Annual Report on Research Activities at Saint Mary's University - 2015

Dr. J. Kevin Vessey
Associate Vice President Research

Preface

This report conforms to the template agreed upon by universities in Nova Scotia and the Department of Labour & Advance Education in September 2013. Each January, the research activity of the University for the previous reporting year is described. In some items, the reporting period is the previous fiscal year (1 April 2014 to 31 March 2015; e.g. funding statistics), the previous academic year (1 September 2014 to 31 August 2015; e.g. enrolments) or the previous calendar year 2014 (e.g. publications).

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Introduction

The *Research Mission* of Saint Mary's University is to engage in research that applies to, and is valued by communities from around the corner, to around the world, and that cultivates intellectual curiosity and creativity of our faculty and students.

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

- To carry out high quality research that builds on existing strengths and partnerships, with particular emphasis on interdisciplinary endeavours;
- To develop research programs that are valued by, relevant to, and engage communities - locally, regionally, nationally and internationally;
- To ensure that students, both undergraduate and graduate, benefit from research activities at the University.
- To disseminate and translate the outcomes of our research to receptor communities who can best benefit from them.

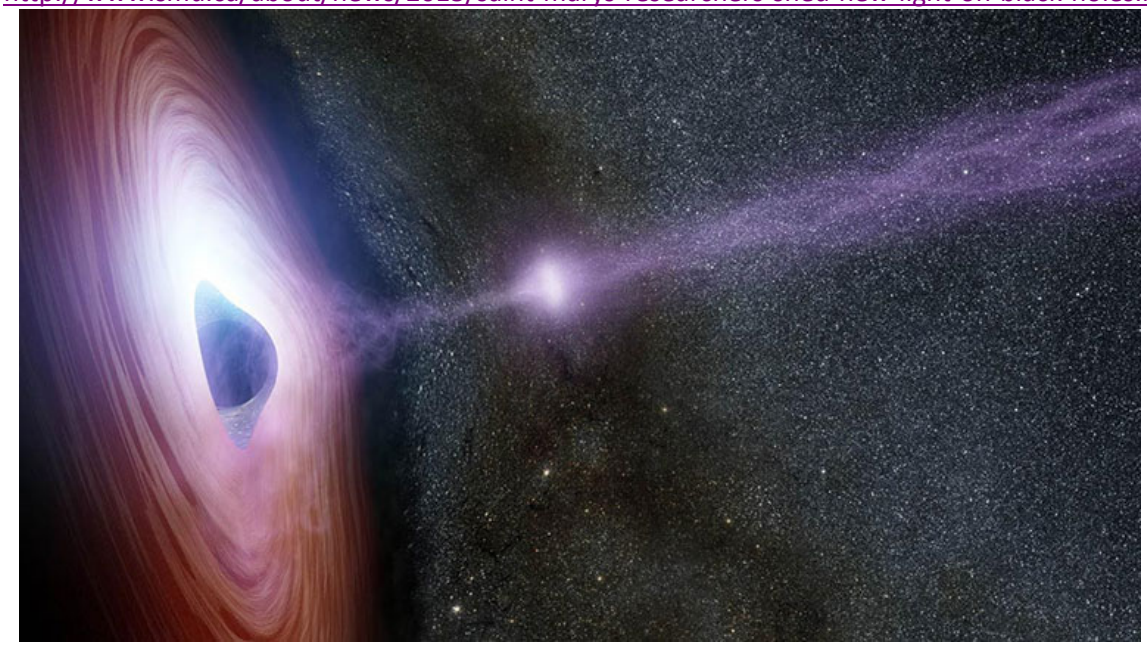
The five *Major Research Themes* of Saint Mary's SRP are:

- Research for Atlantic Canada Communities
- Innovation in Business and Workplace Studies
- The Environment and Natural Resources
- Astronomy, Computational Sciences, and Subatomic Physics
- International Development and Human Migration Issue

Research Activities

1. *Research Highlights (Academic Year 2014-15; maximum 3)*

- **Saint Mary's Researchers Shed New Light on Black Holes** (27 October 2015). Patience and observation have paid off for Saint Mary's researchers with a discovery that just may hold one of the keys to the Universe. For Dr. Luigi Gallo, a professor in the Department of Astronomy and Physics, the excitement began in 2014 when the NASA Explorer mission Swift detected a large flare of light coming from Markarian 335 (Mrk 335), a supermassive black hole located 324 million light-years away in a distant galaxy. As principal investigator for the study at Saint Mary's University, Dr. Gallo asked the Nuclear Spectroscopic Telescope Array (NuSTAR) team to interrupt its regular program of observation to monitor the event --- a protocol used for important discoveries --- and eight days later, NuSTAR set its X-ray eyes on Mrk 335 in time to witness the final half of a giant eruption of X-ray light. The data were analyzed by a team of Dr. Gallo's that included postdoctoral fellow Dr. Dan Wilkins and graduate student Kirsten Bonson. Also see: http://www.smu.ca/about/news/2015/saint-marys-researchers-shed-new-light-on-black-holes.html

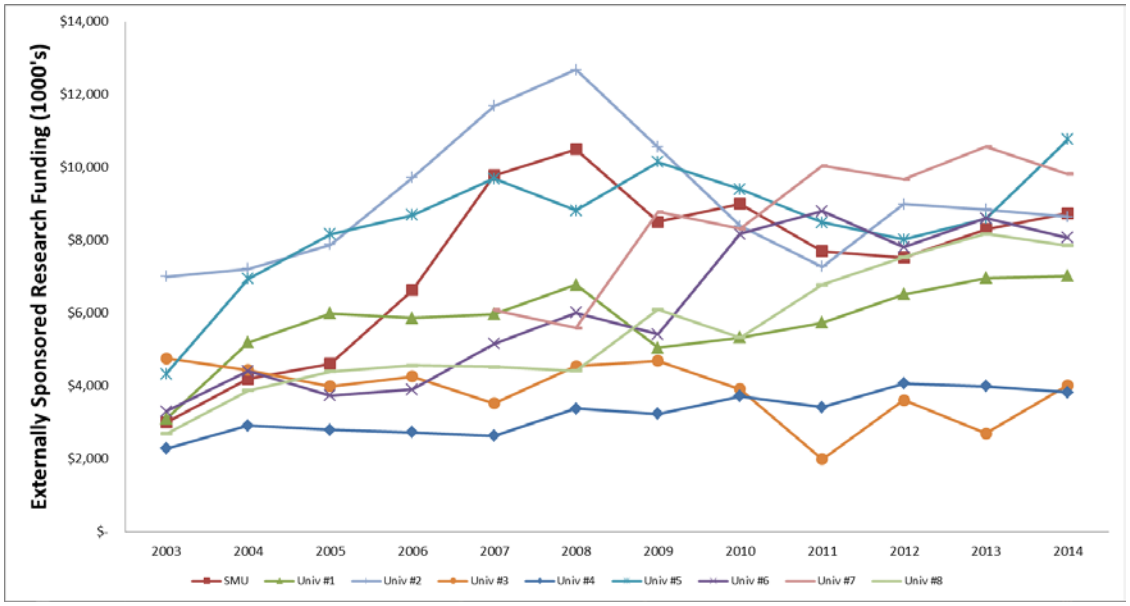


- **Saint Mary's University researches fabrics that can analyze health** (3 March 2015) The exercise sweatband of the future may not just collect what runs down your brow, it could also gather important health information. A small cloth patch on soldiers' uniforms could reveal chemical exposure levels, and a shirt might be able to pinpoint your latest ailment. Those are just some of the potential applications contemplated by scientists at Saint Mary's University in Halifax, in their research into so-called fabric chips. "We're interested in developing wearable sensor technology for health applications," said Christa Brosseau, an associate professor of chemistry. The idea is to develop portable or wearable fabrics that take sweat, phlegm, blood or pollutants from the environment and use special materials that allow scientists to quickly analyze them for chemical markers. The researchers have already proven this can be done. A paper published by the chemistry journal Analyst earlier this year showed certain chemicals could be detected using fabric chips. Also see: http://www.cbc.ca/news/canada/nova-scotia/saint-mary-s-university-researches-fabrics-that-can-analyze-health-1.2980513

