

**Annual Report on Research Activities at Saint Francis Xavier
University**

2014-2015

**Prepared for the Nova Scotia
Ministry of Advanced Labour & Education**

Annual Report on Research Activities at Saint Francis Xavier University – 2014-2015

**Compiled by Dr. Richard Isnor, Associate Vice President Research and Graduate Studies,
January, 2016**

This report was prepared to correspond with the template agreed upon by universities in Nova Scotia and the NS Department of Labour & Advanced Education, as of September of 2013. It is intended to report each January on the research activity of the previous year. For some areas, the reporting period is according to fiscal year (April 1, 2014 to March 31, 2015; e.g. funding statistics). In other areas, the reporting is according to academic year (September 1, 2014 to August 31, 2015; e.g. enrolments) or calendar year 2014 (e.g. publications). **Note:** This report contains data from years later than the reporting period in some instances, since it was prepared in early 2016 and later year's data was available.

Introduction

Research is fundamental to St. Francis Xavier's institutional role as a university and is recognized as one of the primary functions of the university's faculty. Research both informs and is intertwined with the university's role as a post-secondary educational institution, and is an essential component of the university's commitment to service.

The *Major Research Objectives* of Saint Francis Xavier University's 2012-17 Strategic Research Plan (SRP) are:

- To build and enhance an environment that supports scholarly research in its many different forms, and meaningfully engages students in research experience;
- To facilitate synergy and increase research collaboration by building and supporting research clusters that reflect research strengths and areas of growth;
- To increase the training opportunities and skills development of highly qualified personnel by ensuring opportunities for productive research involvement of undergraduate and graduate students, and post-doctoral fellows;
- To develop research and disseminate knowledge at the regional, national and international levels;
- To strengthen the physical and technological infrastructure that supports high quality research by accessing funding opportunities;
- To support faculty applying to external research granting agencies, and continue to develop services and infrastructure that supports knowledge transfer and exchange; and
- To monitor institutional progress in advancing the research profile of the University and celebrate the research achievements of faculty and students.

The six *Major Research Themes or Research Clusters* of the St. Francis Xavier SRP are:

- Culture and Human Development
- Energy, Natural Resources and the Environment
- Human Health and Wellness
- Humanities
- Leadership and Organizational Development
- Public Policy, Governance and Social Justice

Research Activities

1. 2014 Research Highlights

a) National honour for earth sciences awarded to Dr. Brendan Murphy. StFX earth sciences professor Dr. Brendan Murphy was named the 2014 winner of the J. Willis Ambrose Medal from the Geological Association of Canada (GAC). The medal is named after the first GAC president, J. Willis Ambrose, and is awarded to an individual for sustained dedicated service to the Canadian earth science community. The award citation noted that during his more than 30 years at StFX, Dr. Brendan Murphy has been a tireless advocate on behalf of the entire earth science family, “His philosophy has been to never turn down an opportunity to lend a hand, and that success is found in facilitating the achievements of others. It is this vision of our earth science community as a family that has served Canadian geoscience so well, and makes clear why Brendan is such a deserving recipient of the Ambrose Medal. As a tireless advocate of lively but always friendly scientific debate, Brendan has done much to ensure the mutual advancement of ideas.” ...“Perhaps the most striking aspect of Brendan’s contributions to the Canadian Earth Science community is that despite his efforts on behalf of the broader community and the huge amount of time and energy that he has poured into volunteerism, he has also managed to become an internationally recognized elite scientist.” Dr. Brendan Murphy is recognized as one Canada’s premier tectonists. He has published more than 200 papers in refereed journals; is a leading expert on the Appalachian orogen of eastern North America and its European counterpart, the Variscan orogen; and is one of the world’s acknowledged authorities on supercontinents and supercontinent cycles.

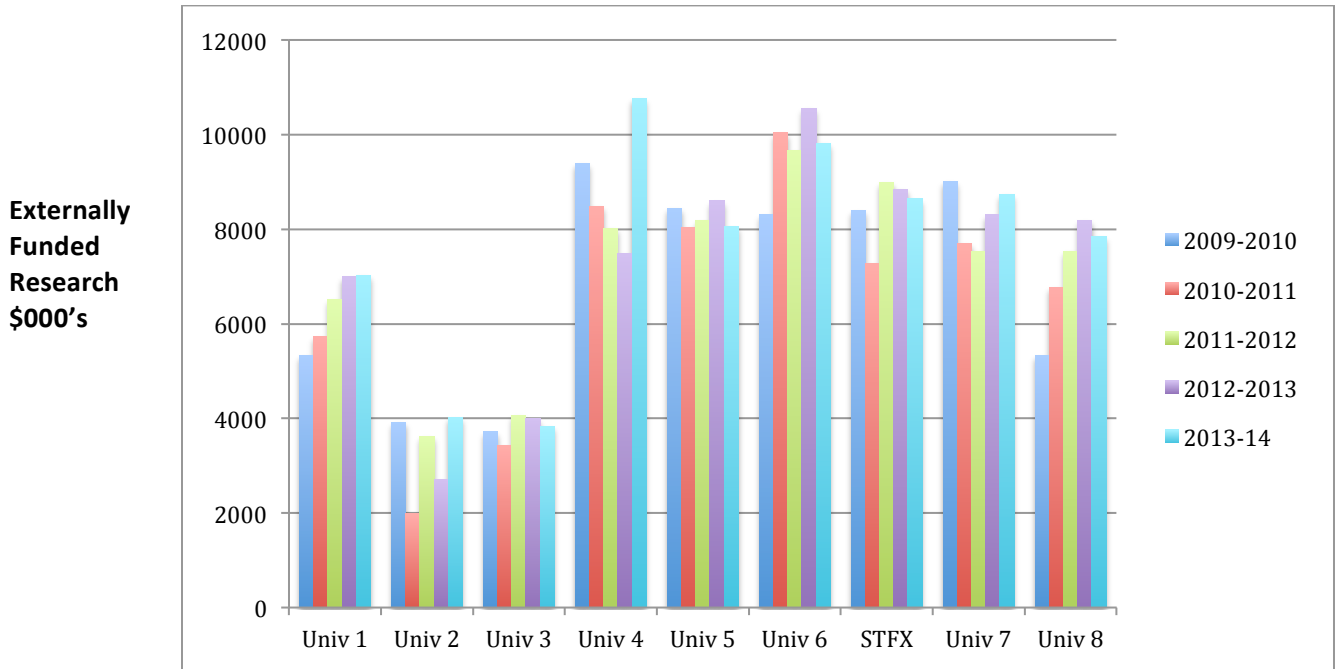
b) StFX political science professor wins SAGE Prize for best article on international affairs. Canada’s flagship scholarly journal on international relations, *International Journal*, has awarded the 2014 SAGE Prize in International Scholarship to StFX political science professor Dr. Youngwon Cho. The SAGE Prize, awarded to the author of the best article on international affairs in the 2014 volume of *International Journal*, was given to Dr. Cho for his article, “*Method to the Madness of Chairman Kim: The Instrumental Rationality of North Korea’s Pursuit of Nuclear Weapons.*” In the article, Dr. Cho challenges the widespread perception of North Korea as an irrational actor, whose security concerns are seen as irrational, paranoiac, and illegitimate; he explains North Korea’s nuclear quest as a fundamentally rational, structurally driven strategy to deal with rational security concerns; and he argues that, in light of North Korea’s inability to address its security anxiety through either internal balancing by conventional arms buildup or external balancing by alliance formation, nuclearization offers Pyongyang a logical and inexpensive route to restore the military balance in the Korean peninsula and ensure its own

