

Public Risk **Private Gain**

An introduction to the commercialisation of university research

2007

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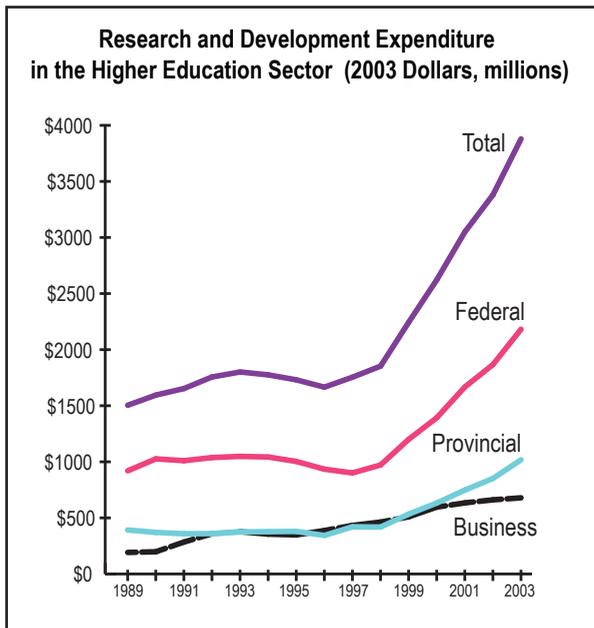
“A particularly dangerous version of [a culture of commercialisation] holds that professors should patent more and, at least by implication, spend less time teaching undergraduates, training graduate students, interacting with their international colleagues, and conceiving novel theories to test in their labs. I have some experience with patenting and I believe that this is wrong-headed...”

Mike Lazaridis, Founder, President and Co-CEO of Research In Motion Ltd. and Chancellor of the University of Waterloo. Excerpt from “The Importance of Basic Research” Keynote Address at the Fourth Annual RE\$EARCH MONEY Conference November 9, 2004.

Commercialisation: What is it?

Public post-secondary institutions are responsible for delivering both high-quality education and research in the public interest. This responsibility requires the right for academic researchers to exercise independent inquiry that is free of influence or restrictions from both the government and private industry.

Over the last two decades, there has been increasing pressure from the private sector to re-shape the mission of the university to be more closely aligned with the needs of business. In the area of university research, this has led to a premium placed on research commercialisation. This shift in focus of publicly-funded institutions is a significant departure from the academic principle of independence on which universities have operated for centuries.



The commercialisation of university research refers to the conversion of new knowledge into “intellectual property” which is then transferred from universities to the marketplace. In other words, commercialisation refers to the transformation of ideas and inventions into products that have market value. Prior to the 1980s, universities played a minimal role in the commercial application of discoveries and ideas. However, over the past decade federal policies and initiatives have introduced generous incentives for universities to produce and sell commercially viable research.

Government incentives include directed research funding to projects or disciplines with identified commercial potential. This is commonly facilitated by establishing new bureaucracies, both in government and on campus, to integrate the

university’s research goals with the goals of corporate sponsors.¹

Integral to the commercialisation of university research is “technology transfer”, a process by which university research is licensed or patented and sold off to the private sector. The university bureaucracy has expanded significantly in recent years to take on a new role in the administration of technology transfer. “Spin off” companies are regularly created by universities and university researchers to market research discoveries.

The commercialisation of university research almost exclusively emphasises applied scientific research and development in a narrow range of fields such as pharmaceutical science, biotechnology, medical diagnostics, electronics, animal science, and plant sciences.

A Brief History of Federal Research Funding

Throughout the 1960s and 1970s, the federal government made significant investment into public programs, including core funding for post-secondary education and funds for research and development (R&D). It was in the 1960s that the federal government established the first research granting councils. The Medical Research Council (now the Canadian Institutes of Health Research) was established specifically to provide public funds to support the newly formed not-for-profit medicare program funded by the federal government. In 1978, the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC) were created to “encourage excellence in research, provide a base of advanced knowledge in the universities, ... maintain a basic capacity for research training, encourage curiosity driven research...”²

International Pressures And The Rise Of Knowledge Ownership

Prior to the 1980s, universities rarely engaged in patenting and licensing. University researchers were available in an advisory capacity for industry and the government, but without the expectation to behave as fellow entrepreneurs. Economic and political shifts gradually led to increased pressure on public sector institutions to re-organise to increase “efficiency”, “quality”, and “value for money”. As early as the 1970s, corporate leaders criticised public universities for being of

1. Einar Rasmussen, Øystein Moenb, Magnus Gulbrandsen, “Initiatives to promote commercialization of university knowledge”, *Technovation*, 26 (2006) 518–533

2. Natural Sciences and Engineering Research Council, “NSERC’s History”, www.nserc.ca/about/history.htm, Viewed on Feb. 12, 2007.

limited value to industry. Similar criticisms have been levied by some members of government and senior university administrators.

