

CBU Annual Research Report November 2013

Introduction

This is the first of what will be an annual research report for Cape Breton University. The fiscal year was chosen as the reporting period to coincide with the CAUBO annual financial reports. Thus, this report is for the period April 1, 2012 to March 1, 2013. However, because there can be significant fluctuations (1 or 2 grants can have a large impact on the statistics) from year to year, in most cases rolling three year averages are used to give a more realistic picture. Research is a complex entity to quantify, in that no one number or statistic tells the full picture of the research enterprise. Research funding is often used as a measure of research productivity; however this is complicated by differences in institution, discipline and type of research. Academic publications are also a valuable measure of research productivity but these also vary drastically between disciplines and even within disciplines. Others may use commercialization and industry engagement as metrics. In this report, rather than focus on one metric, we try to take a holistic approach and emphasize the impact of the research conducted at CBU. We do not merely present the “good news” stories, we also indicate some of the challenges facing CBU in the coming years.

Financial data were taken from the CAUBO website. Some data for academic publications was obtained from *Web of Knowledge*¹. Industry engagement metrics were taken from the annual Springboard Atlantic reports. In addition, researchers were asked to self-report via a survey related to research activities to gather some of the other data².

1. Research Highlights

2012-13 was a very active period for research at Cape Breton University with many projects across all disciplines. Many researchers received external recognition for the quality of their work through external grants, publication and conference presentations. Below are the stories of three of our researchers.

Towards a Cleaner, Greener Pharmaceutical Industry

Dr. Stephanie MacQuarrie’s research will one day lead to important innovations in the pharmaceutical industry. Over the last two years her Canada Foundation for Innovation funded lab has focused on the development of recoverable and reusable organic catalysts. By combining two unique fields of chemistry, nanomaterials (structural chemistry) and catalysis (organic chemistry), MacQuarrie has been able to synthesize and begin characterizing new nanomaterials reducing chemical waste, transforming catalysis research, and proving much safer for the environment.

Utilizing funds from her NSERC Discovery Grant, the individual components of this laboratory work have been structured in a way that maximizes the participation of student researchers, creating numerous HQP and valuable employment opportunities for students in our region. “We

¹ *Web of Knowledge* is a Thomson Reuters product that searches Science Citation Index Expanded 1989 – present, Social Sciences Citation Index 1989 – present, Arts & Humanities Citation Index 1989 – present, Conference Proceedings Citation Index- Science 1990 – present, and Conference Proceedings Citation Index- Social Science & Humanities 1990 – present.

² 82 responses were obtained

know that students who are involved in research at both the graduate and undergraduate level are more likely to go on to further studies and are more likely to secure prestigious scholarships in doing so," notes MacQuarrie. "When I design my proposals and investigations, I design them in a way that creates space and opportunities for students as co-investigators. It is important that students be fully involved in all phases of the research from its inception through to the publication of results."

Her knowledge mobilization and efforts go beyond academia and into the community. MacQuarrie has organized several science outreach activities in the broader Cape Breton community including *Mall of Science* and *Women in Science* attracting a total of 1000 participants.

How are Grammatical Abilities Related to Basic Language Skills?

Dr. Erin Robertson has been studying the areas of cognition and language processing through multiple innovative approaches, investigating how cognitive abilities are related to each other. One big question in psychology is how grammatical abilities are related to the sound structure of language.

"I've been able to work with a lot of students on research. Since I started, I've had nine student researchers work with me." Robertson and her lab members conduct projects with child and adult participants. The child studies currently take place in elementary schools and children participate in a range of language, reading, and nonverbal tests and experiments spread out across several sessions. In the adult sentence comprehension studies, they are measuring how quickly the brain can detect grammatical errors in spoken sentences using Event-Related Potentials (ERP).

A CFI infrastructure grant was awarded to Robertson and Dr. Peter MacIntyre of the Psychology department in addition to Robertson's NSERC Discovery Grant.