survival. *International Journal* is Canada's pre-eminent scholarly journal of global policy analysis, combining the insights of history, political science, and economics with anthropology and other social sciences to advance research and dialogue on issues of global significance. It was established in 1946 and is published by the Canadian International Council and the Bill Graham Centre for Contemporary International History.

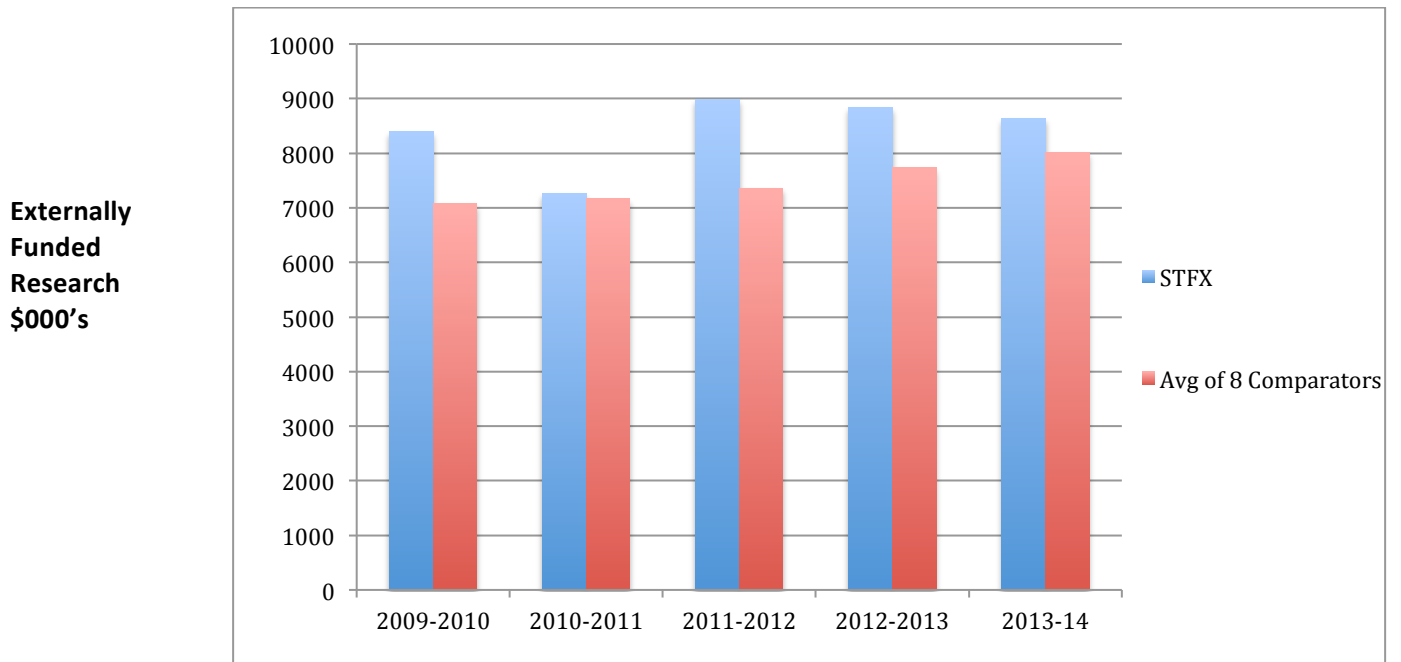
c) Earth sciences professor recognized as scientific leader in Canada. StFX earth sciences professor Dr. David Risk was named in 2014 as one of The Royal Society of Canada inaugural members of The College of New Scholars, Artists and Scientists. The 91 scholars named to the College, including Dr. Risk, represent the emerging generation of scholarly, scientific and artistic leadership in Canada. Together, the members of the College will address issues of particular concern to new scholars, artists and scientists, for the advancement of understanding and the benefit of society, taking advantage of the interdisciplinary approaches fostered by the establishment of the College. Dr. Risk is recognized for making significant contributions to the understanding of how greenhouse gases, such as carbon dioxide, are released from soils and how the sequestration of greenhouse gases can be monitored. Applications of his research have been used around the world and his research collaborations to date have involved individuals in four continents.