The 1980 Bayh-Dole Act in the United States granted universities patent and licensing rights to federally funded research and encouraged universities to foster research partnerships with private companies. This contributed to the expansion of the technology transfer and commercialisation efforts of American universities which, in turn, shifted the international landscape for university intellectual property.³

Federal Commercialisation Initiatives

In an effort to increase the research and development (R & D) capacity in Canada, the federal government began establishing science advisory bodies in the 1970s that would report to the government. Organisations such as the Science Council of Canada, a federal advisory body on science and technology policy active in the 1970s, and the Corporate Higher Education Forum, an independent organisation established in 1983 by university administrators and business leaders, were instrumental in the early stages of the commercialisation agenda.

Today, the Conference Board of Canada is active in promoting commercialisation initiatives by forming the Leaders' Roundtable on Commercialization in 2005 which consists of 46 CEOs, university presidents and deputy ministers.⁴ Technology Partnerships Canada (TPC) was established in 1996 as an agency of Industry Canada to provide funding for strategic research projects. In 2005, TPC was replaced with the Transformative Technologies Program, which shares the costs of innovation and technology adoption projects with Canadian industry.

The Advisory Council on Science and Technology (ACST) was

3. David C. Mowery, Richard R. Nelson, Bhaven N. Sampat, and Arvids A. Ziedonis, *Ivory Tower and Industrial Innovation: University-Industry Technology Transfer Before and After the Bayh-Dole Act* Ivory Tower and Industrial Innovation (2004), Stanford University Press.

4. Conference Board of Canada <http://www.conferenceboard.ca/LRTC/> Viewed on February 6, 2007.

established in 1996 to provide the federal government with advice on science and technology policy. Much of its focus has been guided by the belief that an economic advantage through research and development is necessary for Canada to compete in a globalised world.

Expert Panel on the Commercialisation of University Research

In 1998 the Expert Panel on the Commercialization of University Research was created by the ACST. In 1999, the Panel published a report to the Prime Minister recommending several initiatives to advance the commercialisation of university research. The report outlined that, in order for research to be beneficial to Canadians, it ought to generate economic wealth or strategic advantages for corporations.

It called for greater incentives for researchers to undertake commercialisation and clearer policies for defining who has rights over the research.

The federal government's response to the Expert Panel's 1999 report was presented in a document entitled, *Achieving Excellence*.⁵ The response essentially endorsed the Expert Panel's 1999 recommendations. *Achieving Excellence* committed the federal government to supporting academic institutions in

identifying research initiatives with commercial potential and forging partnerships with the private sector to commercialise research results. What has come to be known as the Innovation Strategy called for universities "to at least triple key commercialisation performance outcomes."

In 2006, the Expert Panel released a second report calling for further commercialisation of research. The recommendations include: creating a "commercialization partnership board"; increasing business demand for talent through development of a new "Canada commercialization fellowships program" (the program would have undergraduate, graduate, and post-doctoral fellowships); and the creation of a commercialization fund to address key commercialisation "challenges" In total, the recommendations would cost an estimated \$1.1 billion.

5. Government of Canada, *Achieving Excellence: Investing in People, Knowledge and Opportunity*, <http://www.innovationstrategy.gc.ca/>

Federal Funding for Research Commercialisation

Chronic federal underfunding of post-secondary education throughout the 1980s, followed by significant cuts to research granting agencies during the 1990s, drastically affected funding for public research. The Social Science and Humanities Research Council (SSHRC), the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Medical Research Council (now the Canadian Institutes of Health Research), saw their budgets reduced by approximately 10% between 1994-95 and 1997-98 alone.

Since the late 1990s, the federal government has steadily increased funding for research while requiring that universities find private sector partners and commercialise research results. The 1997 federal budget established the Canadian Foundation for Innovation (CFI) with an initial investment of \$800 million. The CFI is an industry-oriented research funding agency whose funding criteria stipulates that universities must form partnerships with the private sector before receiving funding. Since its creation, the CFI has received \$3.65 billion in funding from the federal government.