The Long History and the Unknown Future of Canada's Secret Service

Dr. Andrew Parnaby, along with co-authors Dr. Gregory S. Kealey, Professor of History and former VP Research at the University of New Brunswick, and Dr. Reg Whitaker, Distinguished Professor Emeritus, Political Science, at York University recently won the *Canada Prize* in the Social Sciences and Governor General's Award for their book *Secret Service: Political Policing in Canada from the Fenians to Fortress America*. The book surveys the inception and long evolution of the Canadian secret service. Noted Parnaby: "If I were to highlight one underlying argument from the book, it would be that Canada has indeed had an operational secret service since before Canada was Canada. We were still just a collection of colonies and already there was a secret service in place.[...] Canadians are now a lot more aware of CSIS and its growing mandate. From the invasion of Afghanistan and no-fly lists to Canada's anti-terrorism legislation and the Maher Arar case, CSIS is much more visible than it was 10 years ago." Parnaby maintains other active interests; in terms of building highly qualified professionals, he is instrumental in the History student co-op program as well as the development of an MA in Heritage and Culture. He is also actively pursuing research on the community response to the closing of the Sydney steel plant in the late 1960s. And he sits on the committee to nominate Kluscap's Caves as a National Historic Site.

2. Research Funding

While the situation at every university is unique, this is especially true with regards to research and a direct comparison of research funding between universities is not always possible. However, it is still important to get a sense of where one stands in relation to similar institutions within the region and nationally. As a comparison group, we have chosen: Acadia University, Bishop's University, Brandon University, Mount Allison University, Mount Saint Vincent University, Nipissing University, Saint Francis Xavier University, Saint Mary's University and Université de Moncton. The individual universities have not been identified in the following tables and charts. The total research funding was taken from Table 3.1 from the annual CAUBO reports³. The number of faculty at each university was taken from the Statistics Canada, University College Academic Staff Survey⁴.

Table 2.1 and Chart 2.1 show the average funding per faculty member between 2008-10 and 2011-13. Overall, the funding for the group is on the decline. While from 2008 to 2012, the total research funding at Canadian universities increased by 11% from \$6.1 billion to over \$6.7 billion, the total research funding of the comparison group dropped from \$57 million to \$47 million resulting in a drop from 0.9% of the total research funding in 2008 to 0.7% in 2012. This is an alarming trend for not only CBU but all of the smaller universities.

Table 2.1. Total Research Funding per Faculty Member^a

University	2008-2010	2009-2011	2010-2012	2011-2013 ^b
CBU	\$23,878	\$20,902	\$21,832	\$22,528
A	\$8,513	\$7,596	\$8,602	
B	\$12,564	\$10,624	\$10,092	
C	\$23,387	\$23,375	\$22,331	
D	\$24,601	\$24,705	\$26,506	
E	\$17,069	\$12,804	\$13,588	
F	\$28,051	\$26,356	\$28,737	
G	\$25,699	\$25,211	\$23,020	
H	\$38,241	\$34,455	\$32,840	
I	\$41,653	\$33,965	\$31,485	
Average	\$26,361	\$23,824	\$23,331	
CBU Rank	6	7	7	

^a Average over the three year period indicated

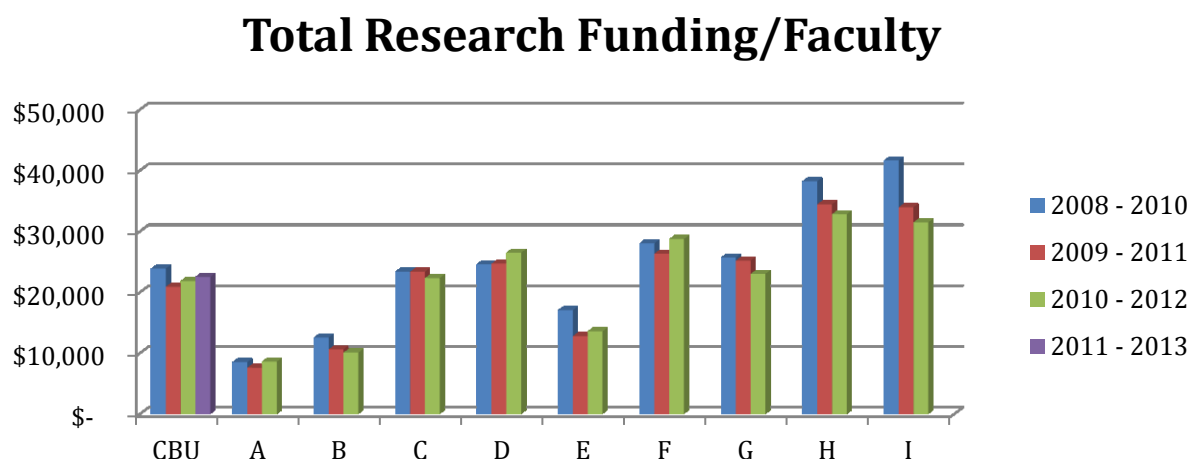
^b 2012-13 Data for other universities will not be available until June 2014

In addition to looking at the total research funding, it is also informative to analyze the distribution of CBU research funding. Table 2.2 shows the breakdown of CBU research funding by source.