- **N.S. Mi'kmaq help with SMU forensic research for missing person cases** (19 April 2015) A new database of facial tissue depth measurements of Mi'kmaq people in Nova Scotia will mean more accurate 3D forensic facial reconstruction in difficult-to-solve missing person cases. Over the last 10 years, Tanya Peckmann, a forensic anthropologist at Saint Mary's University, and colleagues have used ultrasound machines to collect skin thickness measurements on a broad sample of Mi'kmaq adults and children in the province. In cases where unidentified remains are discovered, the measurements can then be used to create a 3D forensic facial reconstruction, or clay model, of somebody in that group. The data was recently published in two separate studies in the Journal of Forensic Sciences and Journal of Forensic Science and Legal Medicine. The measurements were taken on 392 volunteers between ages three and 17 and another 152 between 18 and 75. Also see: http://thechronicleherald.ca/novascotia/1281540-n.s.-mi%E2%80%99kmaq-help-with-forensic-research-for-missing-person-cases

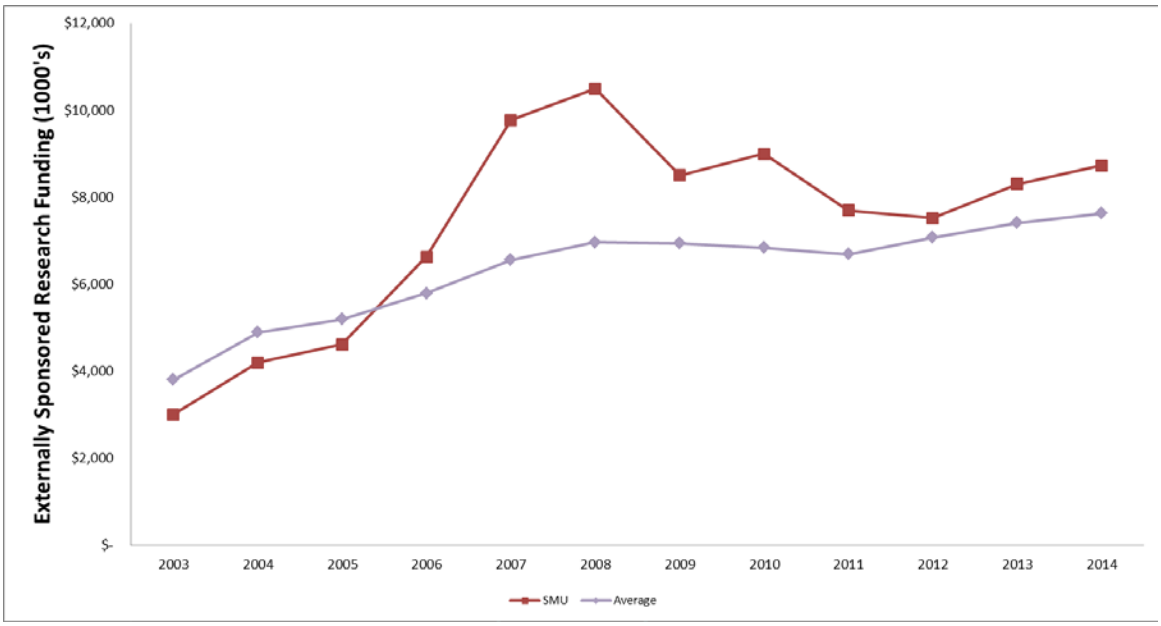
2. *Research Funding*

a) **Total externally sponsored research at SMU relative to eight "comparator" Canadian universities (fiscal years ending 2003 to 2014).** Comparator universities were selected based upon levels of research funding in 2003 and/or regional considerations (key to the comparator universities can be found in Appendix 2; the key is for internal use only and not to be circulated outside of SMU).



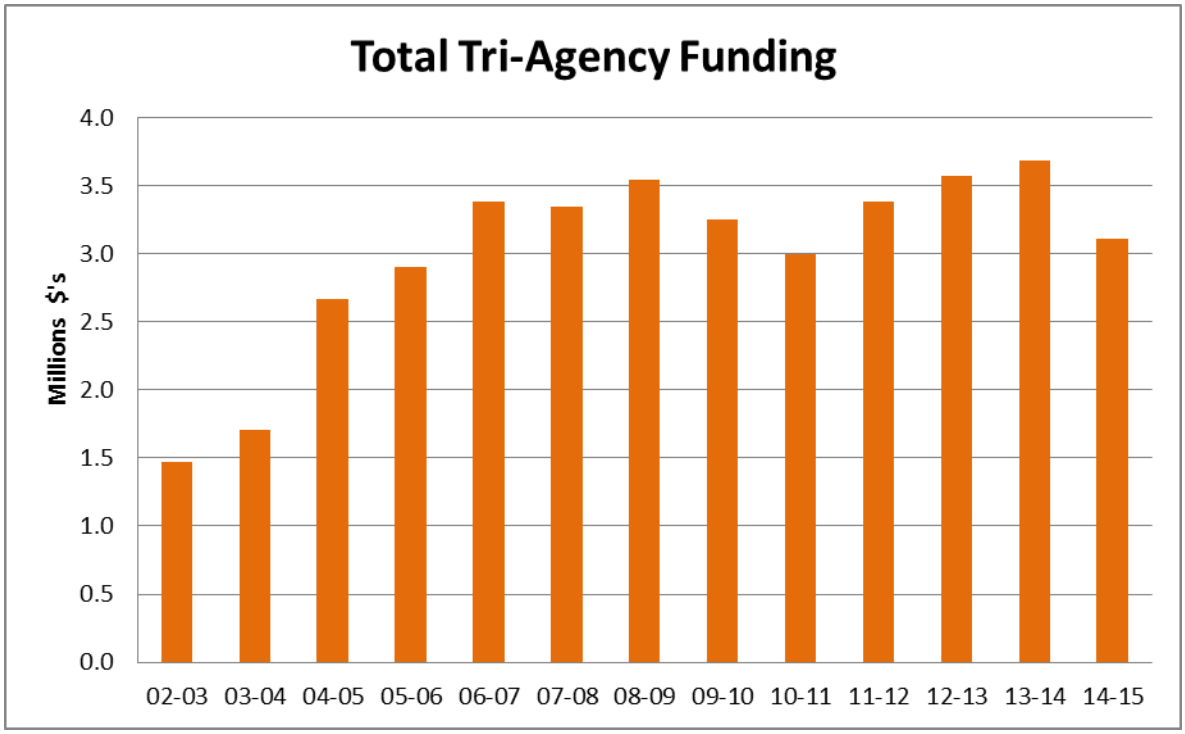
Source: CAUBO

Total externally sponsored research at SMU relative to average of eight "comparator" Canadian universities (fiscal years ending 2003 to 2014).

