed to successfully create and grow high-tech/biotech start-up companies at the University.
- iii) The Springboard Fund, a partnership with the largest venture capital pool in Manitoba, has been established to provide early-stage, proof-of concept research funding to VentureBox companies.
- iv) Incubat is a program designed to provide critically needed, experienced early-stage management, business and fund-raising services to high-tech start up companies derived from research at the University of Manitoba and its research affiliates.

Incubat will also be available for opportunities from the broader Manitoba community. For example, it may also assist *TRLabs* in commercializing its research opportunities. Incubat will be located in 10,000 sq. ft. of Smartpark's new multi-tenant facility within the University of Manitoba's research and technology park. The development and construction of the new facility is itself another investment of the University in fostering the relationships with the private sector that will spur technology commercialization.

As a result of the new program and service initiatives, disclosures have risen.

The University of Manitoba is a member of WestLink and 16 Network Centres of Excellence. Manitoba is examining the idea of a high tech corridor to South Dakota, and possible technology commercialization alliances with Minnesota.

23. St-Boniface General Hospital

St. Boniface General Hospital is a leader in the commercialization of medical technologies in Manitoba. Six spin-off companies have been created over the past few years and, in partnership with the new \$90M Western Life Sciences Venture Fund, the institution is confident in its ability to generate more spin-off companies in the next year.

In addition to improving access to venture capital, the Hospital is taking other strategic steps to enhance the innovation process. For instance, the Hospital is presently constructing the I.H. Asper Clinical Research Institute. This new institute will establish Phase 1-3 clinical trial infrastructure that will enable new technology products to take the next step from the lab bench into a dedicated clinical trial environment. The new institute will also provide incubator space to accommodate start-up companies that have outgrown their original laboratories. The Clinical Research Institute will provide a "test bed" for the testing of new drugs and devices developed in the Research Centre. The CRI will also provide a vehicle for other commercial partners - in the pharmaceutical, medical device and IT sectors - to establish research operations on campus with an eye towards joint ventures, collaborations, and demonstration projects. There will be a strong emphasis on cardiac and vascular disease as well as the emerging field of nutraceuticals.

The St. Boniface General Hospital Research Centre presently provides a technology transfer service to its scientists - proactively seeking out industrial/product development relationships with the private sector. Knowledgeable, professional technology transfer staff work closely with scientists to exploit their discoveries. Elements of this service include: IP protection, business plans, liaison with prospective pharmaceutical and medical device company partners, working with venture capitalists, travel to meet prospective licensees/investors, promotion (trades shows, printed materials) and pre-commercialization funding.

Investigators and research projects receiving CFI support are promoted within this Commercialization Plan.

24. University of Winnipeg

In 1997, the U of W included technology commercialization responsibilities in the Research Administration Officer position in Research and Graduate Studies to manage the preparation and filing of intellectual property (IP) documentation with Canadian and foreign patent offices and to address issues regarding research contracts, material transfer agreements, etc. This position provides general advice to faculty, staff, departments, and centres on the administration of intellectual property matters. Past activities include the production of a series of IP-related videos based on seminars offered to researchers and the creation of a student intellectual property policy at the U of W. In 1999, the University became a member of WestLink Innovation Network Ltd. in order to maximize limited technology commercialization resources.

The U of W's current technology commercialization portfolio includes a chemistry-related patent (in both Canada and the United States) as well as a trademark for the Mutual Fund Challenge, a web-based mutual fund simulation program used in high school and university programs.

The position of Industry Liaison Officer (ILO) was established in August 2002 to support the expected continued growth of research endeavours. The ILO has been active in meeting with researchers and coordinating the development of a publication to profile research at the U of W, as well as developing a Research web site to include industry liaison and transfer of intellectual property. Other activities have included seminars introducing technology transfer concepts and procedures, and the building of external relationships and partnerships. The ILO has also joined and attended conferences for CAURA West and AUTM.

The University of Winnipeg faculty are committed researchers and continue to steadily increase the number of research grants received. A growth in research projects has provided the benefit of undergraduate and graduate student involvement for which the University has become well known.

The University continues to expand its research potential through the appointment of Canada Research Chairs and by further developing research facilities through the Canada Foundation for Innovation (CFI) New Opportunities Fund. Three new faculty members have made application to CFI under the New Opportunities Fund for 2003, in the areas of Chemistry and Biology. All three researchers have great potential to develop their research results into products and solutions

for the health of the general public, the efficiency of the local forestry industry, and the environment of Manitoba.

Previous CFI grants have allowed the study of comparative genomics of genes controlling sperm differentiation and maturation in *Drosophila* that allows us to understand how genes affect the proper development of mature sperm and the variation within populations and among species. CFI has also contributed toward the establishment of a Clinical Colour Vision Assessment Laboratory and a Centre for Scientific and Curatorial Analysis of Painting Elements (C-SCAPE).

The well-established Centre for Forest Interdisciplinary Research (C-FIR) is dedicated to the development of interdisciplinary research, education, and training in the areas of forestry, forest ecosystems, forest values, and the human uses of forests.

In January 2003 the University of Winnipeg will host a CFI Information Session for faculty members and university administrators. Other planned sessions include: grant writing workshops, presentation of information on intellectual property and knowledge transfer, and a faculty forum to provide feedback regarding the research strategy at the University of Winnipeg.

ONTARIO

25. Brock University

Brock's concept of benefits to research to Canada is broadly conceived and encompasses all disciplines in the humanities, fine arts, social sciences, applied health sciences as well as the natural and physical sciences. The Cool Climate Oenology and Viticulture Institute, Canada's only research institute dedicated to research and innovation for the grape and wine industries, focuses on improving viticultural and oenological practices as well as applying advances in genomics and proteomics to grape vines. CFI investments in infrastructure may lead to improvements in grape vines defences against pathogens, improvement of yeasts for ice-wines, and understanding of key factors related to terroir and provision of a scientific basis for sub-appellations of Ontario wines.

Brock assigns IP to the creator. Brock has created a seed fund to assist in the commercialization of research and also participates in a consortium of nine universities that have received funding from the Tri-Council IPMP. Brock reports 3 patent applications, two of which have been licensed.

Brock is currently studying the feasibility of establishing a Niagara Science and Innovation Park, a facility combining the attributes of research parks and incubation centres.

26. Lakehead University

Lakehead University's commercialization activities are managed by the institution's Innovation Management Office (IMO), which is undergoing an expansion period to ensure that it can effectively respond to the expected increased demand for technology transfer services from the University community, the University's new joint medical school with Laurentian University, the Thunder Bay Regional Hospital, as well as other local industries and public sector entities engaged in research and development. Through partnerships with the NRC/IRAP program and the Northwestern Ontario Technology Centre incubator (NOTC), the IMO offered successful seminars in business development and funding opportunities to a large number of university and industry participants. The IMO continues to work with local, regional, and national partners to ensure that the commercialization needs of Northwestern Ontario are met. Significant projects over the 2002 calendar year included:

- Genesis Genomics Inc.: The IMO has participated significantly in the creation and development of Genesis Genomics Inc., the first biotechnology firm to emerge from Lakehead's start-up company program, assisting it in operationalizing its business plan, raising funding, and organising its corporate governance activities. With substantial assistance from the IMO, GGI has raised almost \$1.9M in a combination of grant, debt, and equity investment.
- Paleo-DNA Laboratory: Due in a large part to the efforts of the IMO, the University's Paleo-DNA laboratory has made significant steps towards becoming a viable business. Employing four full-time staff and with assistance from the IMO, the Laboratory has completed a United Nations contract profiling war crime victims from East Timor and

over 20 forensic DNA identifications for law enforcement agencies and coroner offices in Canada, the United States, and South America. Several of its research projects were made into documentaries and will be aired on Discovery Channel, National Geographic Channel, and PBS throughout the coming months. The IMO has developed a comprehensive business plan, secured additional funding for the business in its start-up phase, and has initiated the process of getting the Laboratory accredited.

- Northwestern Ontario Technology Centre Partnership: The IMO has partnered with the NOTC for its “Idea Factory”, a business plan competition, and will be offering its commercialization services to the winners of the competition.
- Innovation Team: The IMO continues its participation in a regional “Innovation Team”, which is a group of organisations involved in innovation facilitation. Given the geographical and other challenges unique to Northwestern Ontario, several regional groups generally agree that they must work together to maximize the usage of each others strengths and avoid duplicative resources. It is anticipated that these activities will result in the development and implementation of a clear commercialization plan for the region.

27. Laurentian University

Laurentian University's Intellectual Property Management office (IPMO), which is jointly funded by a Tri-Council grant (under the Intellectual Property Management Program) and the university, was subject to reorganization in October, 2002. The office's current role is to:

- Through collaborative partners, to coordinate and deliver critical commercialization activities within the university.
- Coordinate the office functions with regional and other institutions
- Firmly establish intellectual property commercialization awareness and the support of this activity throughout the Laurentian University community.

Staffing consists of one manager who is supported by a part time administration assistant. A liaison office, established for and fully funded by an Ontario Centre of Excellence, Materials and Manufacturing Ontario (MMO), is also part of the IP office. This Liaison office, which has been operating very successfully for one year, was initiated by the IP manager in his previous position, and complements the key functions of IPMO.

The key internal focus of the office during this initial year will be to improve the profile and visibility of the IPMO within the university research community. Activities will include enhancing researchers' knowledge of the commercialization process and assistance to researchers with legal, technical IP issues, technology valuations, market studies, funding and strategic planning.

The key external focus of the office will be expanding and refining the various internal and external partnerships surrounding the IPMO mandate. Activities will include: enhancement of the unique Liaison Office for Materials and Manufacturing Ontario, marketing researchers' capabilities to industrial partners, enhancement of working relationships with potential community and regional institutional partners (colleges, research institutes, local government, hospitals) and active membership in the IPM consortium of Ontario universities for seed and

funding opportunities, collaborative research opportunities as well as learning opportunities for the IP manager.

28. McMaster University

During 2002, McMaster University has made great progress in a number of areas related to commercialization. Plans for a locally-based biotechnology incubator, spearheaded by the University as a result of a number of CFI-funded projects, received a significant boost with the commitment by the local municipality of \$5M. McMaster is an active part of the steering committee for this project which will see the construction of a state-of-the-art facility to foster commercialization activities in the biotechnology sector. Relations with the existing Hamilton Incubator of Technology were also advanced during the year to increase awareness of the support systems already in place for new venture formation.

A number of start-up enterprises were identified particularly in the engineering and software areas. It is expected that 2003 will see a number of these projects come to fruition by the formation of self-standing companies. During the year, McMaster entered into a number of transactions where equity in both public and private companies was received. In order to promote commercialization with research partners, McMaster has adopted a practice of considering receiving a portion of a research sponsorship in the form of equity rather than in cash. In this manner, it is expected that over time a portfolio of such investments will allow further reinvestment in promising projects yielding local economic development and employment.

McMaster continued its tradition of working actively with industrial sponsors of research through the creation of additional endowed and industrial chairs in many research areas. Based on a history of working closely with industry, such chairs allow researchers and students to gain industrially-relevant research experience while ensuring that Canadian and other companies can access university-based research. Although such projects rarely result in the creation of new spin-offs, they do allow existing Canadian SMEs and other enterprises to gain a competitive advantage which allows them to expand their operations.