³ There was a change in reporting practice for CBU in 2011. To enable an accurate comparison, the values for 2008 – 2010 were adjusted to use the current reporting practice. The unmodified values are reported in the appendix.

⁴ The survey ended in 2010 and the data for 2011 & 2012 were assumed to be the same as the 2010 data. This may lead to slight inaccuracies in the comparisons. It will be of more concern in future years.

Chart 2.1 Total Research Funding per Faculty Member

Table 2.2 CBU Research Funding^a

Funding Source	2008-2010	2009-2011	2010-2012	2011-2013 ^b
SSHRC	\$107,000	\$86,000	\$198,000	\$173,000
Health Canada	\$6,000	\$6,000	\$6,000	
NSERC	\$203,000	\$184,000	\$134,000	\$173,000
CIHR	\$12,000	\$14,000	\$13,000	\$14,000
CFI	\$156,000	\$32,000	\$183,000	\$289,000
CRC	\$490,000	\$457,000	\$419,000	\$350,000
Other Federal	\$471,000	\$475,000	\$482,000	\$462,000
Nova Scotia	\$291,000	\$196,000	\$321,000	\$340,000
Not-for-Profit	\$140,000	\$159,000	\$219,000	\$126,000
Business		\$63,000	\$246,000	\$395,000
Miscellaneous	\$985,000	\$900,000	\$465,000	\$450,000
Total	\$2,862,000	\$2,571,000	\$2,685,000	\$2,771,000

^a Average over the three year period indicated

From 2008–2013, the Tri-Agency funding has shown a slight increase from \$322,000 to \$360,000. As expected the bulk of this is NSERC and SSHRC funding. However, there has been an important change in distribution of NSERC and SSHRC funding. In 2008-10, NSERC funding was almost double SSHRC funding, while in 2011-13, they are equal. There has been a significant increase in CFI funding from 2008-10 to 2011-13. This is due in part to new faculty hires as well as a concerted effort by the ORGS to use our CFI allocation. While the next couple of years will see execution of several current CFI projects, the number of new CFI projects will decline in the next five years as our allocation will be completely depleted. The CRC funding has declined from \$490,000 in 2008-10 to \$350,000 in 2011-13. This is due to a reduction of CBU's chair allocation from 5 to 4 (in 2008) to 3 (2010)⁵. This reduction is directly due to a reduction in tri-agency funding (while CBU's Tri-Agency actually increased, it is a smaller percentage of the total Tri-Agency funding). This contribution will stabilize at \$300,000 over the next couple of years as the CBU allocation for CRC should remain at 3 Tier II chairs. The funding received from the NS

⁵ Total of Tier I and Tier II chairs with Tier I counting as two Tier II chairs.

government through the NSRIT increased from \$291,000 in 2008-10 to \$340,000 in 2011-13. This is tied directly to CFI funding and so will also decrease in the next five years.

Business funding for research has increased from nil in 2008-10 to \$395,000 in 2011-13. This is due in large part to the addition of a full-time Industry Liaison Officer to the ORGS. Research funding from other federal sources has remained steady around \$475,000. Miscellaneous research funding decreased over the last 4 years from \$985,000 to \$450,000.

Overall from the period 2008 to 2013, the total research funding has been stable around \$2.6 – 2.8 million.

3. Highly Qualified Personnel (HQP) Training

Data on HQP were obtained primarily through the survey of faculty for the period April 1, 2012 to March 31, 2013. CBU has a limited number of graduate programs, however 18 faculty reported holding adjunct appointments at other universities giving them the opportunity to supervise or co-supervise graduate students.