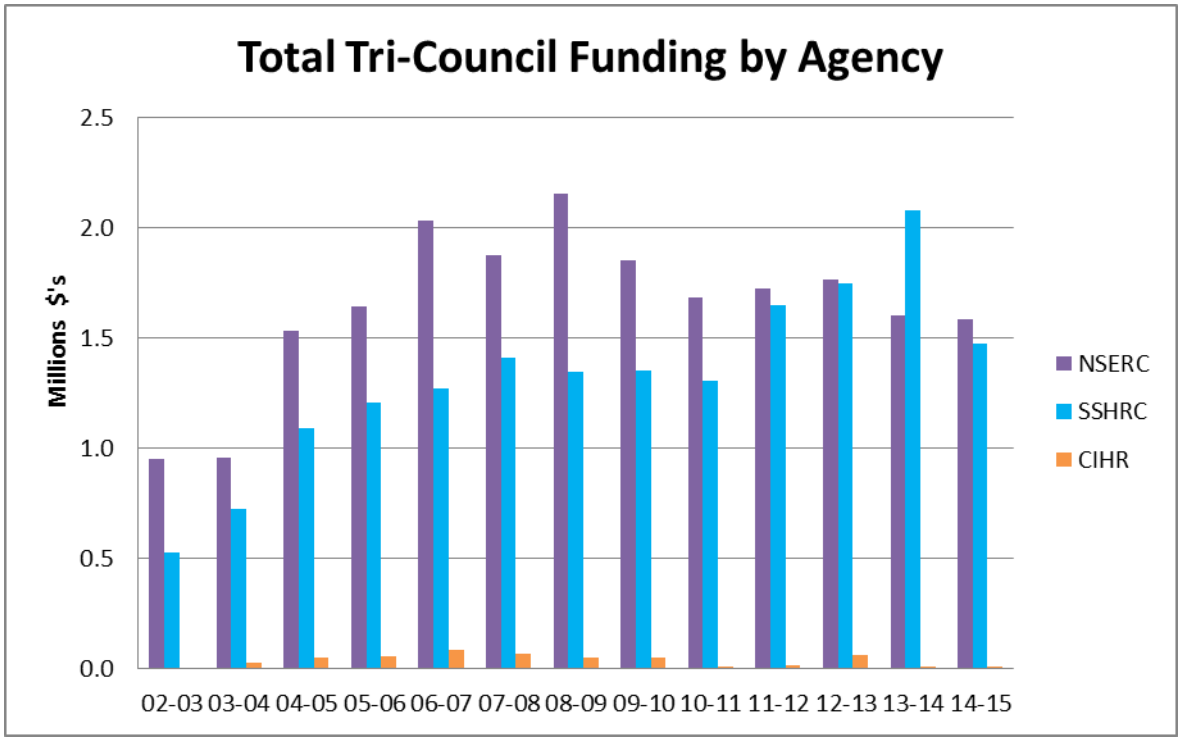


Source: CAUBO. NB: Peak in funding in 2007-2008 due to large ACOA and NSERC institutional grants.

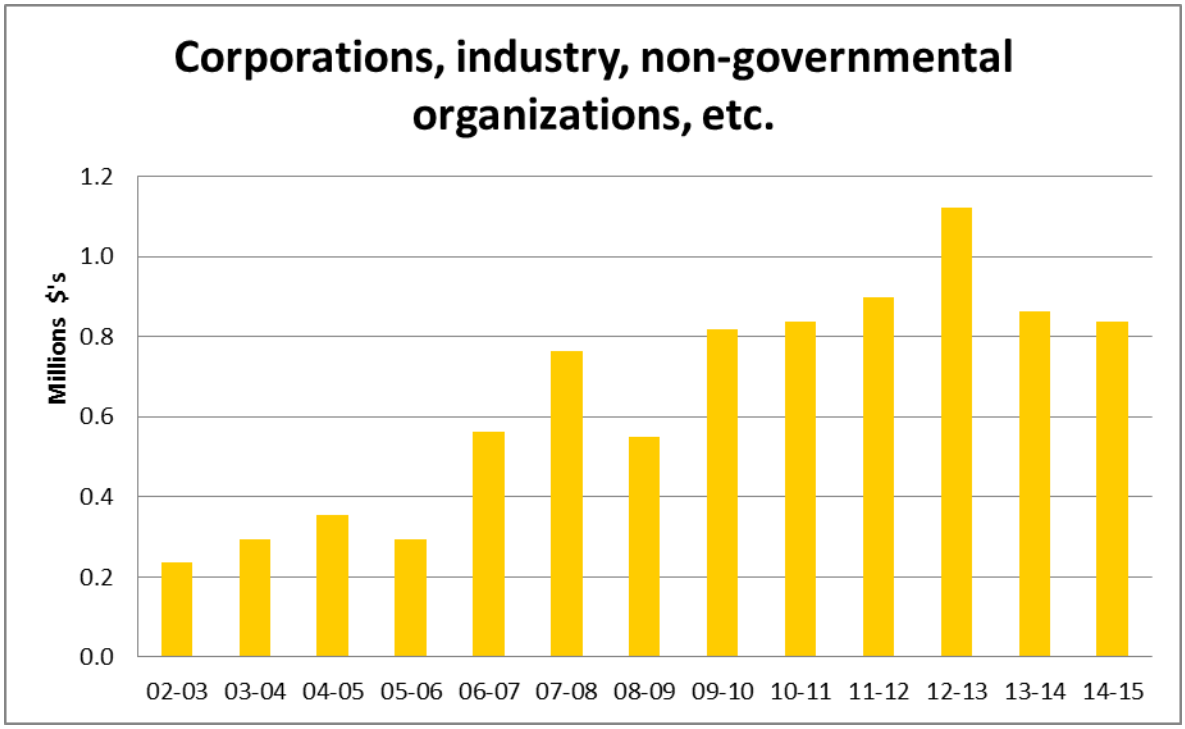
b) **Total Tri-Council (NSERC, SSHRC and CIHR) funding at SMU (fiscal years ending 2003 to 2015)**