2. Research Funding

a) **Total externally sponsored research at StFX relative to eight “comparator” Canadian Universities (2009-2014).** Comparator universities were selected based upon comparable levels of total external research funding in 2010 and/or regional considerations.

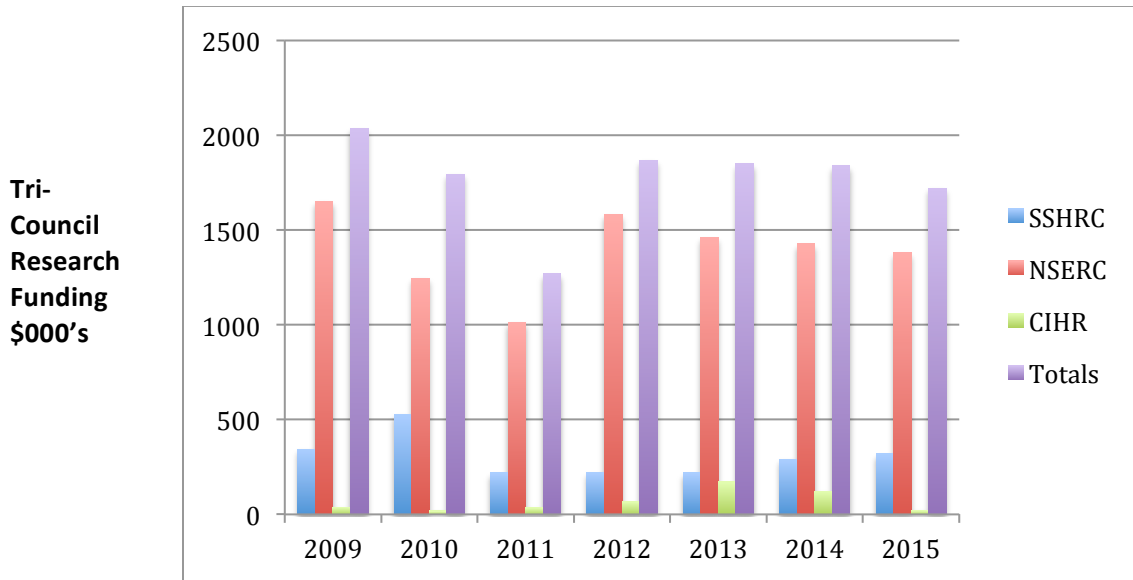


Source: CAUBO



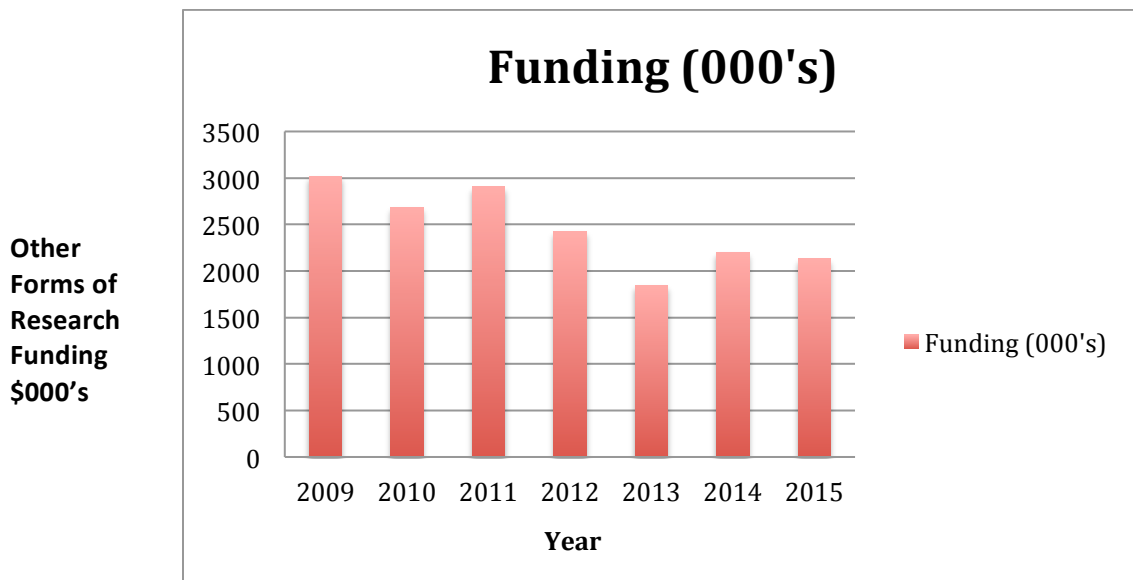
Source: CAUBO

b) Trends in Federal Tri-Council Funding at StFX (all values are 000's)