Table 3.1. Research Assistants Supervised and Co-Supervised

Research Assistants	Supervision	Co-Supervision
Undergraduates	123	31
Graduates	40	25
Post-doctoral Fellows	2	2
Technicians	7	1
Other	15	7

Table 3.2. Mentoring Activities

Activity	Number
Mentoring Colleague	24
CBU Students	135
Other Canadian University Students	31
International (non-CBU) Students	8

4. Industry Engagement

Industry engagement continues to grow with collaborative projects taking place across a number of academic disciplines. Industry partners embrace not only the prospect of working with our faculty but they have welcomed the opportunity to have students become involved in their research and development projects.

Table 4.1. Industry Engagement Activities

Activity	Number
NRC-IRAP Projects	2
Tri-Agency Industry Partnership Grants	2
Provincial Funded Industry Projects	3
ACOA AIF Projects (subcontract)	1
Industry Workshops	8

To form new partnerships, during the last year, ORGS focused on hosting several workshops designed to be of interest to students, faculty and members of the local business community. By hosting a diverse mix of participants at workshops such as *Creating an Elevator Pitch*, *Intellectual Property 101*, *How to Leverage Funding*, etc., there were interactions between individuals who may not otherwise have met –at almost every event, at least one new collaboration was born.

Additionally, several projects that started as small investigations have blossomed into long term collaborations spanning several years. One example is the relationship that has grown between Louisbourg Seafoods and CBU's Bras d'Or Institute. Through access to various funding programs and industry sponsored projects CBU and Louisbourg Seafoods have been able to work together to address several company specific issues which have had direct impact on the production of and products offered by the company.

"Our experience shows that CBU is very business-friendly, flexible, and approachable and is willing to work with the community to bring prosperity to the region. When we look ahead to our future as a company, we feel our greatest opportunities lie in working with and engaging the expertise of CBU."
Adam Mugridge
Louisbourg Seafoods

5. Knowledge Creation and Mobilization

Knowledge Creation and Mobilization activities were captured through the faculty survey and are reported for the period April 1, 2012 to March 31, 2013.

Table 5.1. Knowledge Creation and Mobilization

Dissemination Method	Number
Academic Articles	96
Books	14
Chapters	48
Introduction/Preface	9
Conference Presentations	231
Conference Organization	37
Journal Editor	30
Articles Reviewed	195
Community Events	120
Newspaper articles	39
Radio	96
Television	29
Expert advice	61
Policy	23
Blogs	56
Videos	31
Websites	27

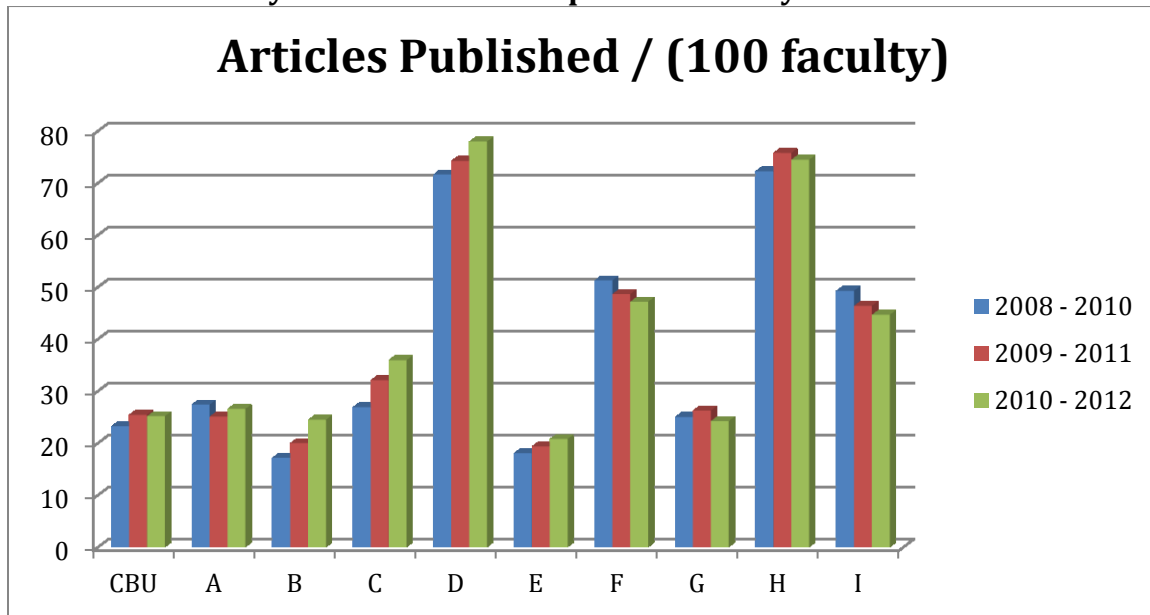
Chart 5.1 Scholarly Articles Published per 100 Faculty