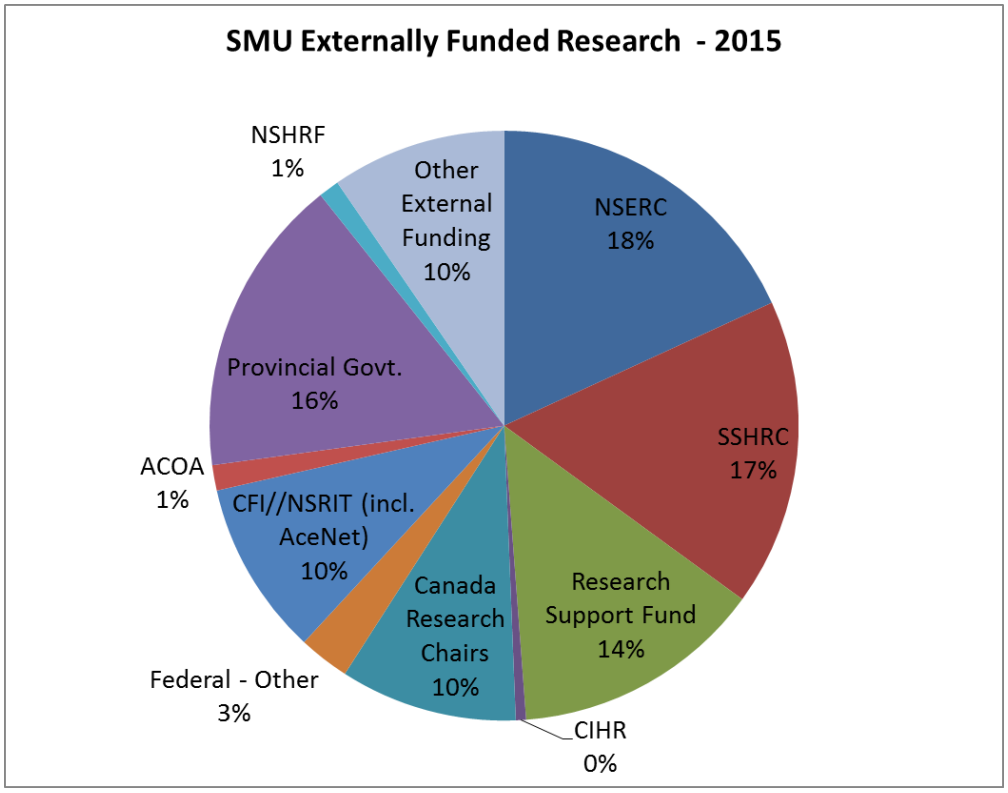
Tri-Council (NSERC, SSHRC and CIHR) funding at SMU (fiscal years ending 2003 to 2015)



Total grant and contract funding from "other" sources (industry; NGO; government departments, etc.) (fiscal years ending 2003 to 2015).



Sources of external support for research – Fiscal year ending 31 March 2015:



c) **Research Infosource Rankings** (http://www.researchinfosource.com/): Research Insource annually creates its "Top 50 Research Universities" and "Research Universities of the Year" (RUY) lists for Canada. The Top 50 list is simply based upon universities' externally sponsor research income while the RUY rates universities in terms of research impact relative to research funding. RUY rankings take into account both financial inputs, research outputs 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.

SMU's Rank in the Top 50 List

Year	Research $'s	Rank
2002	$ 1,924,000	52
2003	$ 3,007,000	50
2004	$ 4,198,000	50
2005	$ 4,619,000	48
2006	$ 6,634,000	47
2007	$ 9,775,000	44
2008	$ 10,497,000	44
2009	$ 8,507,000	49
2010	$ 9,005,000	46
2011	$ 7,703,000	48
2012	$ 7,528,000	50
2013	$ 8,306,000	48
2014	$ 8,735,000	46

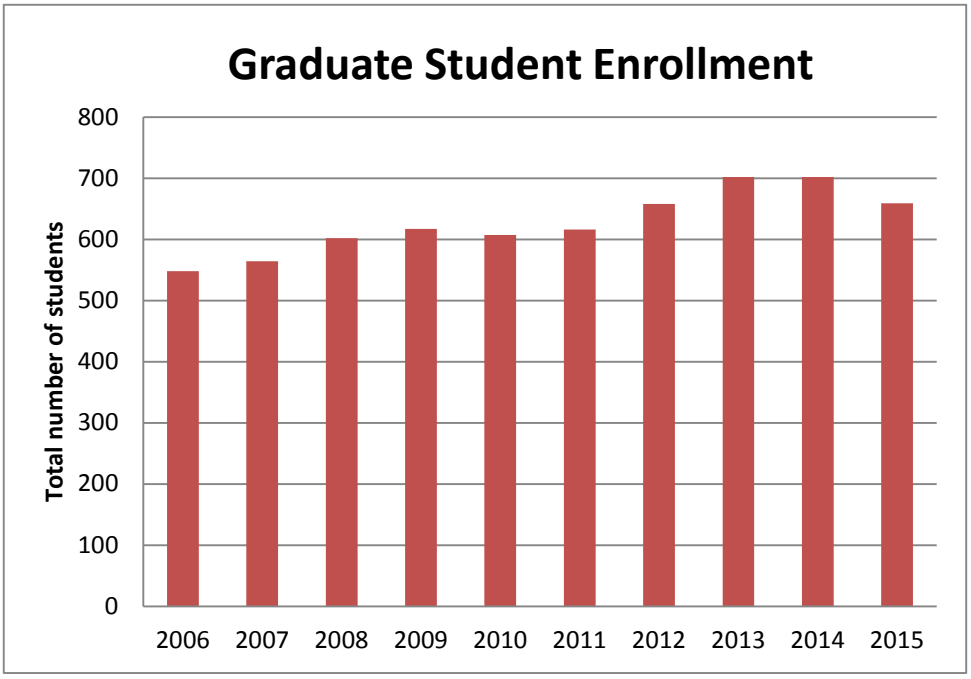
SMU's Rank in the RUY List

Year	Rank
2002	Not ranked
2003	48
2004	47
2005	47
2006	41
2007	37
2008	36
2009	36
2010	35
2011	42
2012	39
2013	41
2014	44

3. Highly Qualified Personnel (HQP) Training

Saint Mary's University offers 24 graduate programs across a wide range of fields in the Arts, Commerce and Science discipline. These include 4 PhD programs, 19 Master programs and 1 graduate diploma program.

- Total graduate student enrolment (based upon winter (Jan-Apr) term)

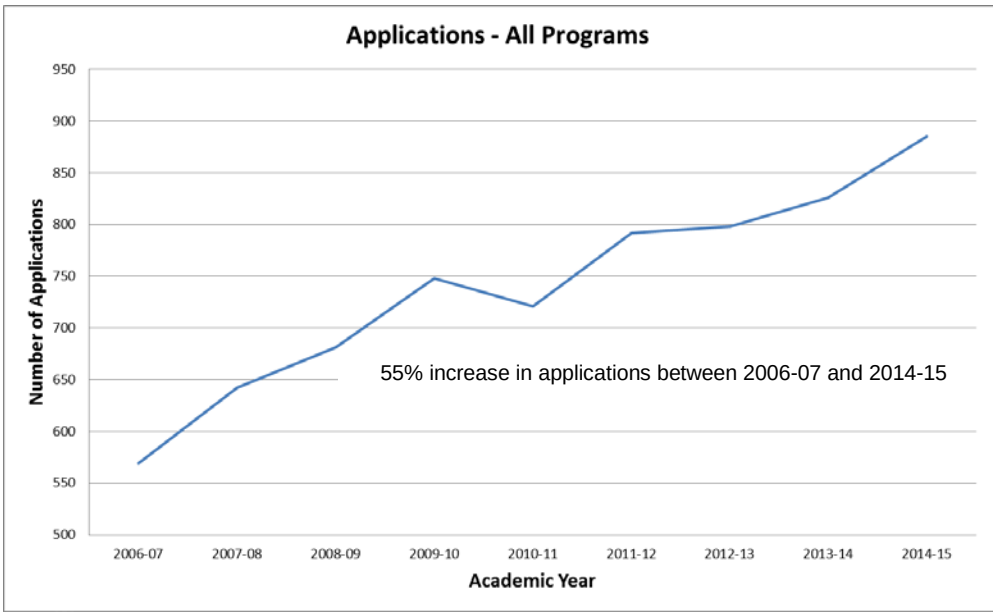


For the first time in many years, SMU experience a decrease in total register students in graduate programs. This was almost totally due to the wind-down of the MBA-CMA program and the MBA-CPA program not yet being in place.

