

Which Are Canada's Most Inventive Universities?

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Note: This is a new version of the original paper including corrected data for Simon Fraser University

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Introduction

Is it possible to determine which are the country's most inventive universities? Let's start with a discussion of "inventiveness". One definition that is apt for our purpose (Merriam-Webster) is: "adept or prolific at producing inventions". So, we are looking for universities that are adept or prolific at producing inventions.

One obvious way of tracking institution's record in producing these is to see how many invention patents a university is applying for or being granted each year. (In 2010 Canadian universities applied for 1,593 patents and were granted 398¹.) But patent applications are costly and while one university might have enough money in a particular year to apply for a patent on a particular widget, another university might not have the money. Also, not all useful inventions (e.g. software) are patent-able. So using patent applications and awards is a useful method of measuring inventiveness, but it has its drawbacks.

Another method for determining inventiveness is to use the source data that underlie the patent applications. Invention disclosures provide a measure of inventiveness, pre-patent. Invention disclosure refers to the obligation on researchers to disclose to their institution (university or hospital) all ideas arising from their research that they believe may have commercial potential. Nearly every institution has this requirement and process for doing so². StatCan and AUTM Canada each track invention disclosures; StatCan at an aggregate level and AUTM at an institutional level³. Disclosure data have their own limitations (e.g. they are dependent on the proclivity of researchers from one institution to another to register a disclosure), but we would argue that they are a better measure of inventiveness than patents simply because they provide a record of the researcher's original perceived inventiveness of his or her research. An institution's inventiveness is really the sum of the inventiveness of its researchers. In any event, though most disclosures are rejected by the institution (for reasons we do not fully understand) every patent begins its life as a disclosure. Thus disclosures are the "raw materials", "precursor chemicals" or "stem cells" for patents. For our research purposes we will track the inventiveness of universities by measuring the number of disclosures that they receive from their faculty in a particular year (2010)⁴.

¹Statistics Canada. Survey of Intellectual Property Commercialization in the Higher Education Sector. CANSIM Table 358-0025.

²NSERC (Natural Sciences and Engineering Research Council) requires all of its grant recipients to disclose the results of their research to their institution.

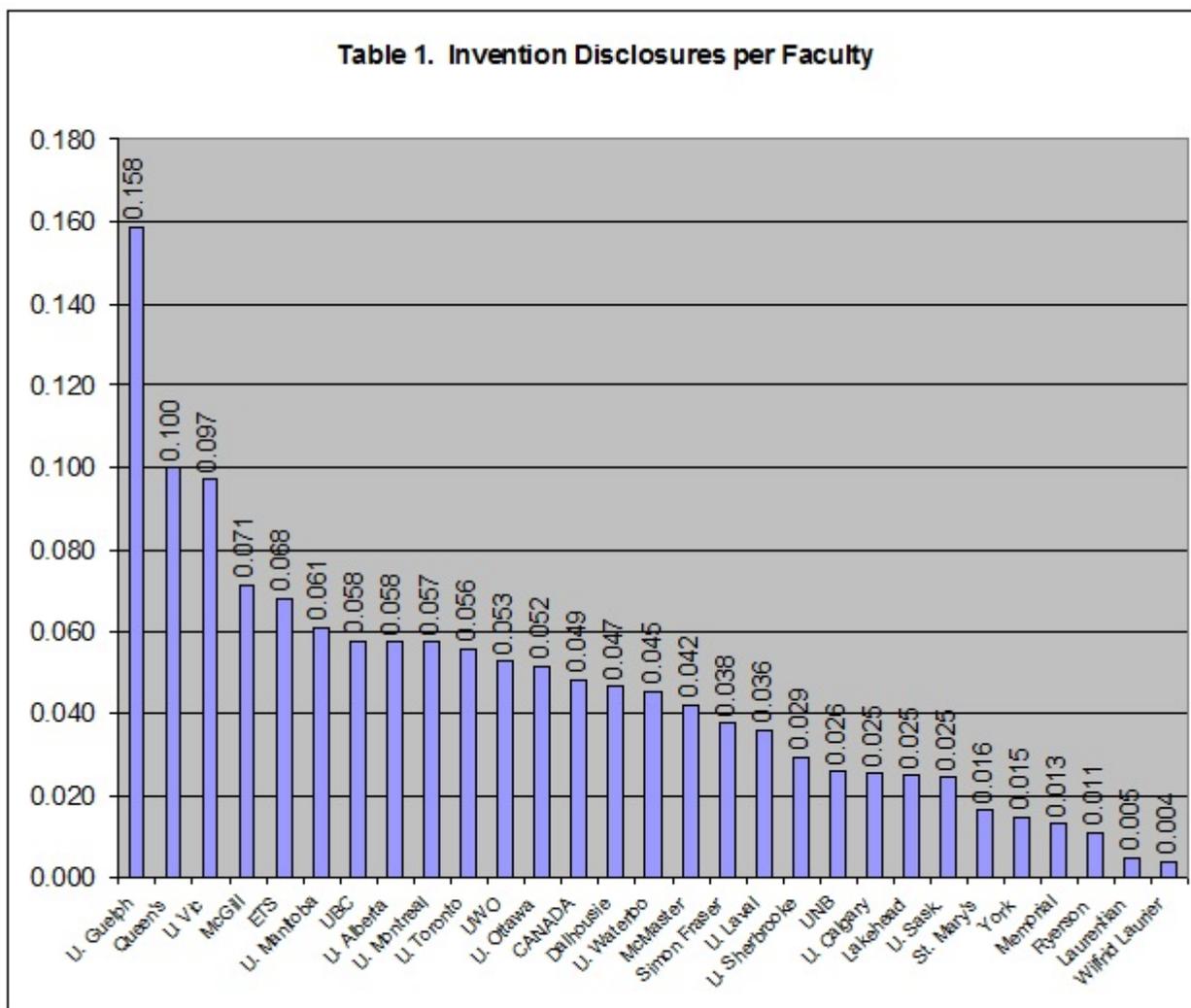
³The two data sets are not comparable.