Since the 1997 federal budget, the federal government has directed research dollars into several other commercialisation initiatives. The 2006 federal budget provided \$100 million for research, \$60 million of which was allocated to the Indirect Costs of Research Program and the CFI. In comparison, \$6 million was allocated to SSHRC.

The 2006 federal budget also stated that the Minister of Industry, in collaboration with the Minister of Finance, would develop a science and technology strategy that would encompass the broad range of government support for research. Additionally, a review of the accountability and “value for money” of the granting councils’ activities was also announced thereby heightening pressures for the granting councils to demonstrate the short-term commercial value of publicly-funded research.

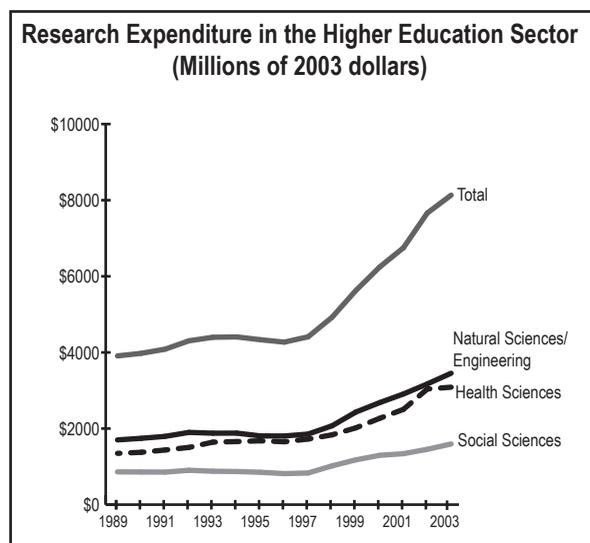
Commercialisation and the Federal Granting Councils

The granting councils were originally established to foster curiosity-driven research through the expansion of funding opportunities to faculty and graduate students. Yet the federal government’s rush to commercialise university research is increasingly at odds with the councils’ peer-reviewed and independent research projects.

Housed within Industry Canada, the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC) provide public funding for basic and applied research. The Innovation Strategy placed significant pressure on the granting councils to increase ties with the private sector, causing greater focus

being put on applied research. NSERC has been promoting the commercial side of its programs and has a directory of companies established from NSERC research funding.⁶ NSERC introduced a new program in 2006, “Idea to Innovation,” to facilitate the creation of spin-off companies from its research projects through the funding of new enterprises.⁷

Support to the granting councils is increasingly



disproportionate. Even though over 60% of students study in the Social Sciences and Humanities, SSHRC receives significantly less funding than other granting councils. Pressure to support industry-relevant research means that funding increasingly supports disciplines that are considered “natural” allies of business, such as health, applied science and technology. SSHRC’s management team recognises the shift in thinking within Industry Canada, and it’s strategic plan articulates the challenge this way: “The challenge for the social sciences and humanities is to expand the idea of ‘return on investment’ to include benefits other than mere commercial ones. But even with a strong argument for the broader benefits of research there is never a guarantee that the government’s support for [SSHRC’s] research will continue to grow.”⁸

6. Natural Sciences and Engineering Research Council, *Research Means Business: A directory of companies built on NSERC-supported university research*. October 2005

7. Natural Sciences and Engineering Research Council, *College Faculty Can Now Apply for Idea to Innovation Funding*, Ottawa, Ontario, February 23, 2006, <http://www.nserc.gc.ca/news/2006/p060223.htm>

8. Social Sciences and Humanities Research Council, *Strategic Plan 2006–2011*, July 2005

Unlike SSHRC and NSERC, the Canadian Institutes of Health Research (CIHR), operates under Health Canada. CIHR's "Commercialization and Innovation Strategy" is oriented to conducting research with partners to move research discoveries to the market.⁹

The CIHR has rapidly integrated commercialisation into most of its research funding, forging relationships between biotechnology and pharmaceutical companies and researchers studying in the health and medical fields.

From University President to Executive Director of Marketing

University administrators have supported the commercialisation agenda by courting business and promoting market driven research. In response to the federal government's Innovation Strategy, the Association of Universities and Colleges of Canada (AUCC) secretly negotiated an agreement with the federal government to, among other things, double the amount of research performed by universities and triple research commercialisation by 2010.¹⁰ Despite this surprise move by university administrators, it could be a difficult goal to achieve because no consensus was sought from the people who actually conduct research: faculty members and graduate students.