- Graduate student enrolment in research versus professional programs (based upon winter (Jan-Apr) term)

The decline in number of students in professional programs is almost solely due to the winding down of the MBA-CMA program.

- **Applications for graduate programs** (Academic years 2006-07 to 2014-15)



- **HQP Highlights**
    - **Saint Mary's University Graduate Student Goes to National 3 Minute Thesis (3MT) Competition for her research on lie detection** (May 2015) SMU MSc student Nicole Adams-Quackenbush has used lies and deception to earn herself a spot in a high-profile # Minute Thesis (3MT) competition in Montreal. Adams-Quackenbush says most lie detecting techniques are rooted in an outdated belief that liars are nervous, feel shame or guilt. But she says deception is not an emotion, and not all liars show signs of anxiety. Her research instead looks at how busying the brain can be used as a technique to detect lies. Also see: http://www.cbc.ca/news/canada/nova-scotia/halifax-student-nicole-adams-quackenbush-studying-lie-detection-1.3063951
    - **Saint Mary's Geology Students Dig Deep in Sudbury Basin** (May 2015) Saint Mary's geology students recently travelled over 1000 kilometres by plane and up to 2.8 kilometres underground to explore Northern Ontario's Sudbury Basin and Timmins District, both major mining camps. Twelve students took part in the five-day geology field school, which included hands-on exposure to the mining and mineral processing industry in both Sudbury and Timmins. Students toured the diamond drill core logging facilities with Vale Canada (Ontario Operations) and took part in a surface excursion where they were introduced to key aspects of the impact geology of the Sudbury Basin, the second-largest known impact crater on Earth. Also see: www.smu.ca/about/news/2015/saint-marys-geology-students-dig-deep-in-sudbury-basin.html
    - **SMU's Afri-Sea drought solution lauded** (May 2015) Afri-Sea from Saint Mary's University exceeded expectations at the International Business Model Competition. The company, which uses compounds from seaweed to mitigate the effects of drought, made the finals at the event at Brigham Young University in Utah, ending up placing fifth and winning US$5,000. Tim Cranston, Sulayman Cham and Todd Mercer entered the 16-month Master of Technology Entrepreneurship and Innovation graduate program that teaches lean entrepreneurship. Cranston had already co-founded a marine biotech company, Natural Ocean Products, which won the biotech category at the I-3 startup competition in Nova Scotia last year. Also see: http://thechronicleherald.ca/business/1284491-entrevestor-smu%E2%80%99s-afri-sea-drought-solution-lauded
    - **Enactus Team Places Second in Canada** (May 2015) Saint Mary's Enactus team has been named first runner-up – the number two Enactus team in Canada – at the Enactus National Exposition in Toronto. Team members travelled to Toronto to present their award-winning social enterprise projects including The Startup 100, OPtions Nova, and OPtions International (Peru). The team also received the national title, BDC Entrepreneurs First Project Partnership Best Project. They received the title for their community development project The Startup 100 – 100 businesses in 100 days in 50 communities. This program offered young entrepreneurs the chance to develop and implement business ideas. Through training modules on lean startup and business principles, Enactus Saint Mary's University helped 127 students from 50 communities, driving economic development across Nova Scotia. Also see: http://www.smu.ca/about/news/2015/enactus-team-places-second-in-canada.html
    - **New Scholarships Support 'Transformative' International Study and Research** (March 2015) Saint Mary's University students involved in two innovative projects will receive more than $545,000 in mobility funding as inaugural beneficiaries of a new scholarship program to promote educational opportunities in Commonwealth countries. "The Canadian Queen Elizabeth II Diamond Jubilee Scholarships will provide students with transformative international study and research experiences," says Paul Davidson,

president of the Association of Universities and Colleges of Canada. “By sending young Canadians overseas to study and bringing international students to our campuses, this visionary program will help build economic, diplomatic and cultural ties that benefit all Canadians.” Also see: http://www.smu.ca/about/news/2015/new-scholarships-support-transformative-international-study-and-research.html

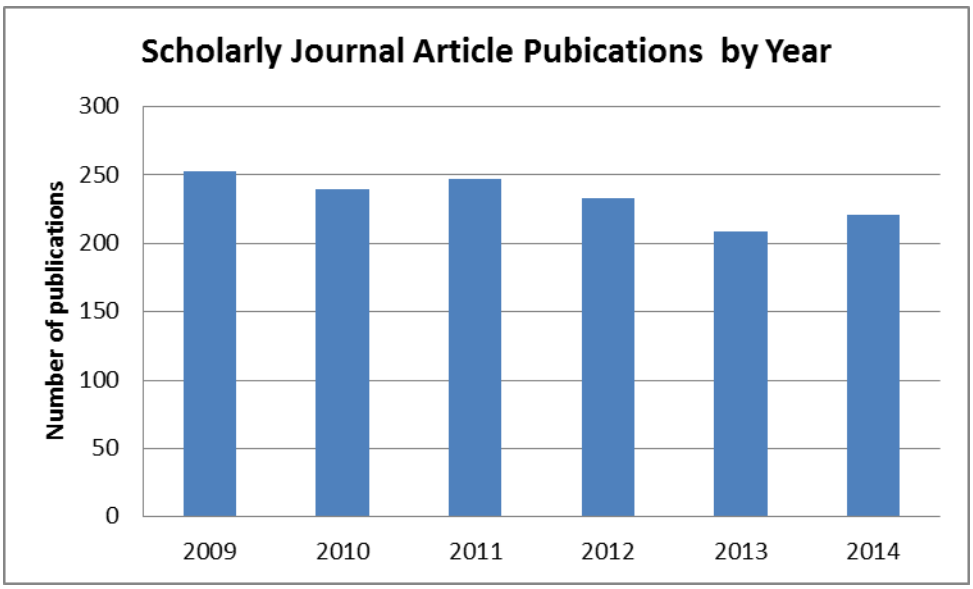
- **Saint Mary’s Student Researchers Receive Prestigious Funding** (November 2014) Eight promising Saint Mary’s University scholars have cause to celebrate an announcement made by the Social Sciences and Humanities Research Council of Canada (SSHRC). Kate Bowers, Brianna Cregan, Alyssia Fogarty, Matthew Heesing, Blaine Mackie and Tyra McFadden have each received Joseph Armand Bombardier Canada Graduate Scholarships in the amount of $17,500 for their master's programs. PhD students Mohammed Alhamdani and Aleka MacLellan have received prestigious Doctoral Scholarships through the same program in the amount of $105,000 each. Also see: http://www.smu.ca/about/news/2014/saint-marys-student-researchers-receive-prestigious-funding.html
- Also see SMU’s NS Research & Innovation Graduate Scholarship Holders Report – 2015 in Appendix 1