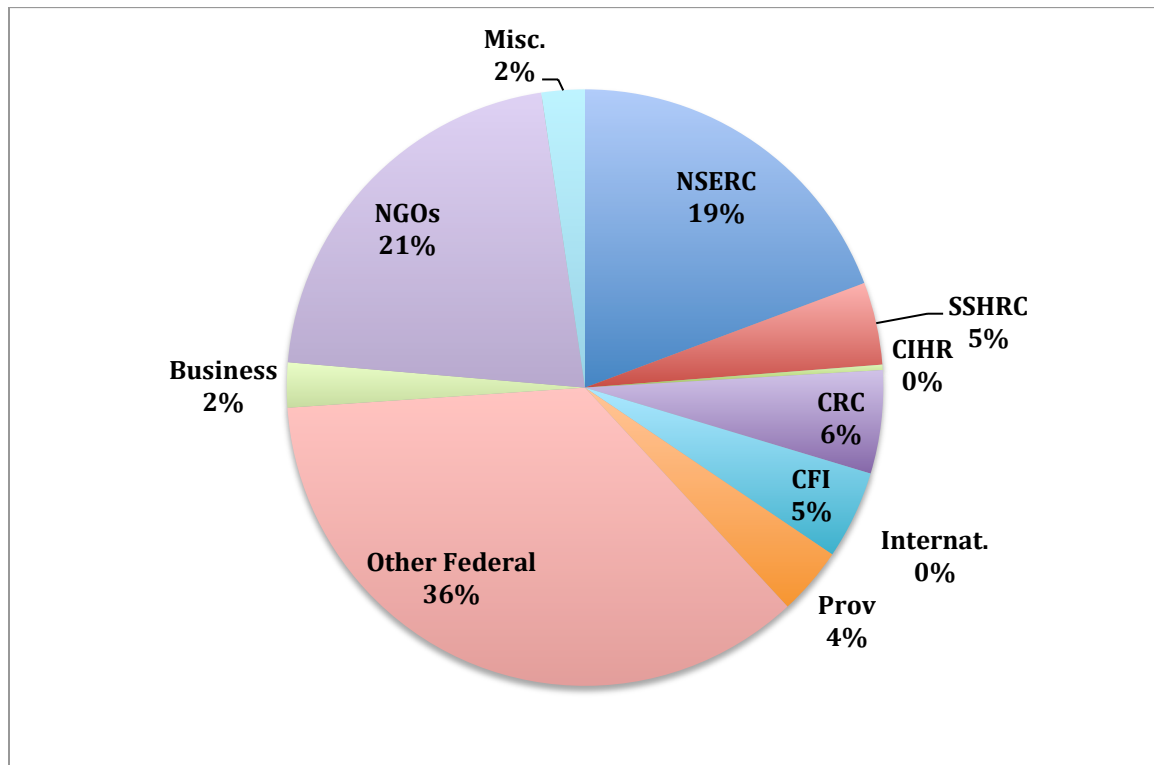
Source: CAUBO & StFX (note: does not include Canada Research Chairs, Networks of Centres of Excellence, Canada Foundation for Innovation or Federal Research Support Funding).

c) Trends in Grant/Contract Funding from Other Sources Funding at StFX (e.g. Industry, NGO, Provincial, Government Depts) (all values are 000's)



Source: CAUBO (note: does not include other sources of federal research funding)

d) Key Sources of External Research Funding at STFX (2014-15)



Source: StFX submission to CAUBO

e) Research Universities of the Year (RUY) rankings: Research InfoSource

(<http://www.researchinfosource.com/>) RUY rankings rate the top 50 Universities in Canada. RUY rankings take into account both financial input and research output and impact/quality measures. The financial input measures are: total sponsored research income and research intensity. The research output and impact/quality measures are: total number of publications, publication intensity and publication impact.

Year	2009	2010	2011	2012	2013	2014
StFX Rank*	43	47	49	46	45	47

* - Rank for Externally Sponsored Research Income

Research Universities of the Year (RUY): STFX Rankings for 2013 & 2014

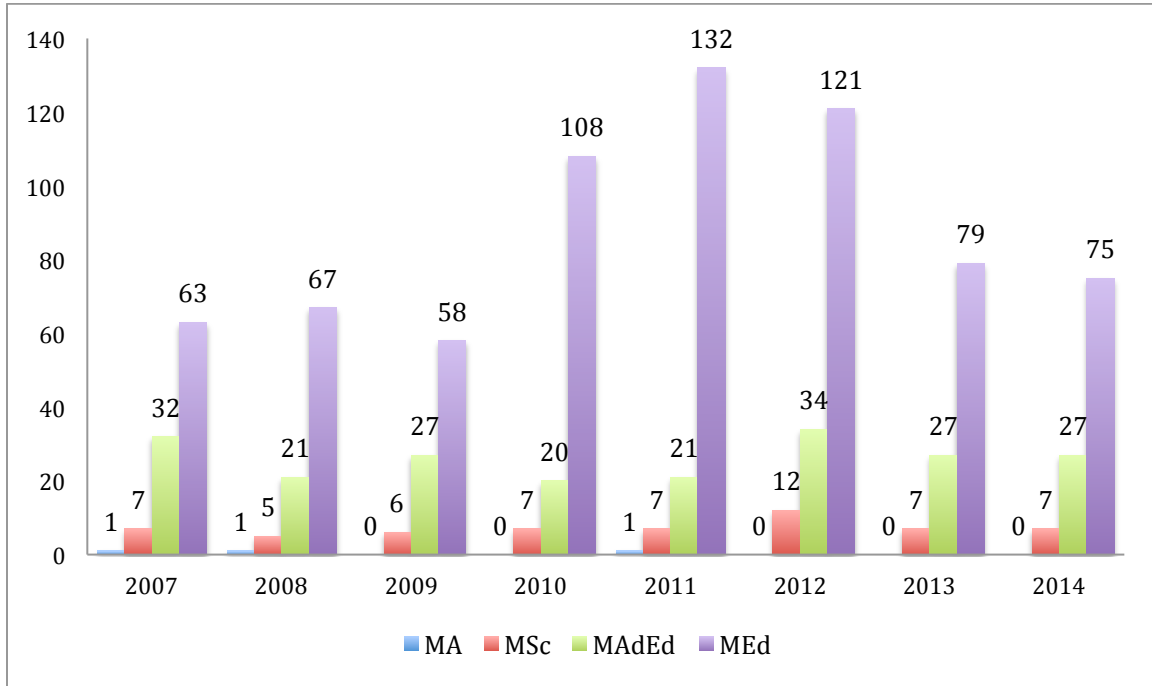
	2013	2014
Externally sponsored research income	45	47
Research intensity (externally sponsored research \$/faculty member)	44	43
# of publications	45	45
Publication intensity (publications/faculty member)	46	45
Publication impact	44	21
Overall	46	42

Source: Research InfoSource

3. Highly Qualified Personnel (HQP) Training

StFX is primarily focused on undergraduate research training across its four faculties of Science, Arts, Business, and Education. It also offers 8 graduate studies programs, including 1 joint PhD program (in Education established in 2011 jointly with Acadia and MSVU), as well as Masters of Education & Adult Education, Masters of Science in Biology, Chemistry, Earth Sciences, Computer Science; and Masters of Arts in Celtic Studies.