⁴As measured by the AUTM data.

Method

We took the 2010 AUTM data on disclosures and combined them with the faculty and research income data published by Research Infosource Inc.⁵ We calculated inventiveness in two ways. First, the number of invention disclosures at each institution per full-time faculty position. Secondly, the number of invention disclosures per \$ million of research funding.

Findings

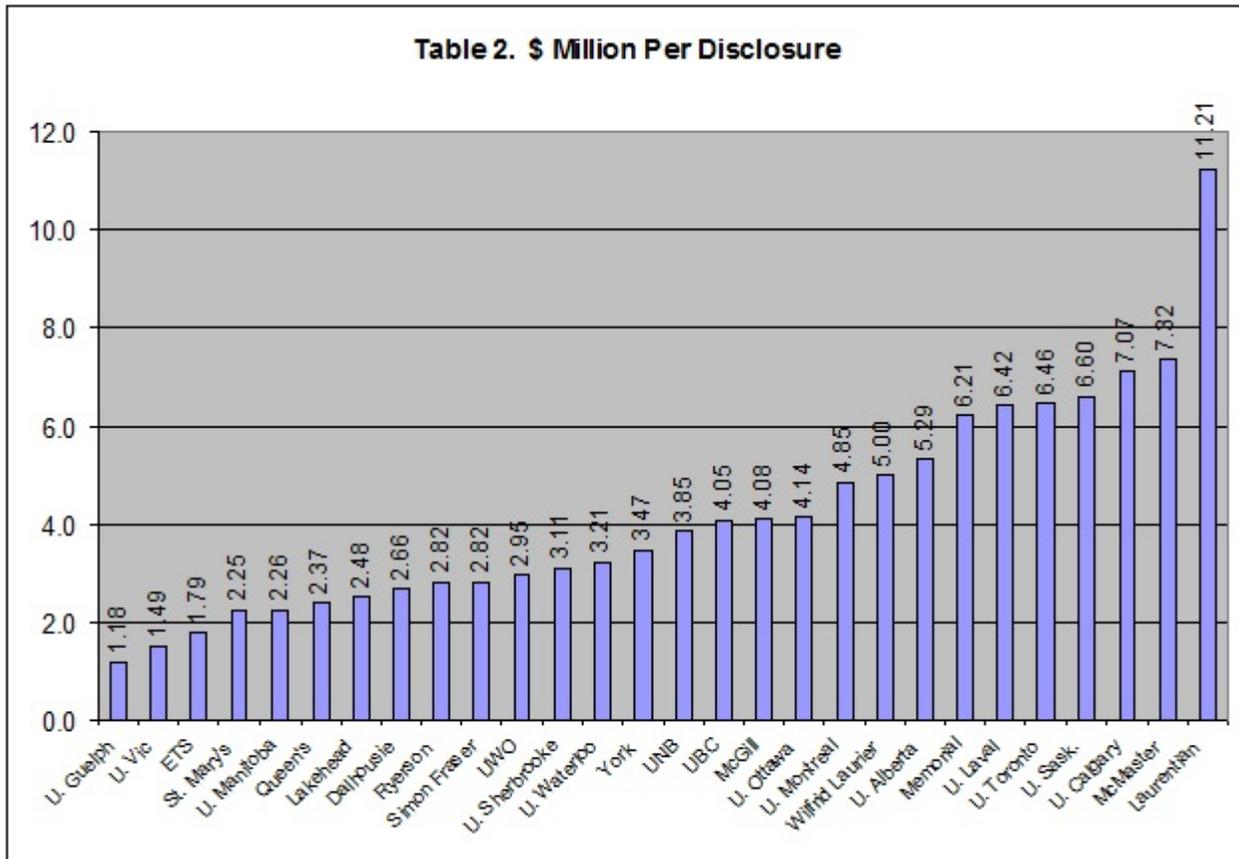


Measured by invention disclosures per faculty position (Table 1) University of Guelph has a clear lead over other universities for which data were available. On average Guelph researchers produced 0.158 disclosures each, or about 1 disclosure per 6 faculty positions, followed by Queen's University (0.1 disclosures per faculty) and University of Victoria (0.097), McGill (0.071) and École de Technologie Supérieure (.068). The Canadian average was 0.048 disclosures per

⁵<http://www.researchinfosource.com/top50.shtml>

faculty. As can be seen, there is considerable variability among institutions, even institutions of the same type (e.g. Medical/Doctoral, Comprehensive, Undergraduate).

Viewed from the perspective of cost per disclosure (Table 2), a different picture emerges. University of Guelph researchers produced 1 invention disclosure for each million dollars of research funding they received. Next were University of Victoria (1 disclosure per \$1.49 million of funding), École de Technologie Supérieure (1 per \$1.79 m), St. Mary's (1 per \$2.25 million) and University of Manitoba (1 per \$2.26 million). Interestingly, smaller institutions appear to produce more disclosures per million dollars of funding than larger institutions.