The University is an active part of important Canadian and International commercialization networks. These include participation in the Networks of Centres of Excellence (NCE) and Ontario Centres of Excellence (OCE) programs as well as commercialization networks such as the tri-council funded IPM6 group used as a model of inter-institutional commercialization collaboration. McMaster personnel serve in leadership roles in some of these networks such as Materials and Manufacturing Ontario (MMO) and the Association of University Technology Managers (AUTM).

29. Queen's University

Now in its 16th year of operation, Queen's University's technology transfer arm, PARTEQ Innovations, continues to be a significant source of revenue for Queen's and an important contributor to economic development in Canada. Highlights of the past year include:

- 42 invention disclosures (up from 27 in 2001-02)
- 60 patent applications filed and 16 patents issued
- \$4M generated in licensing and royalty revenue
- \$25M invested in PARTEQ spin-off companies, bringing the total raised by spin-offs to \$270M

As well, PARTEQ is addressing the current shortage of intellectual property professionals in Canada by currently training three intellectual property management trainees in the areas of patenting and commercialization. PARTEQ continues to build opportunities for investment in Canadian innovation, expanding its sponsorship of labour-backed venture funds. PARTEQ now manages one captive venture fund and sponsors three additional funds, for a total pool of \$16M devoted to Canadian investment in emerging technologies. PARTEQ spin-off companies have created more than 200 jobs in Canada.

New products now on the market include a leading anti-cancer drug; an approved treatment for skin cancer; a drug to treat male erectile dysfunction; the leading wheelchair restraint system in North America; data mining software for drug discovery; and innovative laboratory equipment for teaching and research in the biological sciences.

Products in development include drug candidates to treat Alzheimer's, epilepsy, diabetes, cardiovascular disease, cancer, bone disorders and skin diseases.

30. Ryerson University

During the past year Ryerson was the proud recipient of an NSERC Synergy award, awards that "recognize lasting partnerships in research and development between universities and industry." While the award is directed toward a specific individual and company it is reflective of Ryerson's historic ties with industry. In recognition of the opportunities inherent in these ties and in order to build increased research capacity, Ryerson will be increasing the FTE devoted to industrial liaison and tech transfer in the near future with a further increase anticipated for later in the year. This increase in staffing levels will allow Ryerson to build on existing industrial ties as well as to seek out additional opportunities for collaborative research, development and tech transfer.

One such example of a well developed industrial relationship is the Centre for the Study of Commercial Activity. The Centre has continued its highly successful research collaboration with over 70 different commercial partners. The Centre has also been aided in this work by infrastructure support through the CFI.

The University has continued to benefit from its participation in the NSERC sponsored Intellectual Property Management Group grant made to six Ontario universities as well as from its own IPM grant. These funds have provided supplementary training for staff, prototype development funds for promising technologies and additional funds for patenting.

In the coming year Ryerson will implement a database to track and manage University developed IP. It will continue to provide workshops promoting tech transfer and protection of intellectual

property. This coming year should also see the execution of an agreement for Ryerson's participation in the MaRS project which will greatly expand its tech transfer capabilities.

31. University of Guelph

Medical and Related Links to Agricultural Network for Development and Innovation with Guelph (MaRS LANDING) promotes new partnerships linking agricultural and rural innovations to medical, scientific and health innovations. With the burgeoning interest in nutraceuticals and nutrient-added foods, and the growing prominence of agri-food issues such as spread of disease, food safety and food biosecurity, MaRS LANDING is also poised to provide an important link between agricultural technology – including plant biotechnology, effective crop management and maximum production yields - and marketing of these technologies for national and international applications.

Funding in the amount of \$2.96M was awarded from the Ontario Ministry of Municipal Affairs and Housing's Ontario Small Town and Rural Economic Development program. Partners in this \$5.9M project include the Corporation of the City of Guelph, Ontario Agri-Food Technologies, the University of Guelph, and the MaRS Centre in Toronto, a 1.2-million square-foot complex located at the heart of one of North America's largest medical research networks. MaRS LANDING will facilitate new collaborations and partnerships between the main MaRS organization and Guelph's growing agricultural-life sciences cluster - one of the largest in the country - to create one of the continent's largest, most comprehensive medical/agricultural research networks.

Air Quality Solutions Ltd., a new University of Guelph spin-off company was formally registered in October 2001. The spin-off company was built on the foundations of strong research partnerships with private- and public-sector partners and was finally launched as the result of a \$100,000 award from the Ontario Centres of Excellence to Dr. Darlington, co-winner of the Martin Walmsley Fellowship for Technological Entrepreneurship. Air Quality Solutions Ltd. originated from the space program for life support systems in atmospheric management and markets biofiltration systems for indoor air control of environmentally hazardous pollutants which may lead to such conditions as "Sick Building Syndrome". The biofiltration system was developed out of the Environmental Space Program of M. Dixon whose research program was awarded funding from the Centre for Research in Earth and Space Technology (CRESTech) and the CFI in 1999.

The company intends to enter into a manufacturing agreement with the Northern Centre for Advanced Technology Inc. (NORCAT) that will provide employment for four to five people, as well as several people of its own. With orders already being taken, AQS is looking to expand its capital base and aims to have a full-time staff of 30 to 40 people within three years.

32. University of Ottawa

The University of Ottawa has identified four strategic areas of development for research: Canada, Health, Information Technology, and Molecular Sciences. These areas are the focus of

major University investments and are supported by directed CFI grants, Canada Research Chairs, Networks of Centres of Excellence and other major project funding.

In March 2002, the University of Ottawa created the Technology Transfer and Business Enterprise service to handle research contract negotiation, industrial liaison, intellectual property and commercialization. With 5 additional permanent positions, this new service doubles the University's capacity in the technology transfer area, and better reflects the University's growing stature as one of Canada's research intensive universities. The University of Ottawa has commercialized, through license or spin-off company, technologies in such diverse areas as photonics, cancer, pain management, earthquake damage prevention, stroke, battery power, and *in-vitro* replacements for animal testing. Over \$20M in venture capital has been invested in University of Ottawa spin-off companies over the last two years.

33. University of Toronto

The University of Toronto, with the important support of federal and provincial government programs, such as CFI, has made significant investments in research. It has also worked to transfer the results of that research for the public benefit – through publications, collaboration with Canadian industry and non-profit organizations, technology licensing, the creation of new companies, and other means. Reflecting that commitment, the University has:

- Since the early 1990s, increased the number of professional staff working on technology transfer from 3 to 18, and in the past three years has created a technology transfer intern program that has already graduated seven new professionals and currently has three more in training.
- Increased the number of invention disclosures from 23 (in 1990) to 130 (in 2002), generating in the past year approximately \$2M in licence revenues.
- In the past ten years, facilitated the creation of 70 new companies, which in the past five years alone have attracted almost \$50M in capital investment.
- Created a new business incubator, The Excler@tor, for start-up companies in the information technology sector, and in collaboration with five affiliated teaching hospitals, is developing a new biotechnology company incubator.
- Through the Innovations Foundation, has run an annual business plan competition, which last year became national in scope.
- Been a founding member and financial contributor to the establishment of the MaRS Discovery District, which will be a major centre for the creation of new companies in the medical and related technologies sectors.
- Created an “intellectual property consortium” of six – soon to expand to nine – southern Ontario universities, that use a common source of commercialization expertise, the Innovations Foundation, and jointly run an early-stage seed fund.
- Sponsored, sometimes in collaboration with hospitals or other universities, the creation of several Community Small Business Investment Funds (CSBIFs), currently valued at \$30M and focused on seed investment in start-up companies.

The benefits that Canada has derived from this activity have been significant. They include healthy established companies, like MDS Sciex and Platform Computing, and new highly

innovative ones, like Affinium Pharmaceuticals and BIOX Inc. They also include the introduction of new technologies, such as the salt-tolerance gene for plants, a diagnostic test for Alzheimer's Disease, software for geological analysis and many others.

34. St. Michael's Hospital

St. Michael's Hospital (SMH) has made a commitment to translational research and is dedicated to transferring knowledge from its laboratories to benefit society. SMH works closely with other teaching hospitals in Toronto with respect to evaluating and commercializing intellectual property. It is also a partner in the Toronto Biotechnology Commercialization Centre with other teaching hospitals and the University of Toronto; this centre will provide a state of the art incubator facility in the "MaRS" discovery district. Knowledge transfer will occur in relation to SMH's priority research programs:

Inner City Health and Global Health Research

Coincident with SMH's mission and values, a major research priority is to improve the health of disadvantaged populations. This involves obtaining a better understanding of the barriers to health care, and improving access to high quality health care. SMH is interacting, and will continue to interact with relevant community groups and government agencies to improve the health care delivery to disadvantaged populations. The net effect will be improvement in health of vulnerable populations, economic benefits to the health care system and a healthier society.

With its global health research program, SMH will improve the health of individuals in the third world, and learn about health care delivery that will impact their major metropolitan centres who have a large influx of immigrants.

Critical Care Acute Organ Dysfunction

With funding from CFI for its Critical Care Unit for Research Excellence (cCURE), SMH is developing a translational research focus at SMH with a critical care network across southern Ontario. In this area there have been 2 spin-of companies, a number of disclosures and patent applications. Specific areas of expertise are research into dysfunction of the heart, brain, lung, kidneys, and pancreas, with a strong bench to bedside research program in cardiac gene transfer.

35. Sunnybrook and Women's College Health Sciences Centre

S&W is located on three sites: the Sunnybrook Health Sciences Centre, Women's College Hospital (including the Centre for Research in Women's Health), and the Orthopaedic and Arthritic Institute. Together, they receive external funding of over \$45M. In addition, a research infrastructure budget supports work in: bioengineering, cancer biology, cardiovascular sciences, imaging, immunology, and neurosciences.

Over the last three years, significant investments have been made toward expediting the development of intellectual property, technology transfer, and commercialization. The following

summarizes activities in the past year:

- Renewed an agreement with Innovations Foundation at the University of Toronto to provide services to S&W's Technology Transfer Commercialization Centre. This is focused on uncovering early-stage research that has commercial potential, and to provide the resources to protect and develop this intellectual property.
- One of S&W's spin-off companies, VisualSonics Inc., received further financing.
- Started the Medical Venture Fund Inc. with Dynamic Venture Opportunities Fund and Innovations Foundation to provide funding for early-stage commercialization. This Fund will work with the already existing Sunnybrook Working Ventures Medical Breakthrough Fund in this area.
- S&W participates in a venture called Discovery District in which the officers involved in technology transfer of a number of downtown Toronto hospitals participate together in reviewing promising intellectual property.
- S&W participated with the University of Toronto and Innovations Foundation as well as other downtown Toronto hospitals in developing a booth at BIO 2002 which was held in Toronto. The purpose of this booth was to highlight the commercialization activities taking place at these various research institutes.

S&W also enjoys reciprocal benefits from hosting private sector partners. These include:

- Aventis Pasteur has located the global headquarters of its cancer vaccine project at S&W which offers the potential of synergies between the basic research of S&W and the applied research of Aventis Pasteur.
- S&W is the largest single site of the Aventis Pasteur pan-Canadian Cancer Vaccine Network. This initiative funds S&W cancer biologists and immunologists and has led to information exchange, as well as to the provision of employment opportunities for students, fellows, and technical staff.
- VisualSonics has located in S&W space. In addition to working on collaborative projects together, the existence of VisualSonics has also provided employment opportunities for S&W students and graduates.
- The imaging physicists at S&W have established a preferred partnership with General Electric. This collaborative initiative is supporting the development of innovative imaging hardware and software in the detection and treatment of cancer and cardiovascular disease.