4. *Industry Engagement (Springboard Atlantic Inc. performance indicators)*

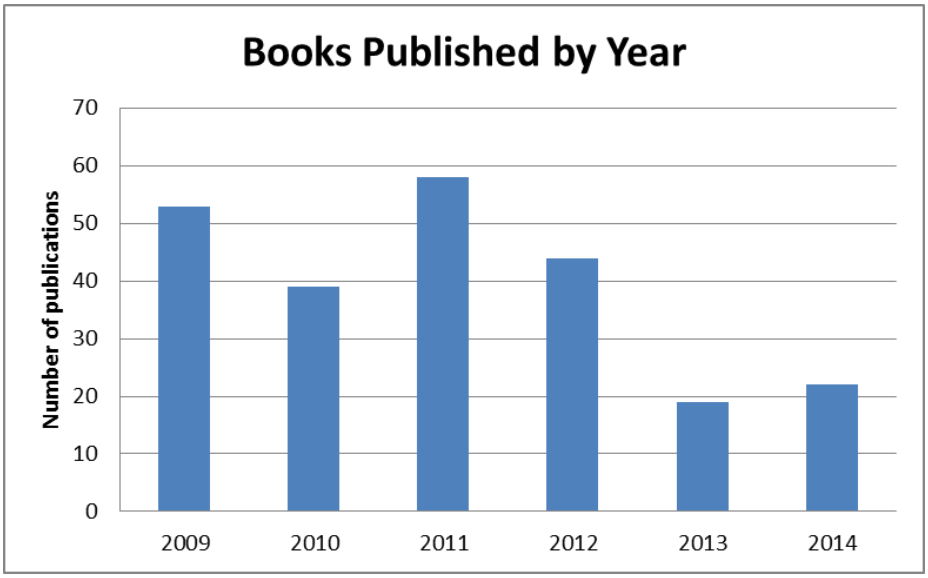
Springboard - Performance Metrics - SMU	Year 1 - 2014/2015				
	Q1	Q2	Q3	Q4	Total
1. Industry Engagement Activity	12	5	11	9	37
IRAP Projects (#)	7	-	-	1	8
Total IRAP NMA Projects: (#)	7			1	8
IRAP BIAP Projects (#)					-
Other (#)					-
Tri-Council Industry Partnerships (#)	-	2	2	1	5
–Interaction - #					-
–Engage - #			1	1	2
–IE(CCI), ARD - #					-
- CU I2I - #					-
–ARTi #					-
–CRD - #		1	1		2
–I2I – Phase 2a/2b - #					-
Industry Partnership Scholarships (IPS, IRDF, MITACS) - #		*1*			1
Industrial Partnerships (SNG, SPG) - #					-
I-USRA - #					-
Industrial Research Chair, Canada Research Chairs (with industry) - #					-
– CIHR POP Phase II - #					-
–SSHRC Partnerships (with industry) - #					-
Other					-
NCE/CECR/CERC Organisation Funding or Agreements - #					-
Provincial Funding programs (Industry Project related) -#			3		3
CFI (for Colleges or Universities) - #					-
ACOA AIF Projects (#)	-	-	-	-	-
Number of AIF Projects Leading (Member): (#)					-
Number of AIF Projects as Subcontract: (#)					-
Other Federally funded Industry (#)			1		1
Other R&D Contracts (no government leveraged funding) - (#)	5	3	5	7	20
Industry R&D Contracts (#)	5	2	1	1	9
R&D Contracts (#)				1	1
Leases - Lab or incubation (#)					-
Government R&D contracts (Where Gov. is the client) - (#)		1	4	5	10
2. Workshops with Industry (#)	1				1
3. New Spin Off or Startup Companies: (#)	-	-	1	2	3
Spin Off or Startup with Institution IP Assigned - #					-
Spin Off or Startup **from the Institution** w/o IP Assignment - #			1	2	3
4. Technology and Knowledge Transfer (#)	1	-	-	-	1
Assignment of IP rights to a Corporate Entity - #	1				1
Option (License) Agreements - #					-
Licenses - #					-
Grant of Rights - #					-
Material Transfer Agreements (MTAs) **with industry and/or must transfer IP** - #					-
Other IP Transfer Agreements - #					-

5. *Knowledge Creation and Mobilization*

- **SMU scholarly journal article publications[1]:** Searches where performed on Web of Science, EBSCO, and Proquest databases held by Saint Mary's, and Science Direct databases for the publication (calendar) years 2009 to 2014.

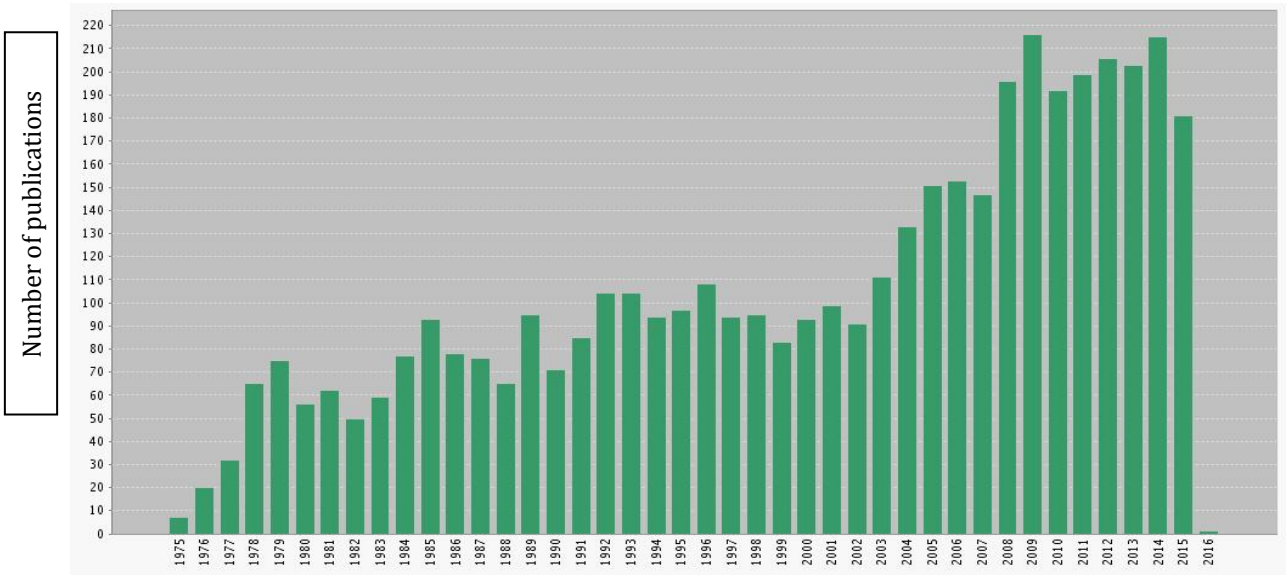


- **SMU Book Publications[1]:** Searches were carried out in the OCLC WorldCat Local database for publication (calendar) years 2009 to 2012 and from the Ingram Oasis publication database for 2013 and 2014, configured for Saint Mary's University. In addition, Library staff conducted standardized searches for works by author name using lists of full-time and part-time faculty members' names. Complete books, and non-article publications, such as government reports where identified. Complete books, and non-article publications, such as government reports where identified. Book chapters were also identified where possible.