In a recent submission to the Minister of Industry and the Minister of Finance on the Development of a Science and Technology Strategy for Canada the AUCC, among other recommendations, calls upon the government to continue supporting university partnerships with the private sector and facilitate more commercialisation initiatives.¹¹

In order to meet the goals of commercialisation, universities have taken on several new responsibilities and administrative

9. CIHR. *CIHR's Commercialization and Innovation Strategy*. November 2005

10. Framework of Agreed Principles on Federally Funded University Research between the Government of Canada and the Association of Universities and Colleges of Canada, November 18, 2002.

11. Association of Universities and Colleges of Canada, submission to the Minister of Industry and the Minister of Finance on the Development of a Science and Technology Strategy for Canada, http://www.aucc.ca/publications/media/2007/st_strategy_02_12_e.html February 8, 2007.

burdens. Most universities have created "technology transfer" offices to assist researchers identify possible commercial potential for their research and successfully develop research into marketable products. These offices focus on establishing partnerships with industry, licensing discovery, patenting knowledge, and forming spin-off companies.

It is becoming common for universities to advertise discoveries available through their research offices for licensing by private companies.

How Does Commercialisation Harm Universities?

Federal commercialisation initiatives create incentives for universities to meet the needs of business rather than broader social objectives upon which universities were founded. Universities are becoming less independent, less trustworthy, and less reliable as they become more involved in business ventures. Universities are also at risk of becoming less inclined towards protecting public interest over private interests as the financial costs of losing industry partners becomes greater.

Proponents of commercialisation argue that market-driven university research will enhance Canada's productivity and global competitive advantage. However, the race to commercialise university research at any cost is based on faulty assumptions and questionable outcomes.

Commercialisation warps the wider public research agenda

The strategies for commercialisation in universities disproportionately favour research in disciplines or research topics that are considered to have commercial value. Disciplines that have little perceived value are under pressure to either redefine their value in market language or perish. The disproportionate funding among the tri-councils demonstrates this unbalanced approach. Graduate students studying in the liberal arts are often competing for limited funds to study, while students in applied disciplines may be able to survive on comfortable stipends throughout their programs. The unequal financial support makes it more difficult for graduate students in the liberal arts to complete in a timely fashion.

Commercialisation Can Actually Inhibit Innovation

Time and valuable human and financial resources are spent in

Public Resource Sell-Off

"The CIHR/Rx&D Research Program is a jointly funded partnership between CIHR and Canada's Research-Based Pharmaceutical Companies that facilitates collaborative partnerships among academia, industry and government to enhance **the transfer of publicly funded research to the private sector.**" [emphasis added]

Source: Canadian Institutes of Health Research, "CIHR: Where innovation takes flight", Commercialization, <http://www.cihr-irsc.gc.ca/e/23906.html>

the (often futile) attempt to transfer technology and negotiate intellectual property agreements. University researchers are increasingly bogged down in a new role seeking investors, negotiating contracts, and haggling over publishing rights. All of this effort detracts from laboratory and teaching time—what Canadians have traditionally expected from university professors.

Innovation is also stalled in the wider scholarly community when research results are kept secret. It has become standard procedure for university-industry research contracts to prevent researchers from discussing results for extended periods of time while a patent is filed.

A recent study confronts the perception that patents speed up technological progress. The research shows that market incentives make it more beneficial for the “innovator” to sit on research discoveries. While the effect of a patent may be to increase the potential number of innovations, it also impedes the introduction of such discoveries to the market.¹²

Commercial Pressure Promotes Bad Science

The academic research environment is at odds with the values of industry research. Industry is oriented towards secrecy to gain a competitive advantage, while academe requires open dialogue and debate for peer assessment.