Other S&W initiatives include:

- S&W is a member of the Toronto Biotechnology Commercialization Centre which is aimed at providing space for new companies in the medical and medical technology sector.
- S&W is a member of the Functional Imaging Research Network (FIRN) consortium, funded by CFI, to link the University of Toronto teaching hospitals through a gigabit wide-area network. The Baycrest Centre for Geriatric Care is the lead member of this CFI project.

36. University Health Network

Launched in 1999, the Research Business Development Office (RBDO) has the following mandate: to establish and grow relationships between the UHN research community and the private sector and to protect and market intellectual property generated by researchers.

- In 2001/02 the office signed 180 material transfer agreements, evaluated 32 invention disclosures, and negotiated contracts worth \$1.7M and inked 6 option and/or licensing agreements.
- 18 patent applications were submitted to protect new inventions arising from the work of the following UHN researchers: Robert Inman, Mark Erwin, Shaf Keshavjee, Mingyao Liu, Avi Chakrabarty, Lothar Lilge, Brian Wilson, Norman Boyd, Jeff Medin, Jean Garipey, Pam Ohashi, Fei-Fei Liu, Henry Klamut, John Marshall, Alex Vitkin, Gary Levy and Reg Gorczynski.
- UHN Intellectual Property Policies were drafted and adopted by the Board of Trustees in December 2001.
- In partnership with other University of Toronto-affiliated institutions, RBDO participates in the seed-stage investment fund, the Discovery District Fund, for life sciences start-up companies; this fund has an initial capital of \$6M.
- RBDO negotiated new or enhanced equity stakes in four early stage companies incubated at UHN, increasing the book value of UHN's investment portfolio to more than \$2M.
- Company creation continued to be an important activity at UHN: the RBDO is currently working on business plans for five new spin-offs which will capture business opportunities in cell therapy, drug discovery, genetic testing, genomics and neuroscience.
- Business Development staff in conjunction with outside counsel provide educational seminars for UHN staff on contracts, intellectual property, patenting and company creation.
- UHN Research will be a major tenant in the first of the MaRS Discovery District buildings. UHN is also a partner, with UofT and the other affiliated teaching hospitals in the Toronto Biotechnology Commercialization Centre. The TBCC will also likely be a tenant in the MaRS project.
- Investments like CFI's in core research infrastructure have significantly enhanced the institution's ability to market its capabilities to commercial partners.

37. Hospital for Sick Children

The Intellectual Property and Commercial Development Office (IPCDO) was established to provide integrated services to The Hospital for Sick Children (HSC) in all areas involving intellectual property and the commercialization of research activities. The mission of the IPCDO is to generate contract-based revenues to support HSC research activities and to derive maximum value from HSC intellectual property assets. The IPCDO also provides contract negotiation expertise to HSC's Research Institute and its researchers.

Last year, the IPCDO managed 153 research contracts, generating revenues over \$5M to support research at HSC. In addition, 26 intellectual property license and option agreements with private

sector partners, totalling almost \$1M in revenue were managed. As well, the IPCDO considered 25 invention disclosures and filed 9 patent applications, with 11 patents issuing.

Many of CFI-sponsored projects, such as the Mouse Imaging Centre and the Centre for Applied Genomics, have extensive active collaborations with numerous private-sector and academic collaborators in Canada and world-wide. Multiple patent applications, based on the discoveries made in these centres, have been filed. Research emanating from CFI-sponsored projects is key in creating the discoveries and innovations from which the institutional intellectual property portfolio is ultimately based.

38. Mount Sinai Hospital - Samuel Lunenfeld Research Institute

Mount Sinai Hospital and the Samuel Lunenfeld Research Institute continue an active program of commercialization of research developments through the Office of Technology Transfer and Industrial Liaison. This office provides services in support of intellectual property and commercialization to ensure the application of new information and technology to the promotion of wellness, the prevention, diagnosis and treatment of diseases.

The office has a broad scope of interactions with companies in Canada and abroad including research collaborations, licensing of intellectual property and new company creation. In fact, last year there were 23 research agreements, 16 patent applications filed, and 6 IP licenses executed.

Mount Sinai Hospital continues to be involved with the University of Toronto, The Hospital for Sick Children, Sunnybrook and Women's College Health Sciences Centre, and the University Health Network in the Toronto Biotechnology Commercialization Centre to provide incubation facilities and support services for start-up companies arising out of their research programs.

39. Baycrest Centre for Geriatric Care

The CFI/OIT funding that Baycrest received as part of the successful Functional Imaging Research Network (FIRN) has provided the basis for the following technological development successes. In 2001 Dr. Terry Picton and Dr. Sasha John developed a system for rapidly testing frequency specific hearing in newborn infants, entitled the MASTER technique. Baycrest Hospital and the inventors filed a PCT in order to secure worldwide patent rights for this technology and have licensed these rights to Bio-logic System's Corporation (BLSC). BLSC is one of the largest manufacturers of diagnostic neurophysiology systems and both the rapid timeline of the licensing and the licensing itself reflect a very successful commercialization of the technology. Over the last year, BLSC has successfully transferred the MASTER techniques into its clinical instrument, received FDA approval for its use in hospitals. In the first quarter BLSC distributed the system to over 50 sites. It is the only technology that is currently being tested for objectively assessing hearing in cochlear implant users. The technology is gaining a much larger market share than similar technology developed elsewhere.

In 2002 Dr. Picton and Dr. John obtained a CIHR proof of principle grant for further developing the technique, developing new techniques, and running clinical studies for establishing the validity of these techniques. The clinical application of these new techniques may be even

broader than the MASTER technology. An additional patent has been applied for and several companies have expressed interest in developing the techniques described in the patent into commercial devices.

In addition, in the second half of 2002, several members of the Rotman Research Institute started meeting to discuss commercialization of several software packages that have been developed at the Rotman. The software relates to two areas. The first area represents analysis and imaging software developed in Dr. Picton and Dr. Claude Alain's laboratories for use with EEG data. A large library of programs have been developed which may be included in a software package that is sold to other laboratories and research hospitals. This software package will likely be distributed, both by Baycrest and by a 3rd party vendor. The second area of commercial software concerns neuropsychological test batteries that have been developed at the Rotman by several scientists including Drs. Donald Stuss, Brian Levine, Gordon Winocur, Morris Moscovitch, and others. There are several companies that may act as 3rd party distributors for this type of software. Additionally, the Centre for Addiction and Mental Health currently has a large marketing and distribution network for clinically based tests. The software may be sold for a flat fee or may contain a per-use charge, where the number of "uses" can be replenished over the Internet using a credit card.

40. University of Waterloo

From the beginning, Waterloo has been outward looking—aware of and responsive to the needs of society. It has been a leader in conducting research in partnership with the private sector, and in transferring new knowledge and technological advances to society for the benefit of all. More than 100 companies trace their roots to the University of Waterloo, which is the national leader in technology transfer—more than 22 percent of all high-tech spin-offs from Canada's 84 universities came from Waterloo.

Innovation and entrepreneurship are key features of the University of Waterloo. In April 2002 Waterloo officially opened Innovate Inc., a not-for-profit entity wholly owned by the university. Sponsored by both the National Research Council and the Business Development Bank of Canada, Innovate Inc. has the following mission: to encourage and facilitate the commercialization of innovative product and service ideas to the benefit of the university's entrepreneurs, the university itself, the community and investors. Innovate Inc. aids entrepreneurs with the development of their venture concept, the creation of business plans, the development of the venture team, and the introduction to potential investors.

The Enterprise Co-op program, an Innovate Inc. affiliate, assists a select group of undergraduate co-op students as they work toward launching their own venture during a work term. Enterprise Co-op builds upon Waterloo's world-class Co-operative Education program, and leverages business expertise from both the university and the local community. Students also find the path to entrepreneurial success through the Enterprise Boot Camp (established in 2002). The Boot Camp helps motivated third- and fourth-year undergraduate students make their business ventures a reality. Participants spend four days at intensive, hands-on workshops, learning how to assess their technical and business skills, and evaluating their readiness to start a new venture.

As it has done for 20 years, the university's Technology Transfer and Licensing Office (TTLO) continues to develop its expertise in the areas of patents, copyright, and trademarks as well as in the licensing of intellectual property and commercial enterprise development with the university. The TTLO plays a key role in assisting the university research community in transferring technologies to industry for commercialization. This assistance includes ensuring that adequate intellectual property protection is put in place and appropriate license terms are negotiated on behalf of the university and the researcher.

In 2002 the University of Waterloo undertook the planning of its new Commercialization Practicum—part of the academic offerings of its new Centre for Business, Entrepreneurship and Technology. Running over two academic terms, the Commercialization Practicum will provide students the opportunity to apply their skills and knowledge in a real workplace setting. Teams of students will have the opportunity to work with local companies on real-world projects in many fields, including: health, genetics, the environment, multimedia, and computing. The practicum provides a focal point through which students will gain experience and insights into the early stages of entrepreneurial technology commercialization, company formation and finance, and technology licensing and intellectual property issues.

Also in 2002, Waterloo undertook the planning of a new Cluster Accelerator that will be part of the University of Waterloo Research & Technology Park—a six-way public/private partnership that will strengthen the linkages between industry and academe with their initiatives to move from knowledge creation to societal benefit. The Cluster Accelerator will encourage the growth of new high-tech firms and act as a catalyst for the creation of new products and services, and is intended to make Waterloo Region more attractive to technology-based firms and to investors in knowledge-intensive start-ups. It will support innovation at the local level, enabling the community to continue to be a magnet for investment and opportunity.

41. University of Western Ontario

UWO has invested considerably in developing its tech transfer capabilities starting with the creation of the Office of Industry Liaison (OIL) in 1996. A new Director was hired for this office in 1999. Since its inception the office has grown to 12 full-time employees. Five of these employees are dedicated to intellectual property management, 5 to contract research and inter-institutional agreements and 2 to NRC's IRAP program delivery. The office has enjoyed success in all three rounds of IPM (Intellectual Property Management) grants from the tri-councils.

The program of adding value includes thorough due diligence focused on patentability and commercial potential, prototype development funding, statutory protection, marketing, licensing and start-up company creation and incubation.

In the year ending April, 2002, OIL handled 238 agreements, including 61 research and technical service contracts, 34 license/option agreements and 131 non-financial agreements (typically confidential disclosures and material transfers). OIL also was instrumental as the lead institution in assisting SharcNet, CLLRNet, the Institute for Catastrophic Loss Reduction and the Canadian Light Source in developing and implementing affiliation agreements for member institutions. OIL received 23 new invention disclosures, had 5 new patents issued raising the total to forty, 23

new patent applications filed and received \$811,000 in gross licensing income, a significant increase over the past. It is too early to report on activities for the fiscal year that ends April 30, 2003 but a significant increase in the number of invention disclosures is forecast. However, licensing income will likely be closer to half of last year's.

In 2001 OIL was instrumental in creating, with New Millennium Internet Venture Fund, the UWO Internet Ventures Fund, which operates as a Community Small Business Investment Fund. This fund so far has made one investment of \$500,000 in a local London company.

For several years UWO has operated a Research Park which incorporates a multi-tenant facility, NRC's Integrated Manufacturing Technology Institute, a Conference/Hotel facility and recently added the London Biotechnology Commercialization Centre (Incubator). OIL is working closely with this incubator to ensure success of their start-ups.