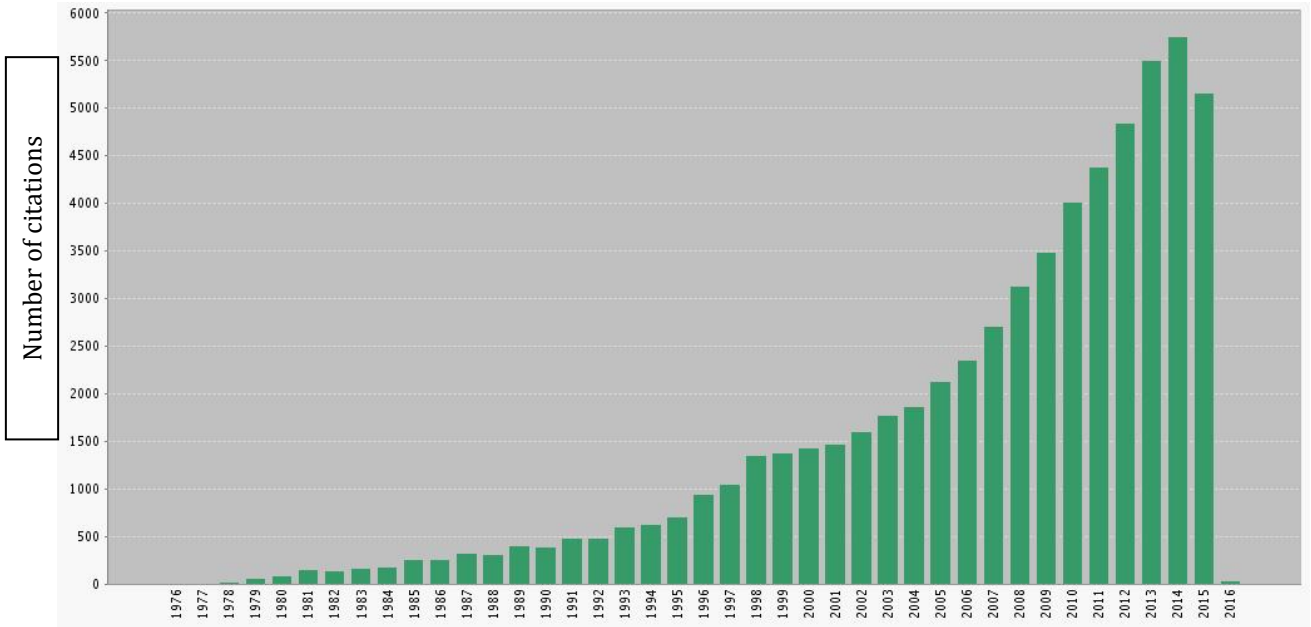


[1]Compiled by staff at the Patrick Power Library.

- **Thomson Reuters "Web of Knowledge" Database Citation Reports Publication Analysis (run on 30 Dec. 2015)**



Total number of SMU publications by year (identified by postal code of authors).



Total number of papers published citing SMU publications by year.

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

- **SMU and Dal hosts 2015 AI/GI/CRV Conference** (2-5 June 2015) The 2015 AI/GI/CRV Conference is a collaboration of three leading conferences: Artificial Intelligence 2015, Graphics Interface 2015 and Computer and Robot Vision 2015. It will bring together hundreds of leaders in research, industry, and government, as well as Canada's most accomplished students, to showcase Canada's ingenuity, innovation and leadership in intelligent systems and advanced information and communications technology. Also see: http://aigicrv.org/aigicrv2015/
- **Saint Mary's Leads Canada in International Research Collaboration** (22 October 2014). Saint Mary's University has been ranked first in Canada for international research collaboration by Research Infosource Inc.'s 2014 university research rankings. The "Spotlight on University International Research Collaboration" is a new addition to Research Infosource's annual rankings on university research. It was calculated by measuring the proportion of total publications at each institution from 2008-2012 that were co-authored with researchers outside of Canada. Saint Mary's ranked first in the undergraduate research category at 53.8 per cent, the only university in the country to score over 50 per cent. "The fact that 53.8 per cent of the scholarly publications from Saint Mary's were co-authored with researchers from outside of Canada shows how plugged-in our researchers are around the world, as well as the merit of our research which is appreciated so highly that it attracted these international collaborations," said Dr. J. Kevin Vessey, Saint Mary's Associate Vice-President, Research. Also see: http://www.smu.ca/about/news/2014/saint-marys-leads-canada-in-international-research-collaboration.html
- **Saint Mary's Hosts First CN International Safety Culture Symposium** (21 October 2014) Leaders in safety culture and those looking to advance safety culture in their organization met at Saint Mary's University for the first CN International Safety Culture Symposium. Attendees were engaged through two days of presentations, case studies, and interactive workshops that addressed some of the key safety challenges facing the industry. Held on campus, the symposium brought together representatives from a broad group of industries, including railways, along with regulators, labour groups, industry associations, and academics from North America and Europe. Saint Mary's President Dr. J. Colin Dodds opened the symposium by welcoming the presenters and guests, while commending the leadership of CN in the area of safety culture. Also see: http://www.smu.ca/about/news/2014/saint-marys-hosts-first-cn-international-safety-culture-symposium.html
- **Associate Vice-President Research at Saint Mary's University Appointed Chair of the Alliance of Canadian Comprehensive Research Universities** (20 October 2014) Dr. J. Kevin Vessey, Associate Vice-President Research at Saint Mary's University has been appointed the Chair of the Alliance of Canadian Comprehensive Research Universities (ACCRU). Dr. Vessey succeeds Dr. Daniel Weeks, former Vice President Research at Lethbridge University and recently installed President of the University of Northern British Columbia, who chaired ACCRU since its founding in 2011. ACCRU brings together small- and medium-sized comprehensive universities from across Canada. ACCRU is not a lobby group, but rather strives to be a forum to discuss the challenges and issues that smaller universities face. ACCRU enables its member institutions to identify best practices in the effective execution of research, to respond to new research opportunities in a coordinated, collaborative and timely fashion, and to speak with a coordinated voice on research and scholarly activity issues important to research funding agencies, policy makers, and the public at large. Also see: http://www.smu.ca/about/news/2014/dr-j-kevin-vessey-appointed-chair-of-the-alliance-of-canadian-comprehensive-research-universities.html
- **Government Partners with Saint Mary's to Launch Marine Heritage Study** (15 October 2014) Government is partnering with Saint Mary's University to study Nova Scotia's marine heritage resources. The goal of the project is to chart a new course for marine heritage management and

development. The study will determine what is required to support a marine archeology program and strategies to protect underwater resources. "Nova Scotians have long recognized the significance of the province's vast underwater heritage, from submerged landscapes and eroding shorelines to historic shipwrecks and underwater artifacts," said Communities, Culture and Heritage Minister Tony Ince. "The study is an opportunity to examine how we can research, manage, and most importantly, protect the province's invaluable heritage resources." Saint Mary's graduate and archaeologist Jonathan Kyte of Seahorse Cultural Resource Management Services is leading the study. Also see: http://www.smu.ca/about/news/2014/government-partners-with-saint-marys-to-launch-marine-heritage-study.html

- **Coastal Communities Focus of New Research Initiative** (15 September 2014) Saint Mary's University and Friends of Port Mouton Bay will partner with other members of the OceanCanada initiative over six years to improve the social, economic and environmental situation of Canada's oceans, coasts, and coastal communities. A major part of the research will take place in Nova Scotia, where Saint Mary's University and Friends of Port Mouton Bay will study the vision, goals and challenges faced by coastal communities, and their future possibilities. The research will draw on the experiences of Port Mouton Bay, and extend the knowledge acquired to other communities locally and across the country. Dr. Tony Charles, a Saint Mary's professor and researcher will lead the university's involvement in the partnership. Also see: http://www.smu.ca/about/news/2014/coastal-communities-focus-of-new-research-initiative.html