Number of Graduates from StFX Post-Graduate Programs



- In 2014-15, STFX students were awarded 13 NSERC Undergraduate Student Research awards, as well as four NS Health Research Foundation Scotia Scholar awards. Seven Irving Research Mentorship awards at a value of \$6000 were awarded to StFX students and the University Council for Research provided five awards of \$4500 to StFX students. The University also awarded ACEnet Research Fellowships (\$5000 each) to three StFX students in 2014-15.
- Service Learning (SL) is an important element of the StFX training and education experience. Course based SL works with approximately 100 community groups annually, providing approximately 850 service experiences to 900 students. SL courses are offered in over half of the departments at StFX.

2014 Highlights

StFX PhD student demonstrates greatest promise for health research in province. A StFX PhD student, Lawrence Nyika, was honoured with the prestigious Quest award from the Nova Scotia Health Research Foundation (NSHRF). The Quest award honours a graduate student who

demonstrates the greatest promise for health research in the province. This is the first time a student from a university outside of Halifax Regional Municipality has been selected as a winner. Mr. Nyika is taking his PhD in educational studies at StFX University as part of the program jointly administered by StFX, Acadia University and Mount Saint Vincent University. He was a teacher and medical laboratory technologist in Zimbabwe before coming to StFX. His doctoral research is studying the multiple perspectives of various stakeholders in health promoting schools including students, parents, support staff, and health and education professionals, in particular he is exploring the health beliefs and practices of different ethnic groups in health promoting schools in Nova Scotia.

M.Ed. graduate earns national honorable mention for her thesis work. Alanna Jamieson, a high school English teacher who holds a BA, a B.Ed., and now a M.Ed. from StFX, was singled out for her excellent scholarship completed while a student at StFX. Ms. Jamieson, who completed her M.Ed. thesis in 2013, learned on September 23, 2014 that she'd received honorable mention from the Language and Literacy Researchers of Canada (LLRC), in their annual Master's Thesis Award. LLRC is a national organization with a focus on literacy and literacy education across Canada. Ms. Jamieson completed her thesis, *Which Boys and Which Girls? Seeing Beyond the Gender Gap in Literacy* with thesis supervisor Dr. Anne Murray-Orr in the StFX Faculty of Education. *Which Boys and Which Girls? Seeing Beyond the Gender Gap in Literacy* examines how students' backgrounds, perceptions, and relationships impact their reading behaviours. As a teacher researcher, Ms. Jamieson endeavoured to identify who was struggling in her class, and then looked at both why they were struggling as well as possible solutions. She also explored the use of challenging texts with the students, to observe how they interact with, benefit from, and struggle with such texts. The study focused on 18 Grade 11 students in an English language arts classroom as they embarked upon a novel study of Dickens's classic *Oliver Twist*. The major criteria for the LLRC award are excellence in research, creative and thoughtful representation of data and significance of the work for language and literacy education.

Biology student wins best oral presentation award at national conference. Third year StFX biology honours student Laryssa Halat was awarded the Lionel Cinq-Mars award for the best oral presentation at the 50th Annual Meeting of Canadian Botanical Association (CBA), held at the Montreal Botanical Garden from June 15-19, 2014. Ms. Halat and her colleague, aquatics resources honours student Sara Gitto, competed for the award against a field of undergraduate and graduate students from universities across Canada. Ms. Halat and Ms. Gitto both conducted research on rockweed (*Ascophyllum nodosum*), which is a commercially harvested brown seaweed, under the supervision of biology faculty member Dr. David Garbary.

Psychology student wins best criminal justice system poster prize at Canadian Psychology Association meeting. StFX psychology honours student Catherine Gallagher was awarded the prize for best undergraduate Criminal Justice Section poster at the Canadian Psychology Association (CPA) convention in Vancouver, BC from June 4-6, 2014. Ms. Gallagher's research was conducted with women offenders under the supervision of StFX psychology professor Dr. Margo Watt.

StFX psychology student wins Best Research Poster at national meeting. Psychology honours student Brianna Boyle was the winner of the Research Poster Award at the 4th annual convention of the Canadian Association of Cognitive and Behavioural Therapies (CABCT), held in Halifax May 24-26, 2014. Ms. Boyle presented some of the findings of her honours thesis

project, "*Anxiety sensitivity as a predictor of mental and physical health in undergraduates.*" A Scotia Scholar Award from the Nova Scotia Health Research Foundation (NSHRF) funded the research, which was supervised by StFX psychology professor Dr. Margo C. Watt.

StFX biology students sweep top spots at Science Atlantic Conference. Six StFX biology students presented their research at Science Atlantic's Aquaculture & Fisheries and Biology Conference held in Moncton, NB March 6-8, 2014 and, in competition with students from 12 Atlantic universities, the StFX delegation brought home four prizes; and three students each won the top prize in their respective categories. Laryssa Halat, a biology honours student supervised by Drs. Moira Galway and David Garbary, won both 1st prize, out of 25 oral presentations in the undergraduate oral presentation competition of the Biology Conference, as well as the Science Atlantic Science Communication Award, a "people's choice" balloted competition. Her presentation was titled *Skin shedding in a marine plant*. Kieran Murphy, a MSc candidate supervised by Drs. Russell Wyeth and Cory Bishop, won the 1st place prize for the best graduate student oral presentation at the Aquaculture and Fisheries Conference for the presentation, *Keep it fresh and stay cool: combatting *Ciona intestinalis* biofouling in aquaculture*. Sarah Van de Reep, a biology honours student supervised by Dr. David Garbary won the 1st place prize for best undergraduate presentation in the Aquaculture and Fisheries Conference, for her presentation, *The "magic" of *Ascophyllum nodosum* extracts: an endosymbiotic hypothesis*. Also presenting their research at the conference were Erika Kinach (biology honours; research conducted on exchange at the University of Bangor in Wales); Sara Gitto (biology honours; supervised by Dr. David Garbary); and Candace Nickerson (Aquatic Resources program; supervised by Dr. Jim Williams).