42. Lawson Health Research Institute (St. Joseph's Health Centre of London and London Health Sciences Centre)

The London Health Sciences Centre and its research arm the Lawson Health Research Institute are very pleased at the progress that they have made. They have submitted the required documentation to the CFI and OIT. They are also pleased to report that their construction program, a new facility to house their robotics research program funded by CFI, OIT, ORDCF and private sector, is on schedule. They anticipate completion in June and will be accelerating their research activities after that. They anticipate an official opening of the Legacy Research Pavilion which will house CSTAR - Canadian Surgical Technologies & Advanced Robotics Centre in September 2003. This will be marked by a scientific symposium and of course officials and senior members of the CFI and OIT will be their welcome guests.

With respect to commercialization activities they are pleased to report the establishment of a spin-off company whose mandate is to advance the field of surgical robotics for use in all disciplines of surgery. This company is seeking financing. The institutions have made sure that the research enterprise and its commercial spin-off are supportive of the context of the innovation strategy of the federal government. As this process proceeds they will be pleased to keep the supporting agencies informed.

Imaging researchers have successfully licensed CT Perfusion software and MRI technologies to multi-national imaging companies.

Two spin-off companies are currently carrying out contracts from Canadian industry in the field of MR and in the field of Bioelectromagnetics.

New patents have been filed and several patents have been awarded in Bioelectromagnetics.

One spin-off company currently has 12 part-time employees.

43. Robarts Research Institute

The year 2002 marked a significant fiscal year for Robarts Business Development and the Institute, overall. Robarts Research Institute is Canada's only independent medical research institute. Based in London, Ontario, the Institute employs more than 500 people, including more than 40 principal investigators harnessing the power of cell biology, genomics and advanced imaging technologies to investigate disorders of the neurological, cardiovascular and immune systems.

The Institute's \$26M expansion includes a seven-floor building adjacent to the present structure, doubling its size to 192,000 square feet. This addition will house several new senior scientists along with the an image-guided surgery laboratory, the Institute's program in Stem Cell Biology and Regenerative Medicine, and the new Centre for Brain and Mind, an interdisciplinary neuroscience collaboration between The University of Western Ontario and Robarts, supported in part by CFI and OIT.

As the commercialization arm of the Institute, the Business Development team, now in its fifth year, has grown its annual licensing royalties in excess of \$1M and negotiated more than \$2M in annual industry contract research. In addition to these funds, the team has been awarded a \$300,000 CIHR Intellectual Property Management grant and continues to be successful with CIHR Proof of Principle grant applications. Robarts, along with its community partners, is proud to be one of the founders of the London Biotechnology Commercialization Centre (November 2002), the first of its kind in Ontario – a project ready to assist in the formation, development and acceleration of the life sciences sector in Southern Ontario.

Some notable highlights of the year include:

- Sale of spin-off company Enhanced Vision Systems Corp. to GE Medical Systems Inc. (GEM) which has become the cornerstone of GEM's functional genomics and molecular imaging group in London;
- Negotiation of several key Phase II and III European and North American studies/contracts for Robarts Clinical Trials group, enhancing their international presence;
- Viron Therapeutics Inc., a Robarts spin-off, completed its first in-man studies showing favourable results with its lead product, VT-111;
- Two spin-offs were marked as two of the top 15 private biotech companies in Canada by TD Securities;
- More than 20 invention disclosures received, four license agreements, negotiated eight sponsored research agreements, and 10 patents filed;
- Total venture capital financing for Robarts' seven spin-off companies now aggregates \$26M.

44. Wilfrid Laurier University

Commercialization of research is a new and rapidly growing area at Wilfrid Laurier University. The University has created four research clusters, in the areas of Culture and Human Experience,

Society and Public Policy, Environment and Health, and Science and Technology. Researchers in all of these areas are working on projects that have the potential for commercialization, and several have received significant support from CFI/OIT. For example, researchers in the area of optoelectronics and photonics are making important contributions to one of the fastest growing high technology areas locally and in the rest of Canada. Their work receives support from the Canadian Institute for Photonics Innovation, Photonics Research Ontario, the Centre for Information Technology Ontario as well as from the Canadian optoelectronics industry. Another area of common research interest from different disciplines is the application of computational methods to solve significant problems in the natural and physical sciences. Laurier is one of a consortium of five institutions awarded a CFI and ORDCF grant in high-performance computing (SHARC-NET). Spin-off possibilities are high in all of these areas. Innovation and technology are also strong focal points in the School of Business and Economics (SBE), which has strength in supply chain management and the use of e-business technology. In Geography and Environmental Studies, researchers are developing software which tracks human activity-travel patterns, with potential applications in personal time management. In the Department of Mathematics, researchers are examining patenting procedures for competitive fair division of goods.

Commercialization of these and many other research activities is already beginning to take place and will become increasingly important on this campus. Of particular importance is the CFI/OIT funded Laurier Science Research Centre. When the Centre opens in August 2003, it will house state of the art laboratories and other research facilities that will support research in the latter two clusters. The university is currently building up the infrastructure to aid in technology transfer and commercialization of research by providing training for the senior academic and research administrators. Such activities will draw on the expertise of the new Schlegel Centre for Entrepreneurship Studies in the School of Business and Economics.

45. York University

With the progressive development of the Office of the Vice-President, Research and Innovation, York University is ensuring greater diffusion of its research through knowledge/technology transfer in the sciences, social sciences and fine arts. Strategic planning has determined key services and personnel required to support faculty members in achieving this objective and accordingly a full time employee has recently been appointed to manage the university's technology transfer and commercialization activities. Furthermore, four thematic research areas have been identified as areas in which to focus research and innovation efforts. These are: Health, Sustainability/Urban Studies, International, and Culture/Entertainment.

York University is ideally located in the Greater Toronto Area (GTA), with its concentration of high tech companies. To capitalize on this advantage, the Innovation Synergy Centre (ISC) has recently been announced. The ISC is a York University partnership with York Region and the Town of Markham to service SMEs in their business planning for growth and to become a focal point for cluster development in the immediate Markham area and the GTA.

Complementing York's commercialization activities is its participation, as a founding member, in an intellectual property consortium of eight universities in Ontario. This consortium administers an early-stage seed fund and is a common source of commercialization expertise.

Many of York's research centres (<http://www.yorku.ca/yorkweb/research.htm>) and facilities work closely with industry and the private sector and have been the source of intellectual property development and several spin-off companies. Selected examples are included below:

- York's Centre for Research on Mass Spectrometry is working with and spinning off results to technology companies such as MDS Sciex.
- York's Centre for Research in Earth and Space Science is working in partnership with the private sector on space flight instruments and systems. These labs have already led to four start-up companies.
- York's leading-edge combinatorial chemistry facility houses a number of collaborative projects with pharmaceutical and instrumentation companies. This research has already led to two spin-off companies.
- York's Centre for Vision Research has recently added to its roster of spin-offs through a new company developed around a web-site creation and management tool.

Individual faculty members are also pursuing commercialization of technologies through a number of programs including the Networks of Centres of Excellence and the national partnership initiative to build the Canadian Geospatial Data Infrastructure.

46. Carleton University

Carleton University has made impressive strides in growing its research enterprise over the past few years. A recent national ranking of universities in relation to research income growth now places Carleton third among the country's comprehensive universities. In addition to its fundamental role in education, training and knowledge creation, Carleton recognizes its emerging role in regional technology-led economic development. As the following examples will demonstrate, CFI's mandate to strengthen the capability of post-secondary institutions to carry out R&D, underpins our efforts to successfully commercialize university research.

CFI support in the area of advanced materials research and more specifically novel polymeric materials has directly benefited one of Carleton University's emerging spin-off companies. The CFI investment in major laboratory equipment and specialized facilities has enabled university researchers to develop promising electro-, photo- and chiroptic materials for emerging applications in telecommunications and display technology markets. With additional support from Carleton's flagship research commercialization program (The Foundry) a core team has been assembled and a new spin-off company (TWLinks) formed to commercialize these technologies. The spin-off is permitted access to the CFI-funded research infrastructure for key development activities such as materials characterization, device engineering and prototype development.

Another tangible example of CFI impact on Carleton's commercialization efforts relates to the field of behavioural neuroscience where specialized equipment acquired for molecular and

neurochemical analyses has proven indispensable. Another spin-off company (Molecular Ligand Technologies) has depended on equipment such as state-of-the-art laser capture micro dissection to validate a novel mRNA amplification technology developed by a Carleton researcher. With the support of the Carleton Foundry Program, a technician was hired to pursue required proof-of-principle work to validate the novel technology. Carleton believes this technology has immediate potential to be marketed to research laboratories to overcome the problems inherent in the existing mRNA amplification kits.

In both examples cited, it is clear that CFI support not only benefits the research enterprise of the university but also factors in bringing promising research one step closer to commercial realization.

47. Trent University

Commercialization activities at Trent University in 2003 will focus on commercialization of technologies for automation of DNA profiling, with projected commercial applications in forensic sciences, wildlife management and waterborne pathogen monitoring. Opportunities exist for marketing integrated technologies for cryogenic sample storage, automated sample preparation and analysis, bioinformatics and spatial analysis systems.

Trent University is working closely with the Greater Peterborough Area Economic Development Corporation and local investors to develop the commercial potential of the "Peterborough DNA Cluster Strategy" adopted by multiple stakeholders in this community.

The primary activities in 2003 will be the development of commercial partnerships between the private sector, public sector, Trent University and Sir Sandford Fleming College. However, work will begin in 2003 on the development of commercializable DNA profiling technologies in the areas of robotics automation and bioinformatics.

CFI support for the applied research of several faculty at Trent University has provided the groundwork for this commercialization initiative. Future applications will take this activity to even higher and more broadly based applications for commercialization.

48. University of Windsor

The University of Windsor is starting to realize tangible commercial benefits from its growing investment in research, built especially around the work of its six industrial research chairs. Five of these chairs concern the automobile industry (three with DaimlerChrysler and one each with Ford-Nemak and General Motors) and the sixth involves chemical catalyst work with Nova. Because of the proprietary nature of most of this work, specific details are limited at present, but the following can be noted.

Dr. Douglas Stephan's work with Nova includes successful production trials on his catalyst. Dr. Roman Maev has several US patents for his work with DaimlerChrysler in the areas of spotwelds and ultrasound (including a unique handheld device) and is exploring applications in dentistry as well. Dr. Jerry Sokolowski is developing a series of patents for novel technology platforms as

well as analytical and testing techniques in light metals casting for Ford-Nemak and Dr. Peter Frise has worked on two recent patents evolving from his earlier work at Carleton, one for a momentum wheel for attitude control of spacecraft and a single-use syringe for the World Health Organization. AUTO 21, the Network of Centres of Excellence for the Automobile of the 21st Century for which Windsor is the host institution under Dr. Frise, is also working to encourage commercial outcomes from its investment in automotive research across Canada. Dr. Ahmet Alpas is developing a patent application for a unique friction and wear tester for simulating engine wear from laboratory tribological tests. Dr. Phil Graniero, an earth scientist, credits the CFI New Opportunities program for his success in the ProbeFusion project which is developing a software system for highly flexible geospatial and environmental probes in conjunction with Conestoga Rovers and Associates.

The University is in the process of replacing its recently vacated Associate Vice-President Research position with a Vice-President Research post to underline its growing commitment to research.