Chart 5.1 shows the scholarly articles published per 100 faculty member per year for the comparison group. These data were obtained from *Web of Knowledge* and are for calendar year as opposed to fiscal year used for the rest of the data in this report. *Web of Knowledge* databases do not capture all publications. Chart 5.1 shows that while the scholarly articles published annually increased slightly since 2008, it still lags significantly behind most of the comparison groups. CBU is ranked 7th or 8th and is well behind the top five. To move into the top five requires an approximate doubling of the annual scholarly articles.

6. Research Collaborations - Internal, regional (Atlantic), national and/or international

Table 6.1. Collaborations

Collaboration	Number
Internal to CBU	68
With Community	39
With Other University	92
With Industry	17
With Nongovernmental Organization	27
With Government Agency	30

IDRC Partnership Lead by CBU

“One of the joys of working on international research projects is that they invariably draw in people from different academic, not to mention cultural, backgrounds”, says Dr. Dana Mount who along with colleagues Dr. Richard Watuwa and Principal Investigator Dr. Thomas Bouman, are collaborating with colleagues from Obafemi Awolowo University, Osun State University and the University of Manitoba on the Nigeria-Canada Underutilized Indigenous Vegetable Project. The project has employed several graduate students with ranging expertise in community economic development, gender analysis, credit unions, biology, agricultural extension, and economics.

The project now in its third year, received funding from the IDRC, and the Government of Canada, provided through DFATD. The goal of the project is to provide tools for better production, processing, and marketing of these locally important vegetables. This will enhance food security, economic growth, and conservation of valuable vegetable species, all of which will help empower rural women in Nigeria. According to Mount, the project has already had some very positive impacts for the women it exists to support. “Members of our gender team, who are working closely with the farmers, report that many of the taboos around indigenous vegetables have been lifted and they are gaining in popularity in the communities we are working. In addition, savings education with the women farmers seems to have been very popular, indicating a growing dialogue about income control and savings.”

7. Research Environment

2012-13 saw many changes in the research environment at CBU. Completion of CFI/NSRIT projects awarded in FYE 2011 saw new research laboratories open in chemistry and biology. In addition, CFI/NSRIT awards for a new psychology laboratory was granted in FYE 2012, a CFI/NSRIT project for upgrading recording and performance space in the CCBS was awarded in FYE 2013 and CFI/NSRIT projects for the creation of a multimedia laboratory in Folklore and Religious Studies, the creation of a new research centre for the determination of healthy communities and for a performance space for research in culture and communities were funded in FYE 2014. All of these are at various stages of completion and will have significant impacts on the research environment in coming years.

Two Tier I CRCs completed their terms, and successful searches/nominations for three new Tier II CRCs were completed in FYE 2013. All three started their chair terms on July 1, 2013. In addition, FYE 2013 saw the successful search for two IRCs in the VC. Both IRCs started their appointments in FYE 2013.