In one recent case, Oregon State University graduate student Daniel C. Donato wrote a paper that raised questions about the wisdom of logging trees burned in forest fires. The research results were not favourable to the industry’s interests. The paper was accepted for publication in *Science* with Donato listed as the first author. Critics asked *Science* to delay the publication of the print version, but *Science* did not comply. The Dean, Hal Salwasser, wrote to colleagues about doing “damage control” on the paper and offered suggestions to timber-industry representatives about crafting a public rebuttal. Dean Salwasser also wrote of the study’s effects on the college’s fund-raising efforts and on a Congressional bill related to the forestry industry.¹³

12. Takalo Tuomas, Tuomas and Vesa Kanninen, “Do patents slow down technological progress? Real options in research, patenting, and market introduction” *International Journal of Industrial Organization*, 18 (2000) 1105–1127

13. The Chronicle, “How a Graduate Student Kindled a Firestorm in Forestry

Maintaining research integrity requires an open environment where data can be verified and re-examined. Commercialisation, on the other hand, requires a closed system of knowledge development so that data may be owned and controlled for competitive advantage. In one study, 1077 graduate students and post-doctoral students were surveyed in the life sciences, computer science, and chemical engineering. Approximately, one-quarter reported that they had been denied information relevant to their research at some point. This was especially prevalent in research groups with links to industry. About half the affected respondents reported delays to their research.¹⁴ These results demonstrate the growing challenges to the open debate that is integral to advancing scientific work.

Industry sponsorship of university research may influence how research results are presented. A study of whether industry sponsorship influenced the outcome of pharmaceutical research discovered that studies sponsored by pharmaceutical companies were more likely to have outcomes favourable to the sponsor than were studies with no pharmaceutical company sponsors.

It was concluded that systematic bias favours products which are made by the company funding the research.¹⁵

In addition to external pressure, experimental methodology and dissemination of results may be subject to impropriety if the researcher has a financial investment in the outcome. Inappropriate pressures can come from the researcher to narrow project designs to those most in market demand. Several

studies concluded that industry involvement alters research behaviour.¹⁶

Research”, April 21, 2006, <http://chronicle.com/weekly/v52/i33/33a02701.htm>

14. *Science* “Scientists Keep Some Data to Themselves”, 27 January 2006: Vol. 311, no. 5760, p. 448

15. Joel Lexchin, Lisa A Bero, Benjamin Djulbegovic, Otavio Clark, “Pharmaceutical industry sponsorship and research outcome and quality: systematic review”, *BMJ*, 2003; 326:1167-1170 (31 May), doi:10.1136/bmj.326.7400.1167, <http://bmj.bmjournals.com/cgi/content/full/326/7400/1167>

16. Teddy D. Warner, John P. Gluck, “What do we really know about conflicts of interest in biomedical research?”, *Psychopharmacology* (2003) 171:36–46

See also P. Komesaroff, “Doctors’ interactions with the pharmaceutical industry: science or commerce?”, *Internal Medicine Journal*, 2001; 31: 446–447

When the university-industry partnership involves public health, the stakes are even higher. The corporate infiltration of a panel convened to set standards for chromium (VI) in California succeeded in skewing the panel's decision to protect industry profits rather than public health.¹⁷

Internal checks and balances designed to prevent such abuses of public trust have nearly disappeared in Canada. University administrations, concerned more with keeping industry "customers" happy, are reluctant to pursue cases of research misconduct that may taint the reputation of their institution and threaten future corporate relations. Despite the significant transformations that universities have experienced to accommodate accelerated research activities and marketing, measures to protect academic freedom and research integrity have not been provided equitable consideration.

Commercialisation Does Not Generate Returns for Universities

Significant public resources are being spent on commercialisation initiatives yet the benefits are accrued largely in the private sector. Canada's public universities seem to be receiving relatively little from the commercialisation agenda, yet bear increasing costs. For instance, there are increasing costs associated with legal and administrative aspects of commercialisation.¹⁸

The Canadian Foundation for Innovation estimates that by 2010 it will have disbursed approximately \$4 billion. The Expert Panel on the Commercialisation of Research is recommending an additional \$1.1 billion in federal government spending. Yet, the AUCC's 2005 report Momentum estimates that by 2010 universities will have reaped a mere \$70 million in returns from commercialisation.