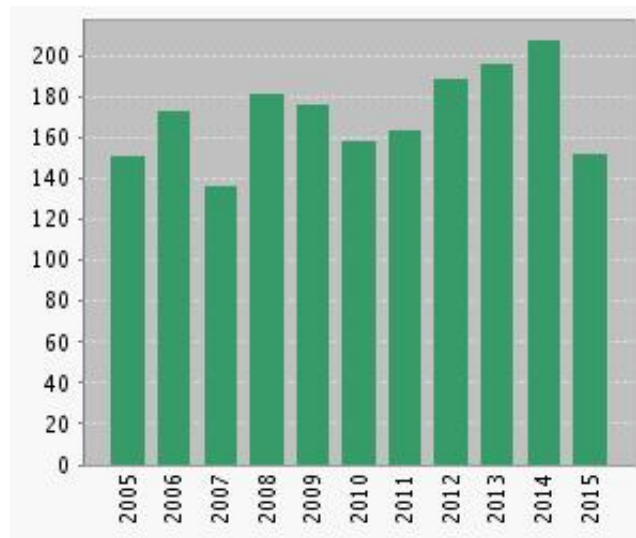
4. Industry Engagement (Springboard Atlantic Inc. performance indicators) 2014-15

	2014-15
1. Industry Engagement Activity	18
IRAP Projects (#)	3
Total IRAP NMA Projects: (#)	3
IRAP DTAPP Projects (#)	-
Tri-Council Industry Partnerships (#)	4
Interaction/Connect - #	-
Engage - #	3
CU I2I - #	-
CRD - #	-
I2I – Phase 2a/2b - #	-
Industry Partnership Scholarships (IPS, IRDF, MITACS) - #	-
Industrial Partnerships (SNG, SPG) - #	-
I-USRA - #	-
Industrial Research Chair, Canada Research Chairs (with industry) - #	-
CIHR POP Phase II - #	-
SSHRC Partnerships (with industry) - #	-
Other	1
Provincial Funding programs (Industry Project related) - #	5
CFI (for Colleges or Universities) - #	1
ACOA AIF Projects (#)	-
Number of AIF Projects Leading (Member): (#)	-
Number of AIF Projects as Subcontract: (#)	-
Other Federally funded Industry (#)	-
Other R&D Contracts (no government leveraged funding) - (#)	5
Industry R&D Contracts (#)	1
R&D Contracts (#)	-
Leases - Lab or incubation (#)	-
Government R&D contracts (Where Gov. is the client) - (#)	4
	-
2. Workshops with Industry (#)	1
3. New Spin Off or Startup Companies: (#)	1
Spin Off or Startup with Institution IP Assigned - #	-
Spin Off or Startup from the Institution w/o IP Assignment - #	1
	-
4. Technology and Knowledge Transfer (#)	4
Assignment of IP rights to a Corporate Entity - #	2
Option (License) Agreements - #	-
Licenses - #	-
Grant of Rights - #	-
Material Transfer Agreements (MTAs) with industry and/or must transfer IP - #	2
Other IP Transfer Agreements - #	-

5. Total Research Expenses (Annual) \$	5,946,396
Disclosures	-
Assignments (faculty/staff/student IP assigned to Institution)	1
Patents Filed	1
Patents Issued	-
Total Industry Sponsored R&D \$	167,000
Tech Transfer Revenues, \$	5,036
Total # of companies engaged (annual)	-
Social Innovation projects: #	-
Number of Internal/Academic Workshops: (#)	4
Federal Funding, Tri-Council, CFI, IRAP, etc \$	863,619
Provincial Funding \$	230,076
ACOA \$	-
Inter Member Collaborations (#)	-
Number of Industry Events Attended (#)	6
Supporting start ups (#) - No Institution IP involved	1

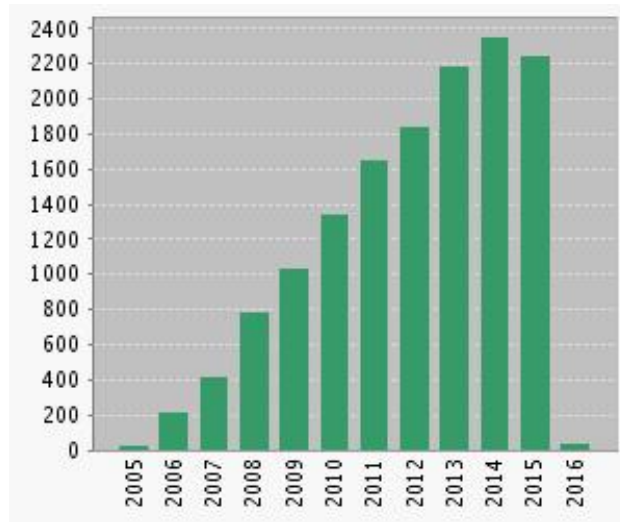
5. Knowledge Creation and Mobilization highlights- (includes publications)

Publication trends by authors from StFX as tracked by Web of Knowledge (total number of all publications)



Source: *Web of Knowledge Database*

Trends in number of citations of publications produced by StFX authors as tracked by Web of Knowledge



Source: *Web of Knowledge Database*

StFX Publications Tracked by Web of Knowledge, Scholarly Output by Type

	Article	Book Review	Editorial Material	Proceedings paper	Meeting Abstract	Review
2010	117	14	10	7	5	2
2011	127	13	5	8	2	2
2012	132	25	9	6	2	4
2013	129	18	17	8	12	5
2014	143	19	10	2	4	2
2015	112	23	9	2	5	2