Even among universities of the same type (e.g. Medical-Doctoral) there was considerable variation in “inventiveness”. For instance, Manitoba produced 1 invention per \$2.26 million of funding whereas McMaster produced 1 disclosure per \$7.32 million of funding.

Conclusion

Measuring the true inventiveness of a university is a multi-faceted process and different metrics yield different results. Measuring inventiveness by tracking the invention disclosures registered by researchers at different institutions is one useful method. Depending on how inventiveness is measured - either per-faculty or per-million dollars of research funding - we see different institutions performing better or worse.

Top 10 Inventive Universities			
Top 10 by Faculty		Top 10 by Income	
University	Rank	University	Rank
U. Guelph	1	U. Guelph	1
Queen's	2	U. Vic	2
U. Vic	3	ETS	3
McGill	4	St. Mary's	4
ETS	5	U. Manitoba	5
U. Manitoba	6	Queen's	6
UBC	7	Lakehead	7
U. Alberta	8	Dalhousie	8
U. Montreal	9	Ryerson	9 (Tie)
U. Toronto	10	Simon Fraser	9 (Tie)
		Western	10

Five universities - Guelph, Queen's, Victoria, ETS and Manitoba - are in the top 10 when measured both by disclosures per-faculty and disclosures per-funding.

More research on the underlying phenomenon of research disclosures is called for, to better understand the drivers of disclosures.