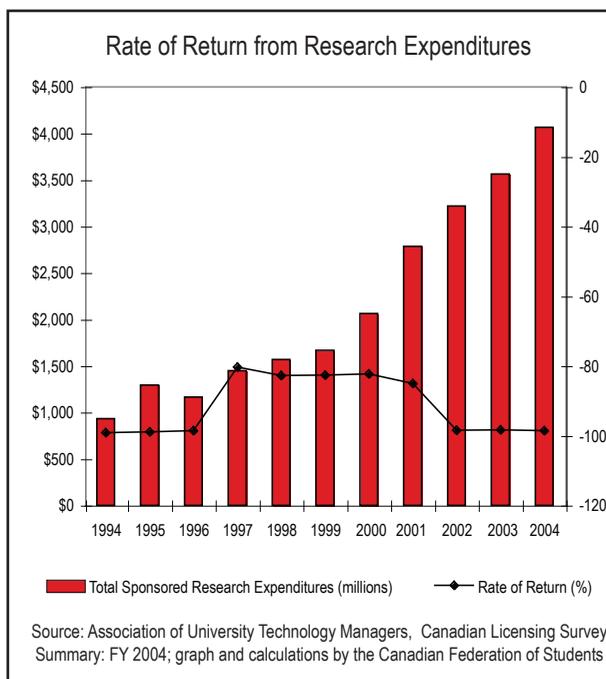
Using the income derived from licenses against the overall expenditure on research, the rate of return from research expenditure income from licenses is extremely low (See chart).

In fact, despite the underlying profit motive, commercialisation

can have the effect of making research more costly. Some research on the matter suggest that efforts to commercialise research in earlier stages of development increase the costs of research later in the process. For example, upstream patents over gene sequences require complex transactional agreements at each subsequent stage of research.¹⁹

Commercialisation Threatens Academic Freedom

Governments are aggressively pushing the commercialisation agenda but are negligent in providing adequate protections for



researchers who come forward to highlight threats to research integrity. Commonly known as whistleblowers, researchers who report data suppression or more blatant misconduct have no formal protection. Coming forward in the name of the public interest can be a career-ending decision.

A number of cases arising in universities across Canada are illustrating that graduate students and faculty members who raise questions about academic integrity often face reprisals from colleagues, supervisors and employers. The most well-known case is that of Dr. Nancy Olivieri who published research results that ran counter to the pharmaceutical sponsor's interests. Apotex claimed that by publishing the results in a journal, Olivieri broke the contract signed between

See also K. J. Breen, "Misconduct in medical research: Whose responsibility?" *Internal Medicine Journal*, 2003, 33, 186-191.

See also Goldie Blumenstyk, "Study Suggests Bias in Nutrition Research", *The Chronicle of Higher Education*, January 19, 2007.

17. David S. Egilman, "Corporate Corruption of Science – The Case of Chromium (IV)", *International Journal of Occupational and Environmental Health* 12 (2): 169-176, April-June 2006.

18. Association of University Technology Managers, accessed on January 2007, FY 2004 Licensing Survey, <http://www.autm.net/surveys/dsp.surveyDetail.cfm?pid=28>

19. Megan Ristau Baca, "Barriers to Innovation: Intellectual Transaction Costs in Scientific Collaboration", *Duke Law and Technology Review*, 2006, <http://www.law.duke.edu/journals/dltr/articles/2006dltr0004.html>

the research hospital and the company. Although this case illustrates large scale influences that companies may have over research, there are also the unspoken and subtle decisions made on a day to day level by researchers across the country who are reliant upon industry funding and who know that their project funding depends upon continued sponsorship.

Although the federal government has rushed public research commercialisation policy into place, it has failed to introduce any safeguards whatsoever to protect research integrity and academic freedom. In contrast to the United States and Britain, Canada does not have a research body responsible for overseeing the ethics of publicly funded research investments. Without explicit recognition for the role of whistleblowers in public research settings, there are few incentives, if any, for graduate students and researchers to report research misconduct or questionable research practices.

With increased corporate influence over universities, university administrators as well as governments seem disinclined to support researchers standing up for academic integrity.

Commercialisation Threatens University Accountability and Transparency

The transformation of the university as a research marketplace is contributing to a larger privatisation trend on campuses across Canada.

University administrators, in the face of public funding claw backs and pressures to restructure, have increasingly assumed a more corporate management style. Competition rather than collaboration, is the new norm. Decision-making has become more centralized on many campuses, and access to information is more restricted.

The formation of spin-off companies may have a number of implications as the university itself is attempting to generate it's own profit and returns on the public's investments in research. In British Columbia, the province's three largest universities have argued that, despite public universities being subject to Freedom of Information legislation, that the finances of spin-off companies are private because the universities are providing a service to private-sector organisations.²⁰ Currently, the

20. Georgia Straight, "Universities fight for corporate secrecy", March 30 2006,

creation of spin-off companies and their treatment as private entities has the effect of limiting access to any discoveries as they become the property of the company and the university, not the research community and the public.²¹

Commercialisation Raises Specific Challenges for Students

Within a commercialised research environment, students face a number of new challenges. Students require both access to new research and open communication within the laboratory and classroom to discover the newest developments within their fields of specialisation. Commercialisation both complicates and limits the knowledge available to students. The legal processes governing the ownership and distribution of knowledge increase the costs and bureaucracy of determining access to knowledge.