Source: *Web of Knowledge Database*

StFX Publications Citation Trends - Tracked by Web of Knowledge (2005-2015)

Results found:	1893
Sum of the Times Cited:	14167
Sum of Times Cited without self-citations:	12666
Citing Articles:	11164
Citing Articles without self-citations:	10571
Average Citations per Item:	7.48
h-index:	47

Source: *Web of Knowledge Database*

2014 Highlights:

StFX art history professor's work commended for outstanding scholarship. StFX art history professor Dr. Sharon Gregory's book, *Vasari and the Renaissance Print*, was a finalist and received a special commendation for its outstanding scholarship as part of the biennial book award for the Society for Renaissance Studies (SRS). Dr. Gregory's book was one of only three books considered for the SRS book prize and received a special commendation. The SRS is an organization of academics that work on aspects of the Renaissance in all humanities disciplines. It is based in the U.K. but includes many European and North American scholars. Professor Gregory's book was singled out by all three judges because of its comprehensive nature and painstaking research in making available for a wide readership all the prints associated with Giorgio Vasari, and for providing a fascinating commentary that explains why they were so central to his thinking and artistic practices. In *Vasari and the Renaissance Print*, Dr. Gregory challenged the long-held view that the first art historian, Renaissance artist Giorgio Vasari, author of the *Lives of the Artists*, downplayed the importance of the then-new graphic print media of engravings and woodcuts. In this study, she shows that, contrary to common opinion, prints thoroughly pervade Vasari's history of art, just as they pervade his own career as an artist.

StFX English professor's scholarly work draws favorable reviews from leading publication. The Times Literary Supplement in its July 25, 2014 issue published an article entitled *Prodigal Prose* that reviewed StFX English professor Dr. Joseph Khoury's "delightful edition" of Barnabe Riche's *The Adventure of Brusanus, Prince of Hungaria*, remarking on his "excellent introductory discussion of plot." "Khoury's decision to edit Brusanus was prompted by a sense of the work's lying behind Shakespeare's *Measure for Measure*," writes reviewer Lorna Hutson, who is very prominent in Renaissance Studies, and an authority in the field. "His introduction, however, does ample credit to the complexity of the text itself, judiciously canvassing recent scholarly work on prose fiction's genres, rhetoric, readership, and 'euphuism.'" Dr. Khoury, a Shakespearean scholar who through extensive research has written a critical edition of *The Adventures of Brusanus, Prince of Hungaria* (1592) by Barnabe Riche, a romance he says Shakespeare used as a source for *Measure for Measure* along with some of his other plays.

Interrogating the past - StFX research selected as a journal highlight by the European Geosciences Union. In studying past climates, one of the least known energy reservoirs is that of the energy stored in the upper layers of the continents. Recently published work from StFX's earth sciences professor Dr. Hugo Beltrami in collaboration with several colleagues, has made an important contribution to understanding the quantity and nature of the heat absorbed by the continental areas. The paper was chosen as a journal highlight by the European Geosciences Union in 2014. The research paper Dr. Beltrami, co-authored with Dr. G. Matharoo (StFX), Dr. L. Tarasov (Memorial University of Newfoundland), Dr. V. Rath (Dublin Institute for Advanced Studies, Ireland), and Dr. J. E. Smerdon (Columbia University, New York) provided the first estimate of the impact of the development of the Laurentide ice sheet on the estimates of energy and temperature reconstructions from measurements of terrestrial borehole temperatures in North America according to a set of simulations from the MUN Glacial System Model. The paper, "*Numerical studies on the Impact of the Last Glacial Cycle on recent borehole temperature profiles: implications for terrestrial energy balance*," published in the European Geosciences Union journal *Climate of the Past* explains that reconstructions of past climatic changes from geothermal data are important and independent estimates of temperature histories over the last millennium. They also point out that there remain multiple

uncertainties in the interpretation of these data as climatic indicators and as estimates of the heat storage of the continental subsurface in response to long-term climatic change. In their article, the authors also presented quantitative estimates of the potential effects of temperature changes during the last glacial cycle on the paleoclimatic reconstructions over the last millennium for North America. Their results pointed to discrepancies, as much as 50 per cent of previous estimates of the continental heat change in North America when the effects of the last glacial cycle are not taken into account.

StFX religious studies professor's book offers new scholarship on the Apostle Paul. A 2014 book by StFX religious studies professor Dr. Ronald Charles is opening new scholarship on the Apostle Paul. In his first book, *Paul and the Politics of Diaspora*, released by Fortress Press in November 2014, Dr. Charles argues that Paul's diasporic condition was central to his life, mission and social relationships. In the book, he argues for understanding a number of important aspects of Paul's identity and work, including the ways his interactions with others were conditioned, by his diaspora space, his self-understanding, and his experience "among the nations." Dr. Charles says another reason the topic was important to him is that the world today is full of people who have come from away, leaving him wondering about the mechanisms of living "here" and still having relationships with somewhere "there" and identifying and imagining where "home" is.

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

StFX professor working with First Nation women on entrepreneur challenge

A St. Francis Xavier University business professor, Dr. Monica Diochon, has turned a recent research project into a pilot project with the Eskasoni First Nation working with women from Unima'ki who are participating in a 'basics of business start-up' hands-on course. The pilot project came from a research study conducted in 2013 with First Nations across Atlantic Canada. Dr. Diochon wanted to see if there was a desire among women in these communities to have their own businesses. Eskasoni was one of the communities where women expressed an interest. The pilot program is an opportunity to give back to the community by designing a course tailored to the needs identified in the research. The opportunity to follow up on research findings with a practical application was made possible through the support of the Atlantic Policy Congress of First Nations Chiefs' Atlantic Aboriginal Economic Development Integrated Research Program. Dr. Diochon and her research team offer four days of training where the women will develop a business plan, learn marketing analysis, and other important skills. They then have three weeks to launch and operate their group-based venture, after which time everyone will reconvene to report on the venture's results and reflect on what they learned from the experience.