Chart 7.1. RE/AC submissions

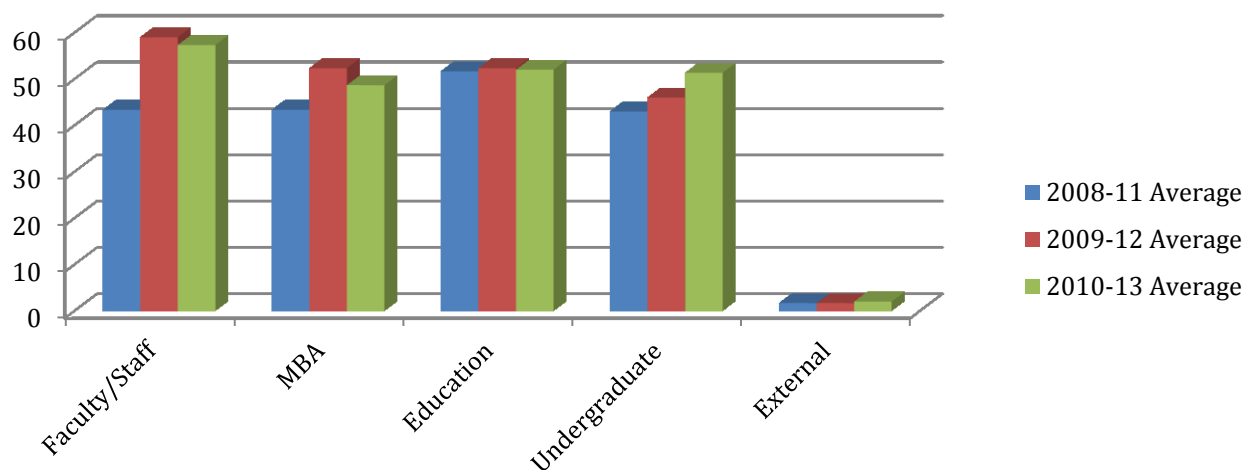


Chart 7.1 shows the Research Ethics Board and Animal Care Committee submissions over the period of 2008-11 to 2010-13. The submissions by faculty have increased from just over 40 to near 60 per year, those from the MBA students increased from approximately 40 to 50 per year,

submissions from the post-degree Education diploma and certificates have been stable around 50 and those from undergraduate projects have increased from approximately 40 to 50 per year. All of this is reflective of increase in research activity. It is also worth noting that annually the REB conducts one to three reviews for external research projects.

8. List of Abbreviations

AC	Animal Care
CCBS	Centre for Cape Breton Studies
CFI	Canada Foundation for Innovation
CIHR	Canadian Institutes of Health Research
CRC	Canada Research Chair
DFATD	Department of Foreign Affairs, Trade and Development Canada
FYE	Fiscal Year Ending
HQP	Highly Qualified Personnel
IDRC	International Development Research Centre
IRC	Industrial Research Chair
NSERC	Natural Sciences and Engineering Research Council
NSRIT	Nova Scotia Research and Innovation Trust
ORGS	Office of Research & Graduate Studies
RE	Research Ethics
SSHRC	Social Sciences and Humanities Research Council
VC	Verschuren Centre

Appendix: Revised Research Funding

The tables and charts presented in Section 2 are presented in this appendix for the unmodified research funding for 2008 – 2010 based on the original reporting to CAUBO.

Table A.1. Total Research Funding per Faculty Member^a

University	2008-2010	2009-2011	2010-2012	2011-2013 ^b
CBU	\$36,609	\$28,715	\$25,816	\$22,528
A	\$8,513	\$7,596	\$8,602	
B	\$12,564	\$10,624	\$10,092	
C	\$23,387	\$23,375	\$22,331	
D	\$24,601	\$24,705	\$26,506	
E	\$17,069	\$12,804	\$13,588	
F	\$28,051	\$26,356	\$28,737	
G	\$25,699	\$25,211	\$23,020	
H	\$38,241	\$34,455	\$32,840	
I	\$41,653	\$33,965	\$31,485	
Average	\$27,157	\$24,325	\$23,585	
CBU Rank	3	3	5	

^a Average over the three year period indicated

^b 2012/13 Data for other universities will not be available until June 2014

Table A.2. CBU Research Funding^a

Funding Source	2008-2010	2009-2011	2010-2012	2011-2013 ^b
SSHRC	\$107,000	\$86,000	\$198,000	\$173,000
Health Canada	\$6,000	\$6,000	\$6,000	
NSERC	\$203,000	\$184,000	\$134,000	\$173,000
CIHR	\$12,000	\$14,000	\$13,000	\$14,000
CFI	\$156,000	\$32,000	\$183,000	\$289,000
CRC	\$490,000	\$457,000	\$419,000	\$350,000
Other Federal	\$1,992,000	\$1,436,000	\$972,000	\$462,000
Nova Scotia	\$291,000	\$196,000	\$321,000	\$340,000
Not-for-Profit	\$140,000	\$159,000	\$219,000	\$126,000
Business		\$63,000	\$246,000	\$395,000
Miscellaneous	\$985,000	\$900,000	\$465,000	\$450,000
Total	\$4,383,000	\$3,532,000	\$3,175,000	\$2,771,000

^a Average over the three year period indicated