Student researchers are often graduate students who are working on a project that may or may not be directly related to their own graduate research. Duties of student researchers can range from basic up-keep of the research lab, to working with or supervising other employees in the lab, to carrying out full research projects as outlined by their supervisor. Through these responsibilities the student researcher is often expected to contribute intellectually and creatively to the research process. If the student

researcher has not previously negotiated who will have creative control over ideas generated on research projects (which may also be governed by contracts with industry), the student may find that they do not have the right to disseminate or communicate research discoveries or ideas arising directly from their employment.

The Patent Trap

"[P]atenting is an inherently secretive process requiring its proponents to withdraw from the very processes that expand and transfer knowledge in a research university—open disclosure, peer review, and publication in scientific journals.

When patents are involved, these become replaced by non-disclosure agreements and lawyer-led bureaucratic processes that often lead to adversarial proceedings in the courts."

Mike Lazaridis, Founder, President and Co-CEO of Research In Motion Ltd. and Chancellor of the University of Waterloo

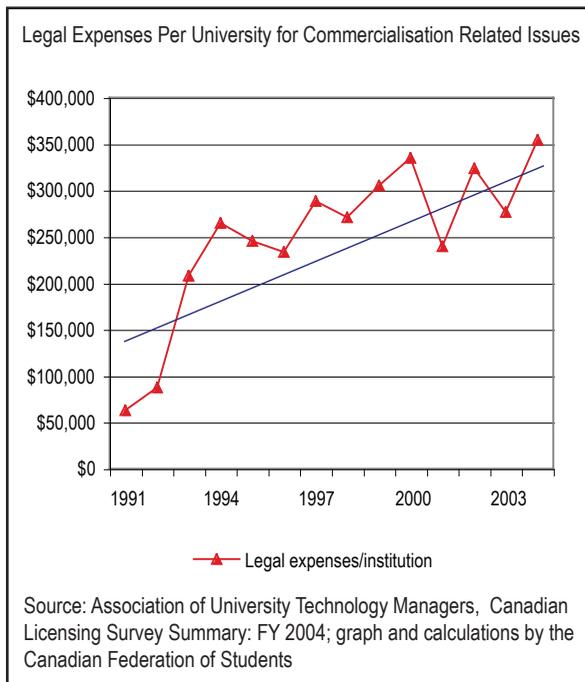
<http://www.straight.com/content.cfm?id=16956>

21. FIPA, "BC universities fight for corporate secrecy", BC Freedom of Information and Privacy Association, <http://fipa.bc.ca/home/news/137>, April 19, 2006, accessed February 13, 2007.

Commercialisation Creates An Increasingly Complex Administrative And Legal Terrain For Researchers

Many policies existing within the university are inadequate in dealing with the recent challenges arising from commercialisation. Statutes governing intellectual property law are ever-evolving on both domestic and international levels.

Students are particularly vulnerable when it comes to appropriate recognition for their contributions to writing, research, and inventions. The case of Christopher Radziminski provides a clear example of the difficulties students may face when coming forward with complaints related to copyright infringement or plagiarism. Radziminski, a former graduate student at the University of Toronto, discovered two journal articles that contained extensive passages copied verbatim from his Master's thesis, without his knowledge or consent. Upon launching a complaint, the University and the two journal publishers did not take the allegation seriously and Radziminski was subsequently threatened by the University with a defamation suit for contacting the journals.



Many universities lack clear intellectual property policy, or exclude students' rights. Where policies exist they are often unclear and require negotiation between the graduate student and the researcher or the university administration. Of course, the power-laden relationship could hardly be expected to yield a fair result for the student. Accordingly, students are regularly denied recognition, patent royalties, or copyright from research they have participated in creating.

Without formal and established rules and protections both through university policy and collective agreements, graduate students are left to negotiate the complicated terrain of labour relations and university regulations on their own.

Protecting Research in the Public Interest

To ensure that universities operate in the public interest, academic freedom and integrity must be maintained, free from corporate interests. Intellectual property and patent laws must not be excessively restrictive, preventing academic and scholarly collaboration. It is in the public interest that university researchers are able to pursue research that may not satisfy the immediate needs industry or government.