Promising research continues at StFX FluxLab

Promising research continues to flow from StFX earth sciences professor Dr. Dave Risk's FluxLab. Midway through a Natural Resources Canada funded project, valued at over \$1.4 million, his five-member project team is developing and testing monitoring strategies for detecting gas leaks from the ground over large areas for use in monitoring unconventional energy developments. In the first phase of fieldwork, in a Saskatchewan oilfield, master's candidate Jacquelyn Hurry, and PhD candidate Jocelyn Egan gathered baseline soil gas emission data used to detect anomalies, and compared notes with site owner and project partner, Cenovus Energy. Members of the team have also worked at Aquistore, a new Canadian CO₂ injection site, which intends to demonstrate that storing CO₂ deep underground is a safe, workable solution to reduce greenhouse gases. Bringing the work closer to home, StFX undergraduate student Liz O'Connell has begun the project's second phase of fieldwork in Nova Scotia, and has already detected some unusual and exciting anomalies on soil gases in the New Glasgow area, in part using a specially equipped truck. The project is the basis for an ACOA Atlantic Innovation Fund application under development.

StFX economics professors receive over \$130,000 to study the economic impact of climate change on coastal areas

Two professors in the StFX Economics Department attracted two national grants and contracts totaling more than \$130,000. The projects focus on the economics of climate change induced sea-level rise. Dr. Patrick Withey and Dr. Jonathan Rosborough are the principal investigators leading a \$595,000 research project funded by Natural Resources Canada. This collaborative project includes members from the University of Prince Edward Island, the University of New Brunswick, and each provincial government in Atlantic Canada. The project will focus on case

studies in each of the four Atlantic provinces, and evaluate the economic cost of climate change induced sea-level rise and storm surge on communities in Atlantic Canada, as well as the net benefits of adaptation options aimed at mitigating these impacts. Dr. Withey also received a \$42,000 SSHRC Insight Development Grant in 2014 for the project entitled "*Estimating the market and non-market economic impacts of climate change induced sea-level rise in Canada.*" This study will take a broader view of the impacts of sea-level rise and storm surge, and use mathematical programming and survey methods to evaluate the aggregate (regional and national) costs of sea-level rise in Canada. Atlantic Canada is particularly sensitive to erosion and flooding due to storms and sea-level rise in the coming century.

7. Research Environment Highlights

The StFX Machine Shop performs a crucial role in helping support both research and teaching. In 2014, the Machine Shop was refitted with two new Computer Numerical Controlled machines – a HAAS Mini Mill and a HAAS TL-1 tool room lathe. This considerably upgraded the capabilities and efficiency of the Machine Shop for students and researchers. Instead of working with one thousandths of an inch tolerance, we are now able to work with one hundred thousandths of an inch. On top of that work time and repeatability has also been greatly improved. These upgrades cost approximately \$100,000 to implement.

8. Other success stories

X-Chem camps offer school-aged children a summer of excitement and learning

From forensic science to a computer camp to an all-girls science camp, the popular X Chem Outreach summer camps for children in Grades 1-8 were back again for another season in 2014, offering much opportunity to learn about science while also having fun. In 2014, X-Chem hosted eight on-campus camps as well as a number of satellite camps including camps for Aboriginal children in Sydney, Paq'tnkek, Pictou Landing, and Potlotek, as well as camps in Guysborough, Mulgrave, East Antigonish, New Glasgow, Canso, Richmond and Sherbrooke. Camps each run for a week from July 7 through August 22. In all, X-Chem had 350-400 children take part. The goal is about inspiring curiosity in youth and stimulating an interest in science. Senior StFX undergraduate students, as well as StFX faculty, serve as instructors in the science camps.

Chance discovery leads StFX professor to fascinating research on Lillian Burke and the Cheticamp hooked rug industry. A chance discovery in a New Glasgow antiques store led to a fascinating new avenue of research for StFX French professor Dr. Edward Langille in 2014, centred upon American artisan Lillian Burke and the Cheticamp hooked rug industry. Ms. Burke of Washington, DC, a friend of the Alexander Graham Bell family, was instrumental in bringing the Cheticamp hooked rug cottage industry to international markets and acclaim in the late 1920s and 1930s, yet despite her artistic and commercial success, little is known about her. Dr. Langille, who has published widely on 18th century French literature, as well as on Acadian culture and literature, happened upon some of Ms. Burke's original hooked rug designs and started researching her life and the events that helped establish a hooked rug cottage industry in Cheticamp in 1927. His research has led to several published articles as well as very successful public lectures held recently at the Alexander Graham Bell National Historic Site in

Baddeck and at Les Trois Pignons in Cheticamp. Ms. Burke came to Cape Breton after she started tutoring Alexander Graham Bell's grandchildren in drawing and watercolours, Dr. Langille says. She became a family friend and started spending summer holidays at the Bell estate in Baddeck. Supported by Bell's daughters, Marian Fairchild and Elsie Grosvenor, she revived the defunct Cape Breton Home Industries founded 50 years earlier by Bell's wife, Mabel Hubbard Bell, to generate economic development. She visited the Acadian village of Cheticamp in Cape Breton looking for women interested in producing hooked rugs for commissioned orders. She found not only an established rug hooking tradition, but women eager to learn new techniques. She taught them these new techniques and insisted on using only pale and soft colours and high quality wool. She designed and marketed the distinctive Cheticamp hooked rugs in New York City. In the process she gave pride and hope to an impoverished rural community during the lean years of the Great Depression according to Dr. Langille. It was also the genesis for today's world-renowned Cheticamp rug hooking tradition.