49. Niagara College

With CFI support for Niagara College's Centre for Advanced Visualization, the college has established an applied research infrastructure, the Centre for Advanced Visualization, that opened on October 1, 2001. The Centre infrastructure includes a 160 degree surround double-curved display screen, V-Desk 6 stereo work desk, and desktop computers supported by an Onyx3400 graphic super computer.

In 2003, they plan to enhance their infrastructure through the development of new software tools and processes to adapt GIS data, kinetics, sound, and other features of real environments into their virtual reality technologies.

In 2003, applied research and commercialization activities will focus on the following areas:

- The development of enhanced virtual reality technologies for land use planning models in urban and rural development and their effective communication to expert and non-expert audiences.
- The adaptation of gaming engine technologies and GIS data into the virtual reality technologies to enhance the resulting 3-D models and make them more effective for the non-expert user. This will result in commercialization opportunities.
- Experimentation with the communication of land use models over the public internet.
- Design and development of a "Virtual Niagara" 3-D database for use in a variety of land use applications or projects.
- Design and simulation of various industry projects, plants and equipment, to assist Canadian companies locally and internationally.

The Centre's objective is to become a hub of visualization technologies in the Niagara Region. Current partnerships involve bi-national companies and institutions. The Centre plans to pursue collaborations with international and other Canadian institutions experimenting with virtual reality technologies.

50. Seneca College

Seneca College does not expect that the CFI/OIT enabled research in Bioinformatics and Internet-based in-service teacher education will lead to spin-off companies. The College is, however, actively exploring new collaborations and partnerships which might lead to commercialization activities in the future. The Internet-based in-service teacher education project is currently in its third phase and Seneca will continue to explore licensing opportunities once the project has been completed.

Seneca is pleased to report that the infrastructure supported by CFI/OIT funds in these two projects is increasingly being used by other faculty engaged in applied research. As well, several scholarly papers on research in the Bioinformatics project have been (or will shortly be) published in peer reviewed journals by faculty and their colleagues.

51. Sir Sandford Fleming College

Sir Sandford Fleming College is currently establishing an innovative Centre for Alternative Wastewater Treatment. This infrastructure will facilitate applied research and development in four key areas with potential national and international benefit:

- The performance of constructed wetlands in cold climates with the objective to develop systems for small or isolated communities.
- The development of constructed wetland systems for water treatment, and reuse in conjunction with polyculturing activities, for the Canadian aquaculture industry.
- The design of low cost/minimal maintenance natural water treatment solutions for developing countries and isolated Canadian communities. The performance of wetland systems to purify water and remove problematic contaminants.

Primary research partners include Lakefield Research, Northern Tilapia and Trent University.

In addition, Sir Sandford Fleming College sponsors the Applied Technologies for Healthy Aging Research Laboratory and Beta Testing site with the goal to advance research relating to technologies that support healthy aging of Canadians. Areas of research focus include the advancement of research and development relating to personal locator systems, smart appliances, and an EEG assisted electromechanical hand, all suitable for use by long-term care residents. The use of wireless networks to support chartless telemedicine is a further area of research focus; primary research partners include St Joseph's Care Group and Trent University.

52. Sheridan College

Sheridan College's Visualization Design Institute will use infrastructure provided through CFI to be a major participant in a Holland College led project, the Justice Knowledge Network. The JKN initiative aims to create groundbreaking services, products and programs to train law enforcement personnel worldwide. The infrastructure has already been used to create a virtual model of a Candu reactor that is being used in development of tools and training of staff for a major refit of the reactor.

Sheridan's Business Accelerator in partnership with the Town of Oakville is under construction for a September 2003 opening to house new companies in the digital media field.

53. Algonquin College

Algonquin College's research activities include government funded research, privately funded research, and student driven research (program-related).

The College is currently focused on research in Technology, Media, Health and Community Service. Major research projects include:

Technology

- Hapto-Visual Research Centre
- Photonics Projects
- International Telecommunications Conformity Assessment Project
- Lime Burning Kiln
- Machine Visioning

Media

- Digital Cinema Research Centre
- SmartCapital and SmartLab Projects

Health & Community Services

- Connected Families: Connected Communities Internet Project
- Tele-Health Research Centre

The College is actively involved with the following research partnerships:

- Canada Foundation for Innovation (CFI)
- Communications Research Canada (CRC)
- Commonwealth Scientific & Industrial Research Organisation (Australia)
- Industrial Research Assistance Program (IRAP)
- Materials and Manufacturing Ontario (MMO)
- National Capital Institute of Telecommunications (NCIT)
- National Research Council (NRC)
- Ontario Innovation Trust (OIT)
- Ontario Research & Development Challenge Fund (ORDCF)
- Ottawa Carleton Research Institute (OCRI)
- Ottawa Photonics Research Alliance (OPRA)
- Photonics Research Ontario (PRO)

QUEBEC

54. Concordia

Over the past year, Concordia has taken significant strides towards putting in place mechanisms aimed at promoting and enhancing the infrastructure of research, and commercializing and transferring technologies that will be of benefit to the Canadian community.

Steps have been taken to reshape and focus the curricula towards the future needs of Canadian society in areas such as bio- and information technologies and digital media. Concordia has hired, and will continue to hire, a large number of new faculty members with strong research profiles. Several centres/institutes have been established, and others are envisaged, to provide closer relations and flow of new information and knowledge to Canadian and Quebec industrial and research communities.

The restructuring and expansion of research administration at Concordia have provided the resources and expertise necessary to meet the increased demands that have been, and that will continue to be, generated by this realignment to a more research-oriented institution. Construction of two new buildings, one to house the natural sciences, and another to house engineering, computer science and the visual arts is currently underway.

In the fall of 2001, Concordia University, together with UQAM, ETS, UQ Rimouski, and INRS, formed a partnership to establish *Gestion VALEO*, a company whose sole mission is to commercialize the intellectual property of the partner institutions. *Gestion VALEO*, with the support of funding from VRQ, has allowed the partner institutions to make monumental leaps in their commercialization efforts. From January 1, 2001 until January 31, 2003, *Gestion VALEO* has evaluated and managed 52 disclosures of intellectual property of the partner institutions, resulting in 45 patent applications. Twelve of the above have resulted in the negotiation of licenses and eight spin-off companies have been created to date. Through Concordia's collaboration with *Gestion VALEO* and *Inno-centre*, with whom it has a complementary agreement, the mechanisms necessary to identify ideas that may be ripe for application-oriented development, potential markets and the establishment of early relationships with likely end users are readily available. The University has established a priority for the pursuit and protection of intellectual property for technologies having likelihood of success. In 2002-2003, Concordia has "spun off" two companies with initial first-round investment totaling more than \$3M.

With Concordia's participation in the creation of two VRQ sponsored consortia: *Hexagram*, the Institute for Research and Creation in Media Arts; and *CRIAQ* the Consortium for Research and Innovation in Aerospace in Quebec, its involvement in two large-scale genomic projects funded by Genome Quebec, Genome Prairie and Genome Canada, and a myriad of other exciting research collaborations, the future of commercialization at Concordia in the coming years is promising.

55. McGill University

McGill University research environment has exceeded \$194M R&D expenditures from grants and contracts in 2001-2002. Areas of particular growth were in genomics, brain imaging and neurological research, cancer research, intelligent systems and machines, photonics and nanotechnology, super-computers, as well as agri-food research and environment.

While the technology transfer program run by the Office of Technology Transfer (OTT) is a rather recent one at McGill since it started in 1992, it has generated enviable results and benefited from the IPM programs 2 and 3. In addition, OTT is funded through University base funds, sharing agreements with deans and research hospitals, revenues generated from both royalties and equity, contract overhead revenues and other management fees. The patent expenses which exceed \$1M, are partially recovered through licenses. OTT team is made of 11 technology transfer professionals.

This year, 145 inventions were disclosed. OTT signed 21 license and option agreements and 216 confidentiality and other non financial agreements. Revenues from licensing, including patent cost recovery, exceeded \$1.5M. According to its Intellectual Property Policy, McGill shares a significant portion of its net revenues from licenses with co-inventors. OTT also facilitated the creation of five spin-offs this year, providing a total portfolio of spin-off companies approaching 25. A number of these companies undergo mergers and acquisitions depending upon the prevailing market conditions and some are publicly traded.

In addition, McGill has invested in the creation of a major Seed Fund called McGill, Sherbrooke, Bishop's Innovation (MSBI). MSBI has now raised \$26M and begun investments. It is hoped that the number of McGill spin-offs will increase over the years as a result of this initiative. McGill has also launched its first in-house incubator in the area of Genomics.

56. Université de Montréal

In pursuing the objectives of direct transfers of research findings to users, the Université de Montréal and its affiliated Schools and hospital research Centres intend significantly to intensify their commercialization efforts in 2003. During the past 2 years, considerable efforts have been made by the University and its partners to establish two new infrastructures to enhance the commercialization of intellectual property assets emerging from research:

- The NSERC-funded *Préval* initiative to heighten researchers' awareness of the commercialization potential of their research data and to establish a systematic approach for prospecting new technologies. Four professionals trained in business development have been assigned to this initiative.
- *Univalor*, an arm's length company, will act as the main University commercialization vehicle by investing in the establishment of proofs of concept and the creation of spin-off companies. Univalor will also be actively involved in the licensing of intellectual property. Univalor currently employs 14 professionals and has a budget of four million dollars for 2003, part of which is provided by Valorisation-Recherche Québec, a Quebec Government research fund.

Both *Préval* and *Univalor* are now fully operational and, with the University Industry Liaison Office acting as the linchpin, 2003 will see the first tangible benefits resulting from these initiatives. *Univalor* currently manages 90 technology cases, and has already created five spin-offs during its first year of activities. Fifty new invention disclosures are expected in 2003, with a continued progression over the next years to reach 80 new disclosures per year in 2005. It is expected that these disclosures will translate into the execution of more than 50 licenses, the creation of 25 spin-offs with \$80M in third-party investments, and the creation of 600 jobs over the 2003-2005 period.

57. École des Hautes Études Commerciales

Through *Gestion Univalor*, a limited partnership company, HEC Montréal assesses the commercial potential of a number of multimedia products including e-books, original application software and telelearning methods.

58. Université Laval

The research commercialization landscape in Québec has evolved significantly in the past few years and the creation of four commercialization companies has led to a new sharing of technology transfer responsibilities between these companies and University-Industry Liaison Offices (UILO).

Thanks to the creation of *Valorisation-Recherche Québec* (VRQ) and the funding it provided for the creation of these commercialization companies, Laval and the *Centre hospitalier universitaire de Québec* (CHUQ) were able to create the limited partnership company *SOVAR* (*Société de valorisation des applications de la recherche*). With SOVAR's creation, the roles of the two entities are somewhat more specialized, with the UILO being more upstream and SOVAR more downstream in the transfer process. Inventions are disclosed to the university and the UILO is responsible for IP protection through applying for the appropriate patents. Then, should the researcher so wish, SOVAR is given the mandate to commercialize the technology, bringing it as close as possible to the commercialization stage. SOVAR accompanies the researchers throughout the whole commercialization process, for example by helping them refine their product through proof of concept projects or by helping them create a company or transfer the technologies to start-up companies or by negotiating licences with existing companies.

In 2001-2002, Laval researchers have received \$201M in research funding, an increase of 18% compared to previous year. To deal with the administrative workload generated by the increases in research funding managed by Laval University and, especially with the increasing needs in the area of technology transfer, the UILO has invested heavily in new human resources. Several new positions have been created. Some are already filled, but the shortage of people in the technology transfer area has somewhat slowed down the staffing process.