Researchers in public universities are not only accountable to the students and the public, but also to the communities in which they work. Researchers must be able to engage in free and open dialogue without commercial interference to commit to scientific and scholarly excellence. Tenure and academic freedom can help ensure that researchers are able to publicly disclose research findings even if those results are contrary to corporate interests. Unfortunately, academic freedom is regularly challenged by intellectual property policy, by contracts with industry, and by the ambiguity of procedures that are intended to help determine the ownership over ideas.

Protecting research in the public interest requires a number of government commitments, including:

1. Increased core funding for post-secondary education.

The significant cuts to research funding during the 1990s combined with targeted re-investments favouring commercial research has created an unbalanced national research agenda. Increased core funding to post-secondary education institutions can reduce the pressure on universities to generate revenues from ties to industry.

2. Increased funding to the granting councils.

The three granting councils were established to promote basic and curiosity driven research. The government's drive for commercialisation means that funding has been increasingly directed to those areas of study that are considered allies of industry: business-science, technology, applied health science, etc. Granting council funding has not kept pace with the needs of graduate students and faculty members. Industry Canada's narrow definition of "innovation" excludes most areas of research from new funding.

Percent of scientists who have engaged in the following behaviour within the last three years (n=3,247)

Source: Nature 435, 737-738 (9 June 2005)

	All	Mid-career	Early-career
Changing the design, methodology or results of a study in response to pressure from a funding agency.	15.5	20.6	9.5
Using inadequate or inappropriate research design.	13.5	14.6	12.2
Overlooking other's use of flawed data or questionable of data.	12.5	12.2	12.8
Withholding details of methodology or results in papers or proposals.	10.8	12.4	8.9
Inappropriately assigning authorship credit.	10	12.3	7.4
Failing to present data that contradict one's own previous research.	6	6.5	5.3
Using another's ideas without obtaining permission or giving due credit.	1.4	1.7	1

3. Establishing a national agency to ensure research integrity.

Canada currently lacks any standardised, transparent and consistent system for maintaining research integrity for research conducted in public institutions or public affiliated institutions. The onus is often placed on universities to ensure adequate standards of integrity are maintained for research. The creation of such an agency would provide clarity to the roles and responsibilities of researchers and research funders, and openness to the processes by which breaches to research integrity would be investigated.

The public record demonstrates that good-faith whistleblowers, some publicly vindicated, have experienced harm or ruin to their professional careers through threats, censorship, retaliatory investigations, academic expulsion, denial of access to their data and laboratories, and even threats of deportation or physical injury. High-profile Canadian cases demonstrate that whistleblowers in this country are not immune to retaliatory attacks and—in the case of graduate students or faculty without tenure—having their academic career derailed.

4. Greater restrictions on private funding.

Private funding cannot in any way abrogate the public purpose of research. Therefore restrictions at an institutional or granting council level must prohibit contracts requiring non-disclosure of research results or the buy out of researchers to be working for industry while holding positions in public institutions. Additionally, the main principals to which researchers in public

research institutions are accountable should be the scholarly community and the public.

Increased industry involvement alters the way research is conducted. High profile cases have illustrated that researchers can find themselves in a conflict of interest between meeting contractual obligations with industry, providing results that have positive commercial potential and having free and open debate within a scholarly community. Ultimately a public post-secondary education researcher's responsibility is to the

public even if private sponsors are involved. Restrictions are needed as to the influence a private sponsor can place upon the researcher in a public institution.

5. Support for an expansion of the knowledge commons.

As knowledge is increasingly commodified and only available through licensing and payment, access to academic journals and

other resources becomes more restricted. The Open Access and Creative Commons movements advance a model that allows researchers or creators of knowledge to protect their knowledge from private use by "licensing" it to the public. Through Creative Commons licensing, a creator can still place restrictions on a work but can also select the freedoms available to a user or to transfer the work entirely to the public domain.

"Misconduct" is Acceptable to Industry

"[S]ome of the behaviours listed as 'unacceptable' will seem quite normal to scientists working in industry... Specifically, using someone else's ideas is regular commercial behaviour....Finally, withholding details of methodologies presents no ethical dilemma to scientists working in industry."

A letter written by industry scientist Ian Taylor. Source: Nature 436,626 August 4, 2005