To help respond to this shortage of adequately trained technology transfer experts, Québec universities, through the UILO working group of the CRÉPUQ (council of university presidents), the University of Moncton and Québec's commercialization companies have agreed, on a pilot basis, to implement training in French, adapted to the needs of Québec and New Brunswick. The

primary goal of the training program in technology transfer (PFVT) is to provide 20 individuals with state of the art training, focused essentially on hands on training, but complemented with a solid theoretical basis. PFVT is intended to train specialists that will join the ranks of commercialization experts already in place. Laval University has joined this initiative early on, by contributing to the initial funding provided for project development and by committing itself to host a trainee for 36 weeks, paying a portion of his or her salary.

In addition, future efforts will focus on the active search for additional staff, with a view to increasing resources in some areas where technological transfer is increasing, such as biotechnology.

59. Université de Sherbrooke (including the hospitals)

In 2002, Sherbrooke's UILO has completed the staffing of three positions, which increases its complement to 11, including seven commercialization officers in the areas of life sciences, engineering, science, social sciences and humanities. Upon appointment, these individuals participated in an internal training and mentoring program which enabled them very quickly to respond to the needs of the university research community and of the university's partners.

Their work includes support for research partnerships and IP protection as well as commercialization through licences to existing companies or through the development of spin-off companies. In the first six months of 2002-2003, results point to a significant increase of industrial research funding, particularly in areas of engineering (annual increase of 37%) and social sciences and humanities (more than 100%).

The UILO expects to receive about 20 invention disclosures during the year. It generally retains 60% of them for protection and commercialization. The University's patent portfolio has reached the 300 mark this year, i.e. 132 active inventions, 96 for which patent applications have been filed. More than 51% of the projects have been commercialized to date.

The University is still the first in Canada in 2000-2001 with respect to revenues from royalties (more than \$15M) and it expects to keep this rank in 2001-2002, with more than \$13M, despite the difficult situation of companies in information technology, the sector which generates most of this income.

The University has seen the creation of two new spin-off companies in 2002-02 and is working in the development of six more projects. All companies created are situated locally.

Jointly, with the *Société de développement économique de Sherbrooke* and the government of Québec, the University has been successful in having the region recognized as a Biotechnology Development Centre. This has led to the construction of a building dedicated to the incubation of biotechnology companies in the biomedical park near the Faculty of Medicine and the affiliated hospital, *Centre hospitalier universitaire de Sherbrooke*. This building will host its first companies in July 2003. Most are spin-off from university research.

With the same partners, the University is working on the development of a second incubator, this time in the science and engineering sector. The business plan is at the draft stage with a view to fundraising for a 2003 launch. The incubator and the science and technology park will facilitate the hosting of spin-off companies and the mentoring of entrepreneurs as well as providing a structure for technological assistance to regional industry.

60. Université du Québec - École de technologie supérieure

In October 2001, in partnership with other constituents of the Université du Québec's network and Concordia University and thanks to a grant from Valorisation-Recherche Québec, École de technologie supérieure participated in the creation of a commercialization company called, since March 2002, Gestion Valeo s.e.c. (Valeo). Valeo is responsible to commercialize the research results of ÉTS and the other participants. Starting from invention disclosures submitted to Valeo by the CETT (Centre for technology experimentation and transfer), Valeo initiates the commercialization process along the following lines:

- Receipt by Valeo of an invention disclosure from the UILO or technology transfer centre of an institution;
- Preliminary technical and commercial assessment of the invention and of the means of IP protection;
- Valeo taking responsibility for the file should the assessment be positive;
- Diligence with respect to IP protection through patent filing or other means already initiated;
- Development of a plan for adding value and commercialization, which may include development activities such as pilot testing, industrial testing or specific prototype development;
- Implementation of the plan through such activities as licence negotiation and execution, creation of spin-off companies and mentoring of inventors in the first investment phases or pre-capitalization for specific projects, negotiation of contracts with partners, etc.;
- Management of investment, patent, licence and spin-off portfolios.

In 2003, notwithstanding new disclosures, commercialization efforts will focus on eight projects. Two of these are major start-up companies whereas the six others have gone beyond the assessment stage and are at different stages of the commercialization process. In addition, two major licensing files stemming from R&D contracts are currently under negotiation by ÉTS itself. Also, to support its technology transfer activities, ÉTS has recently recruited a new transfer officer, responsible, among other tasks, for IP management and proactive identification of innovations.

61. Université du Québec en Outaouais

Université du Québec en Outaouais (UQO) actively collaborates in the design of a technological campus in the city of Gatineau, a project aimed at strengthening development and commercialization efforts in the region. Negotiations are currently underway for the signature of an agreement with a regional partner with a view to supporting the researchers' efforts in commercializing their inventions. Another agreement is likely with a company created by a

researcher in the area of photonics. Finally, it is important to note UQO's participation in a group mandated to perform technical and commercial watch on behalf of the regional forest industry.

The proportion of UQO's faculty members in disciplines of the social sciences and humanities is one of the highest in Canada. This make-up is therefore reflected in UQO's innovation vision which is strongly focused on the improvement of social practices and interventions. There are significant activities in these areas in 2003, for example: launching of the *Observatoire sur le développement régional et l'analyse différenciée selon les sexes (ORÉGAND)*, increased activity of the *Observatoire en économie sociale de l'Outaouais*, and significant expansion of services offered in the region by the researchers from the Cyberpsychology Laboratory.

62. Université du Québec - INRS

With the creation of the *Service de valorisation des résultats de la recherche* in conjunction with the creation of *Gestion Valeo s.e.c.*, INRS undertook the technical and commercial assessment of most of its IP portfolio. Several files were dropped for a lack of interesting commercial outlook in the short- or medium-term. Commercialization efforts were focused on the most promising technologies. Planned commercialization activities for 2003 are within this framework of strategic investment. More specifically, the Institute intends to intensify its commercialization efforts for about ten promising files in the areas of health sciences, food packaging materials, nanomaterials, telecommunications, aquatic environment and mining environment.

63. Université du Québec à Montréal

UQAM is about to adopt a policy on the recognition of intellectual contributions and the protection of intellectual property. This policy will outline principles and thrusts that will guide relationships between researchers when they collaborate in the creation of artwork or in an invention.

With respect to invention disclosures, UQAM transferred more than 12 patents to the commercialization company *Gestion Valeo s.e.c.* of which it is a partner, so that *Valeo* can proceed to the technical and commercial assessment of the inventions and identify the best development opportunities. Four of these inventions are now undergoing more in-depth review which should lead, at least for one of them, to the creation of a spin-off company.

On average, the Office of Partnership Development receives about 10 invention disclosures per year. It will soon have to adopt best practices to support research activities surrounding the creation of spin-off companies.

64. Université du Québec à Chicoutimi (UQAC)

UQAC's research generates major institutional, regional and international benefits. For example, UQAC's research on icing has led to the development of technology that increases the safety of hydroelectric energy transport, which is of interest to companies and institutions in the US and Europe. Similar examples could be given on aluminium research or research on the boreal

forest. In this latter area, innovation support helped UQAC researchers isolate a molecule from the essential oil of balsam fir which possesses anti-tumour properties that could lead to medical applications. These examples demonstrate a research intensity that generates numerous benefits.

Innovation at UQAC attracts contracts and sponsorships, provides a training environment to the next generation of scientists and helps retain world-class researchers in the region and attract new ones. This focus on research results and benefits is such that UQAC innovations have concrete and diverse impacts on community development: by promoting the creation of companies that exploits processes stemming from UQAC's research; by promoting partnerships with local (private companies, sponsors or public agencies), national and international companies through their collaboration with research groups; and by contributing to the strengthening of Canadian research expertise through licences and patents.

In short, with fast-paced knowledge generation in its chosen niches, UQAC provides an environment and a visibility that are proving very attractive to researchers and students from all over the world. In addition, the institution has demonstrated that it can play a meaningful role in the innovation process and it intends to increase its contributions so that the surrounding regions can be full participants in the objective to bring Canada among the top five innovation performers in the world.

65. Université du Québec à Trois-Rivières(UQTR)

Since the Université du Québec à Trois-Rivières is no longer a member of VIP, an agreement between La Technopole Vallée du St-Maurice and UQTR came into force in order to establish an official preferred partnership concerning the technology transfer that could occur from the results of research done at the University.

Also, the University is in the process of signing a Letter of agreement with a spin-off set up by four professors of the Hydrogen Research Institute of UQTR. Two other spin-offs from the Hydrogen Research Institute could also take place in a near future.

66. Université du Québec – Télé-université

The focus on distance learning led this institution to a number of partnerships. Some of the products are being commercialized such as modeling of knowledge and various operating methodologies. Users include other universities, Hydro-Québec and the Bank of Montreal Training Institute.

Together with Bell, Canarie and the NCE on telelearning , Télé-université has developed a new system "Explor@" that will improve training at the work place.

67. École Polytechnique

Univalor was created in the winter of 2002. This commercialization company regroups organizations from Polytechnique (i.e. Polyvalor, created in 1997), the University of Montreal, HEC-Montréal and hospitals affiliated with the University of Montreal. Univalor will help

Polytechnique benefit from a larger critical mass of services related to commercialization as well as from major funding from VRQ (Valorisation-Recherche Québec).

Also in the winter of 2002, an NSERC IPM (IP management) grant was awarded to the University of Montreal and its affiliated schools and hospitals, with the support of Univalor. Its share of the grant enabled Polytechnique to hire an “Advisor on Technology Transfer” in its office of research and centre for technology development. This advisor is responsible for informing, training and advising researchers, receiving disclosures and acting as liaison between Polytechnique researchers and Polyvalor. Polytechnique has already noted the energizing effect of this advisor on researchers-entrepreneurs.

In addition, work is progressing well on the simultaneous construction of three pavilions on campus that will contribute to increasing research activities and innovation capacity: the *Pavillon J.-A. Bombardier* (research space shared by the University of Montreal and Polytechnique), the *Pavillon Lassonde* (expansion of Polytechnique) and NRC’s Aerospace Manufacturing Technology Centre.

68. Université du Québec à Rimouski

UQAR is a small university. Its research expertise focuses on well-defined niches, targeted towards the regional socio-economic environment. Two commercialization projects could come to fruition in 2003, the execution of a licence for sea algae concentration equipment and the creation of a spin-off company for the commercialization of windmill technical components. In addition, UQAR intends to launch a business partnership with a company generating electricity through wind energy.

69. Bishop’s University

The University, through its funding of the venture capital fund MSBI Capital, is involved in the commercialization of research. Bishop’s has established a protocol with the technology transfer office at the Université de Sherbrooke (BLEU) to enable researchers to fully develop their intellectual property. Two professors have done so this past year in the areas of polymer vapour deposition and image processing.

Bishop’s has invested over \$50,000 in such activities and has prepared three submissions to CFI this past year, all of which will support research designed to lead to commercial development.

70. Université du Québec en Abitibi-Témiscamingue

Commercialization of research is just starting at UQAT. Very few research results have been commercialized yet. A small and young university, UQAT is firmly positioning itself as being open to partnerships in all areas. The institution is implementing many complementary initiatives to meet its strategic objectives in the area of technology transfer.

Firstly, UQAT believes that it can use its undergraduate programs to deliver a type of technology transfer. Thus, the integration of training sessions and project courses, which in fact benefit from

industrial experience and academic expertise, is offered to future professionals. This approach ensures a full integration of the university in its community.

Secondly, UQAT has chosen a distributed approach which enables professional resources to be more present in technology transfer. It is for this reason that professionals, such as a geological engineer, a forest engineer and a physical engineer, are working within the research units. The first one is with the research unit in mineral technology, the second with the forestry unit, and the third with the research lab on underground communication.

The role of these professionals is to manage the relationships between the research team, industrial partners and industry in general. Each research unit has an advisory board. Also, the professionals assist in the organization of conferences and seminars. It is under the sponsorships of industrial research chairs, i.e. the NSERC-Polytechnique-UQAT Chair in mining environment and the NSERC-UQAT-UQAM Industrial Chair in sustainable forest development, that these successful annual dissemination activities take place, involving over a hundred researchers who showcase the latest results of their research.

71. CÉGEP de Saint Hyacinthe

Cégep de St-Hyacinthe has two technology transfer centres, the *Groupe CTT* (textiles, geosynthetics and polymers) and *Cintech Agroalimentaire*, that provide R&D services to the relevant industrial sectors. These activities support the development of new products and processes and the improvement of existing technologies or products, commercialized in the short- or medium-term by the companies that contract out the work to the cégep.

Self-financed and showing an increase in contract revenues of 16% to reach \$3,24M in 2002, the *Groupe CTT* has reached maturity and visibility and is built on solid ground. In 2003, the *Groupe CTT* intends to serve an expanded clientele by broadening its presence throughout Canada while continuing to serve its current partners. By promoting new economy textiles, its promotional activities and its offers of services will focus on the importance of diversifying its activities towards technical textile markets, by devoting the necessary R&D efforts to this area. To this end, seminars such as the *Forum Géosynthétique* and *Hightex*, the launching of the portal InfoGEOS.com and the direction of the Canadian Textile Journal will focus on these new markets. In addition, the *Groupe CTT* will continue its research on functional textiles and develop knowledge on intelligent textiles and the aeronautics sector.

72. CÉGEP de La Pocatière

Working with industry since 1983, the *Centre spécialisé de technologie physique de La Pocatière (CSTPO)* has the following mission: to help companies understand new technologies and effectively adapt them to their needs with a view to increasing their returns and their performance.

CSTPQ focuses its activities mainly on the following sectors:

- The development of dedicated electronic products in the areas of power electronics, electronic diagnosis, electronic management, electromagnetism and control;
- The design of dedicated machines, especially for industrial production and processing of agri-food and marine products;
- The optimization of industrial production processes.

Thanks to the expertise of its team of about fifty engineers and technologists, CSTPQ is well placed to respond quickly and effectively to the technology needs of manufacturing companies of all sizes.

73. CÉGEP de Rimouski

Service de recherche et d'expertise en transformation des produits forestiers (SEREX)

SEREX performs research and technology transfer activities. The major research activities planned for 2003 are in the following areas:

- Use of nanotechnology for panel finishing
- Development and improvement of resins for panel finishing and wood impregnation
- Optimization of impregnation parameters for panel finishing paper
- Alternate uses of bark for panel manufacturing
- Wood impregnation for value-added applications (preservation, hardening and colouring)

The intended users of the research are mainly wood panelling producers, wood transforming companies and resin production firms. The labs are equipped with a state-of-the-art pilot research infrastructure and modern analytical and quality control equipment. SEREX's goal is to help Canadian industry improve its international competitiveness.

ATLANTIC

74. Université de Moncton

In 2003, commercialization activities at the University of Moncton are poised to expand. Indeed, many of the previous years' developments have led the institution to increase its research commercialization efforts.

Firstly, some R&D work associated with 1999 CFI grants are starting to bear fruit in the area of commercialization. For example, following research performed in a CFI project, a patent application is underway, which could be the first in a series of patents in the area of nutraceuticals and functional foods.

Secondly, in its first competition in the summer of 2002, the Atlantic Innovation Fund (AIF) selected projects from the University for a total of close to \$7M. Four projects are being initiated, in the areas of advanced optics, Internet communication networks, medical biotechnology and telelearning. Commercialization is at the core of these AIF contracts with industrial partners and ACOA (Atlantic Canada Opportunity Agency). Six applications have been submitted by the University to the second AIF competition (November 2002) and many researchers from the institution participate in applications from other Atlantic universities. Many industrial projects aiming at short term commercialization are therefore underway or expected.

In 2002, to better play its role as an innovation and commercialization catalyst, the University expanded its technology transfer office, renamed *Bureau de soutien à l'innovation (BSI)*, by adding two innovation officers in addition to the director. In addition to activities related to partnerships and IP management, BSI also supports research and knowledge transfer in the area of social policy. BSC is involved in the project Programme de formation en valorisation des technologies (PFVT) spearheaded by Québec universities.

Funding for this major project will come, among other sources, from the Tri-Council Intellectual Property Management Program which approved a grant at the end of December 2002. The University will be involved in this two-year project which will provide French training to the BSI staff and will enable it to host Québec commercialization trainees.

As is the case for other small or medium universities, the University of Moncton is still in an accelerated learning phase with respect to commercialization. Nevertheless, having already been the source of many spin-off companies, it is entering a very promising era with respect to IP management and commercialization of research results.

75. Mount Allison University

As a small university, Mount Allison has been able to strengthen its commercialization capabilities through its Office of Research Development (ORD) by working closely with the province of New Brunswick and developing collaborative relationships with the technology transfer offices of other universities and organizations. A summary of key commercialization activities follows:

Mount Allison works closely with the University of New Brunswick on matters to do with technology transfer, patenting, as well as research and licensing contracts. Mount Allison's direct participation in these activities through its ORD has led up to a Memorandum of Understanding (MOU) with UNB in support of innovation and technology transfer.

Mount Allison is also part of ATLANTECH. Through participation in this network its ORD has enlisted the services of Bereskin & Parr, specialists in Intellectual Property Law, and the firm has completed the filing of a US provisional patent application for a bioactive compound.

In support of potential commercialization projects ORD has enlisted the services of BioMed Management Inc, a privately owned technology development and management services company, operating out of Halifax. These services will be paid for in part through a CIHR Proof of Principle grant awarded to Mount Allison.

Mount A's ORD has supported efforts in the submission of Canadian, US and Patent Cooperation Treaty filings (PCT) for a novel process that generates global antibodies to detect protein components of photosynthesis, carbon and nitrogen metabolism. Furthermore, a research contract with University Health Network (UHN) in Toronto and Medinnova Partners Inc. has resulted in external funding from Medinnova in the order of \$327,800 over a period of 18 months (March 2002 -August 2003). Mount Allison's share of this funding amounts to a total of \$111,550. European, US and Japanese patent applications that are related to this contract have been submitted through UHN.

ORD has also administered the formal disclosure of a discovery of a new and powerful bioactive compound. This project may lead to future commercialization partnerships with Medinnova Partners and other SME's in New Brunswick. Another disclosure is related to various novel microbiological mechanisms associated with the tuberculosis bacterium. This may lead to future partnerships with the University of Toronto's medical school and its Innovations Foundation.

With the cooperation of the Ministry of Business New Brunswick, NRC's IRAP, and BioAtlantech, plans are being formulated for the creation of a university spin-off company in the area of biotechnology.

76. St. Thomas University

No new commercialization partnerships have developed this year but the University is actively pursuing possibilities.

77. University of Prince Edward Island

UPEI is a small university with six faculties and schools (Arts, Business, Education, Nursing, Science and Veterinary Medicine). UPEI is dedicated to providing quality academic education based in a community of scholars whose primary tasks are to teach and to learn, to engage in scholarship and research, and to offer service for the benefit of Prince Edward Island and beyond.

UPEI holds a number of patents and is actively working to commercialize these. Through Atlantech, the Genesis Centre at Memorial University of Newfoundland has been providing commercialization support for several projects related to veterinary diagnostics and veterinary products and continues to pursue these opportunities in conjunction with UPEI.

In November 2002, UPEI, with assistance from the Tri-Council's Intellectual Property Management Program, contracted the services of a full time Technology Transfer Manager and is now embarking on a more aggressive strategy of intellectual property management. Patent disclosures or other forms of IP protection are being developed for a number of novel products in the areas of diagnostic testing, veterinary products, instrumentation and teaching tools. A number of commercialization opportunities are being actively pursued with industrial partners and other opportunities are in the early stage of market analysis.

UPEI continues to work with the other Atlantic universities on the development of an Atlantic Universities technology transfer network.

78. St. Francis Xavier

2002. The ILO is focusing initially on assisting researchers in identifying and building relationships with industry partners for contract research and collaborative research. Another goal is to provide the private sector with better access to research and commercialization opportunities and capability at StFX.

The ILO has provided advice and support to the research groups of StFX's newly-created Centre for Applied Petroleum Sciences, with respect to all private sector participation in the Centre's research projects. The Centre's initial research projects, commencing in early 2003, are focused in the following areas:

- i) Biofilms - The Biofilms unit conducts experimental studies of bacterial biofilms to understand their characteristics and to develop techniques to map their structure. The intent is that this knowledge will contribute to manipulating and controlling biofilms. The Biofilms unit will also carry out mathematical modeling and computer simulation studies of biofilms. One of the problems being addressed by this research is bacterially-induced pipeline corrosion.
- ii) High Performance Computing - The High Performance Computing (HPC) unit will create and operate a supercomputing facility that will support research within the Centre, including in the biofilms area.
- iii) Colloids – Chemists at StFX are conducting colloid research, including the synthesis and characterization of new surfactants, with important applications for the oil and gas industry. These applications include soil remediation and treatment of sour gas deposits.

Other areas, in which private sector participation is developing, include innovative research in global warming and the dynamics of greenhouse gas production in soil by their Environmental

Earth Sciences Research Laboratory; and interdisciplinary research in the development of computer software for optimal scheduling of forest resources.

StFX collaborates with other Atlantic universities in commercialization initiatives through the Atlantech Network.

79. University of New Brunswick

The University of New Brunswick has, with support from the federal government, including CFI, made significant advances in its support of commercialization of University technologies since inception of its intellectual property management program in 1999. Since then, eight patent applications have been filed and ten technology transfer agreements have been executed, including agreements with two UNB spin-off companies, Mathis Instruments and Q1 Labs. Revenue from technology transfer fees, royalties and equity since April 2002 is \$355,817. In the last twelve months, the two mentioned spin-off companies have obtained venture capital investments of approximately \$7.5M and \$5M. Together, these two companies employ over fifty people in New Brunswick.

In addition to a primary focus on technology disclosure, protection and licensing deals, planned commercialization activities in 2003 include:

- organization and delivery with Université de Moncton, Mount Allison University, and other private and public sector partners of an event entitled "From Research to Revenue", to be held on March 13, 2003 in Moncton;
- participation in Atlantech and hosting of an intern under the NTAtlantic program, a Westlink-like initiative involving Atlantic universities, venture capital companies, technology companies and NRC-IRAP;
- delivery of intellectual property management services to Université de Moncton, Mount Allison University, and St. Thomas University;
- management of contracts and technology management projects arising under UNB's Atlantic Innovation Fund projects;
- development of the University's business incubator, Enterprise UNB, and increasing the awareness and involvement of UNB in local companies; and
- development of Atlantic Venture Networking Group, an initiative involving representatives from local angel investor groups, venture capital companies, technology companies and NRC-IRAP.

80. Collège communautaire du Nouveau-Brunswick (CCNB)

Since it received CFI funding, CCNB Bathurst was able to proceed with the installation of its research lab in interactive education and remote learning. In April 2002, this new facility has made possible the launch of a three-year study funded in part by the office of learning technologies and entitled: "Système de gestion des contenus d'apprentissage en 3D : les mondes virtuels et l'interactivité éducative en éducation à distance".

Although still in its start-up phase, i.e. the construction of the 3D immersive world, this project is of high interest to both the public and the private sectors. CCNB Bathurst is currently receiving numerous requests to visit the lab and gather information on the innovative technologies in development there. Public schools, universities, private sector and government organizations all are seeing interesting potential applications in their respective areas. In 2003, through these presentations, CCNB Bathurst intends to develop partnerships that will lead to the commercialization of the 3D immersive world, either via applications related to the area of lifelong learning or to the business world and e-commerce.

In November 2002, as part of its commercialization efforts, and in order to increase its R&D activities in the ITC area, CCNB Bathurst applied for funds from the Atlantic Innovation Fund and ACOA for a project on the search for innovative technologies in distance learning for the education and business sectors. This study will focus essentially on user-friendly navigation with personalized guides in an immersive virtual 3D world. In 2003, efforts will continue with a view to improving existing infrastructure and do more advanced research that will lead to fine tuning the final product to the specific needs of organizations and industry.

Building on its success to date, in 2003, CCNB Bathurst will continue dialogue with its partner from Iceland with a view to obtaining production rights, which would authorize it to create other immersive worlds and to commercialize the final product.

81. University College of Cape Breton

The University College of Cape Breton is mandated to actively participate in applied research and community economic development (CED), in addition to teaching and traditional scholarly work. To this end, during a strategic planning process, UCCB considered areas where it could develop a competitive advantage, both for itself as well as the SME's in the immediate locale. Three divergent, yet complementary, areas of research emerged as being economic development drivers, as well as areas where UCCB could build a competitive advantage: information technology, integrative science, and petroleum development and operations. UCCB has established collaborations with researchers, industry, and community partners in these areas of research, with measurable benefits evident in the early stages of the plan implementation.

University Industry Liaison is a primary function of the Department of Economic and Technological Innovation (DETI) at UCCB. The department has three units, each of which facilitates the transfer of knowledge from the university to the community for economic diversification. The units work with their specific partners and collaborators at various capacities from shared research to patent and licensing advice. The divergent, yet complementary units can overlap for the benefit of industry. For example, the petroleum unit is proposing an R&D project that involves wireless communication. This new technology can grow from the information technology unit.

A key area marked for growth is the information technology sector. UCCB has worked with the community for 10 years to nurture cluster growth in this sector. Most recently, the National Research Council has located its Institute for information Technology Wireless Systems research

facilities on campus. Coupled with UCCB MicroElectronics laboratories, these facilities provide opportunities for SMEs to receive R&D assistance at various stages of development.

Early activities focused on the manufacturing sector through CAD/CAM and mechanical engineering. This applied focus has grown to provide aid to several sectors including the IT sector.

The University College of Cape Breton has successfully created spin-off companies, one of which has become the largest Environmental Services Laboratory in Atlantic Canada. LearnCorp International (LCI) is the newest foundation company. LCI's mission is to provide leadership and develop projects and partnerships in corporate and international education and training that will enable the UCCB Foundation to realize its educational and economic goals, as well as facilitating the growth of a vibrant international student community at the University College of Cape Breton.

82. Saint Mary's University

Saint Mary's University has recently created the position of University/Industry Liaison and Innovation (UILI) Officer who will be responsible to develop industrial contacts in order to identify opportunities for research partnerships with industry and contract research by individuals and research centres on campus. The Officer will be responsible for developing, monitoring and where appropriate, managing the contracts. The Officer will assist in the development of workshops related to training in scientific and technological areas. The Officer would also be responsible to assist faculty members in the patenting, licensing and commercialization of research discoveries.

Saint Mary's University is presently supporting projects with exciting commercialization potential in the following areas:

- Research to determine the potential of ionic liquids to remove toxic sulphur containing compounds from natural gas and other petroleum products. This technology may also be used to remove other undesirable compounds, for example, metal pollutants from water and petroleum products, and compounds responsible for the formation of acid rain.
- Forensic contract research on determining insect colonization patterns and rates on carcasses in the Maritime region.
- CFI funded research to create a Maritime Provinces Spatial Analysis Research Centre. This research will support research in many fields both within and outside of the University, including coastal flooding, changing geography, the human use of space and other fields through remote sensing, global positioning, geographic information and seismic subsurface interpretation technologies.
- CFI funded research to identify the genes controlling less desirable traits in agriculturally important crops so that plant breeders can improve these species for human use.
- CFI supported establishment of the Institute for Computational Astrophysics (ICA). The Director of this Institute is a Tier I Canada Research Chair. The ICA will provide a world-class focus for computational astrophysics in the country and will support cutting edge research, multiple computing environments, and highly specialized astrophysical

software, both for its faculty and students, as well as for members of the broader scientific community.

83. Mount Saint Vincent University

Mount Saint Vincent University, a small university, is working on developing and commercializing a state-of-the-art eLearning platform. After examining the ways in which multimedia learning environments can enhance the learning process achieved by more traditional models, the project team will be faced with the challenge of applying the research of learning into practical, useful tools for organizations to improve corporate learning.

In addition, with an eye on future developments, MSVU is also involved with other universities in an application to the Atlantic Innovation Fund for the creation of an Atlantic network of technology transfer experts.

84. Dalhousie University

There are three entities at Dalhousie involved in commercialization of intellectual property and business development related to research: Nova Universities Technologies Inc (NuTech), the Business Development Office in the Faculty of Medicine, and GINI University Services Inc. (GINIUS).

NuTech had 6 new disclosures during 2002, filed 11 patents and executed 1 new license. Several spin-off companies (Immunovaccine Technologies, Atlantic Fiber Technologies Inc, Fusogenics) that were created earlier as a result of intellectual property developed by NuTech are working on capital financing.

The Business Development Office, in a program with MedInnova (MedInnova Frontier Innovation Awards Program) received 19 new disclosures of which 4 received funding for good commercial potential. There are also discussions under way for four potential new spin-off companies based on research in new drugs associated with memory disorders, computational tools for drug design, the study of infectious diseases and cancer research. The office is assisting with raising venture capital funding for two companies (Fusogenics, Novaneuron).

The Global Information Networking Institute (GINI) was formed to undertake multidisciplinary, collaborative research and development network applications. GINI University Services Inc. was formed as a privately owned subsidiary of Dalhousie to focus efforts on student company formation and incubation and business liaison. It has created 2 student-formed companies with a third company to be admitted to the incubator in February 2003. GINIUS has also negotiated 9 contracts in 2002 and acquired 7% equity in a company started by the Faculty of Computer Science.

85. Nova Scotia Agricultural College

Five areas of research activities and strategies for the Nova Scotia Agricultural College are as follows:

Water Quality - develop water quality strategies for regulatory process and to assist commercial farms and agribusiness;

Air Quality - research on monitoring air quality and assist the agriculture sector in dealing with greenhouse gases due to methane and nitrous oxide;

Sustainable Agriculture - research on agronomic and horticultural plant species with better nutrient and soil management practices as well as modeling of grazing systems;

Economic - research on economically important agricultural industries in Atlantic Canada such as wild blueberry, carrot, potato and fur.

Organic Agriculture - research dedicated to enhancing the environmental and social integrity of agriculture through scientific analyses of methods to improve the sustainability of farming.

These all involve close collaboration with extension organizations and producers.

86. Nova Scotia Community College

No products or processes were created last year which resulted in commercialization activity. The activities in the first CFI award are coming to a close, and activities in the second award are just ramping up. Activities which will lead to commercialization in the future, leading from CFI funding, will take place in the areas of decision support systems for coastal flooding and disaster management.

87. Memorial University of Newfoundland

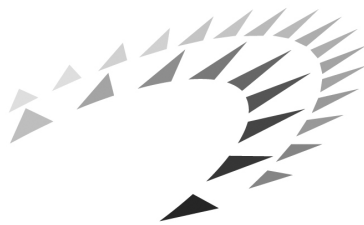
The Genesis Group Inc is the commercialization arm of Memorial University of Newfoundland. Operating since 1987, GENESIS monitors and evaluates university research to identify promising technologies which it then patents and licenses to industry. Genesis facilitates collaborative research and strategic partnerships with industry and, when appropriate, establishes spin-off companies. It also operates a business incubator for technology-based businesses/entrepreneurs, providing them with access to the expertise and facilities resident in Memorial University. Each client is also assigned a highly experienced mentor and a business advisory board to assist in: a) the development of a comprehensive business plan; b) building the management team; and c) raising equity capital.

In the past three years, 129 faculty members have made disclosures to Genesis. Of these, nearly one-third (40 projects involving 60 faculty members) have generated significant follow-up activity. In the same period, 16 students have been involved in commercialization and/or IP related activities with Genesis. The Genesis Centre has hosted 6 companies in which the lead entrepreneurs were students (14 in total) and employing about 25 students. Currently, Genesis holds 15 issued patents and last year applied for 5 new ones. It has 8 active licenses with industry and last year signed 4 collaborative research agreements and 3 strategic alliance agreements with industry.

In the past 5 years, Genesis has incubated more than 20 companies which have raised in excess of \$5M in private equity capital and now employ over 200 people. For example, Garrison Guitars Ltd. manufactures guitars based on a patented bracing system using composite glass fibres. It raised over \$1.5M in venture capital, constructed a \$4M plant in Newfoundland, employs 65 people and pre-sold the whole first year's production of guitars to markets around the world. Another example, Rutter Technologies produces "Black Boxes" and associated sensor systems. These devices are starting to be required for ferries and cruise ships worldwide. They will likely be required on all commercial vessels over the next decade. Rutter Technologies "went public" in December 2002.

In 2003-04, Genesis expects to see the technologies of two of its spin-off companies go to market. NovaLipid's aquaculture vaccine delivery system will be introduced to Europe through its partner Alpharma SA of Norway and AquaBounty Farms anticipates FDA approval of its fast growth fish for sale in the US market. In the health sector, new license agreements will be negotiated in the areas of radio-imaging probes, cardiac diagnostics, neonatal resuscitation and rectal examination technologies. In the physical sciences, university-industry collaborations will continue in fuel cell membranes and in remote monitoring. In the area of genetics, collaboration and partnerships are proceeding well and significant discoveries are anticipated. In 2003, the incubator client Cortec Inc., which has a ship navigation prediction system, is expected to sign a multi-million dollar contract with an Iranian group to install complete systems on each of the 50 vessels in its fleet.

In 2002, Genesis spearheaded a regional initiative to form an integrated technology commercialization network for all universities in Atlantic Canada. Technology commercialization officers will be geographically dispersed throughout the Atlantic region and each sector expert will provide specialized services to all universities in the region. Tri-Council support has been obtained for one third of the cost of this initiative and the remaining funds are being sought under the Atlantic Innovation Fund administered by the Atlantic Canada Opportunities Agency. Genesis will also have a major presence in the new Inco Innovation Centre. Located in the heart of the St. John's campus of Memorial University, this multi-purpose university facility is expected to open in 2004.



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