7. *Research Environment*

- **Saint Mary's Chemistry Professor awarded CFI Funding** (20 January, 2015) Saint Mary's Assistant Professor of Chemistry Dr. Kai Ylijoki has been selected as a recipient of the Canada Foundation for Innovation (CFI) John R. Evans Leaders Fund. Dr. Ylijoki was awarded the funding for his research into metal-mediated and photochemical [5+2] reactions and their application to pharmaceuticals and materials. "This funding is key," explained Dr. Ylijoki. "Without it I would be unable to get the equipment I need to do a lot of this work and research." The CFI funding will allow Dr. Ylijoki and the Saint Mary's Chemistry Department to purchase a new glove box, implement necessary computer upgrades and secure other necessary equipment to allow expanded research.Also see: http://www.smu.ca/about/news/2015/saint-marys-chemistry-professor-awarded-cfi-funding.html
- **Clear Skies Ahead for Tropospheric Remote Sensing Lab** (18 December, 2014) Dr. Aldona Wiacek (Environmental Science and Astronomy & Physics) has received $100,000 in funding from the Marine Environmental Observation, Prediction and Response (MEOPAR) Network to support the continuous measurement of atmospheric boundary layer trace gases affecting air quality and climate change. Her project, Continuous Spectroscopic Measurements of Marine Boundary Layer Composition and Evolution in an Urban Shipping Environment, will use the technique of Open-Path Fourier Transform InfraRed (OP-FTIR) spectroscopy to measure a wide variety of trace gases continuously at Saint Mary's, in the field, and from ship-based platforms. The resulting data will help answer important questions about air quality in Nova Scotia and will be used by Environment Canada to validate and improve air quality forecasts generated by regional chemical weather models. Also see: http://www.smu.ca/about/news/2014/clear-skies-ahead-for-tropospheric-remote-sensing-lab.html
- **Saint Mary's Unveils Most Powerful Telescope in Atlantic Canada** (29 October 2014) aint Mary's University has unveiled the Burke-Gaffney Observatory's (BGO) Planewave 0.6-metre CDK24 telescope—the second largest on a Canadian University campus. Named in honour of Dr. Ralph M. Medjuck, the telescope and new observation deck will greatly enhance the university's teaching and science outreach facilities. It will also be accessible to the public through group tours and regular viewing nights. "Every year, hundreds of school age children and community members visit the BGO to wonder at the night sky, and regulars can expect an impressive change," says Dr. Robert Thacker, Canada Research Chair. The new telescope offers higher optical performance, a matching digital

imaging camera, and state-of-the-art control systems that allow full remote control of the entire observatory. Improvements have also been made to the Burke-Gaffney Observatory facilities, including the addition of an roof-top observation deck.Also see: http://www.smu.ca/about/news/2014/saint-marys-unveils-most-powerful-telescope-in-atlantic-canada.html

8. *Other Success Stories*
   - **Saint Mary's Astronomer Leads Next Generation of Black Hole X-ray Exploration** (April 18) Dr. Luigi Gallo, an astronomer at Saint Mary's University, is head of the research team that will direct the Canadian ASTRO-H Metrology system (CAMS), Canada's contribution to the Japan Aeropsace Exploration Agency's (JAXA) flagship space astronomy mission. ASTRO-H is an x-ray telescope designed to explore mysterious phenomena in the universe in unprecedented detail, and it will advance scientists' knowledge of black holes, supernova explosions, neutron stars, and the formation of galaxies like the Milky Way. Designed by Neptec Design Group, CAMS is an innovative laser measurement system that will calibrate measurements taken by the ultra-sensitive, hard X-ray telescope, significantly enhancing the quality of their images. Canada delivered CAMS to JAXA Tsukuba Space Centre earlier this year, and it has since been integrated into the observatory. Also see: http://www.smu.ca/about/news/2015/saint-marys-astronomer-leads-next-generation-of-black-hole-x-ray-exploration.html
   - **Entrepreneurship Professor Selected as Finalist for Prestigious Mentorship Prize** (15 April, 2015) There's more than a sense of déjà vu to Ellen Farrell's selection as a finalist for the 2015 Business Development Bank of Canada (BDC) Mentorship Award. Dr. Farrell made the cut last year as well, competing against hundreds of nominees from across Canada for the BDC's prestigious prize.
   - "The Business Development Bank of Canada has immense credibility helping entrepreneurs and small businesses," says Dr. Farrell. "It's a lifetime achievement to be selected for their national award. I am doubly honoured to make the finals for a second time." Since arriving at Saint Mary's University in 1996, Dr. Farrell has mentored hundreds of entrepreneurial students, sharing her knowledge, experience, and personal business savvy. The leader of the Sobey School's Entrepreneurship programs, and founder of the Order of Entrepreneurship — an award that recognizes students who put themselves through school by running their own businesses --- she has received more than a dozen awards for teaching and mentoring, most recently the 2015 Student's Association Teaching Excellence Award. Also see: http://www.smu.ca/about/news/2015/entrepreneurship-professor-selected-as-finalist-for-prestigious-mentorship-prize.html
   - **Dr. Peter Twohig Among the Inaugural Cohort of The College of New Scholars, Artists and Scientists** (17 September 2014) The Royal Society of Canada (RSC) recently announced their inaugural cohort of The College of New Scholars, Artists and Scientists. Among those honoured with admission to the cohort was Saint Mary's University Professor of History and Atlantic Canadian Studies and Canada Research Chair, Dr. Peter Twohig. "I am deeply honoured to have been elected to the College," said Dr. Twohig. "I have been fortunate to have had the benefit of excellent colleagues and mentors here at Saint Mary's University, across Canada, and beyond. My students, past and present, continue to inspire me." Also see: http://www.smu.ca/about/news/2014/dr-peter-twohig-among-the-inaugural-cohort-of-the-college-of-new-scholars-artists-and-scientists.html
   - **Interactive Map Marks SMU's History Throughout Halifax** (9 September 2014) The Saint Mary's University Archives has produced an interactive map that lets you check out various locations in Halifax tied to Saint Mary's more than 200-year history, starting with religious education under the direction of Bishop Burke in 1802 at the Barrington Street campus, to the modern-day location on Robie Street. The map, developed by summer archives assistant Carlisle Kent under the supervision of university archivist Hansel Cook, combines research on the University's history and matches it

with images from the Institutional Repository, an online resource for University-related digital content created and hosted by the Patrick Power Library. The resulting information has been placed in a Google map interface to produce a fascinating – and addictive – overview of the University's history. Also see: http://www.smu.ca/about/news/2014/interactive-map-marks-smus-history-throughout-halifax.html

APPENDIX 1

SAINT MARY'S UNIVERSITY SINCE 1802
One University. One World. Yours.
FACULTY OF GRADUATE STUDIES AND RESEARCH

NS Research & Innovation Graduate Scholarship Holders Report - 2015

Isabel Chavez - Mid Cretaceous sand supply to offshore SW Nova Scotia: tectonic diversion of Labrador Rivers during Naskapi Member deposition
The proposed research on the topic of petroleum geology will interpret the regional trends in Naskapi Member (Mid Cretaceous) shale and in thin sandstone deposits in the Scotian Basin and equivalent intervals in the Georges Bank to test a published hypothesis about supply of sediment to thick deltaic successions through the Bay of Fundy to the Shelburne sub-basin. If such sands are present in this un-drilled area, they could be important hydrocarbon reservoirs. A new reservoir offshore Nova Scotia's basin could provide a positive economic improvement for the province as well as new jobs.

Leah Springate - Conservation Biology
We are looking at gamete compatibility in the endangered North Atlantic right whale to determine why their reproductive rate is lower than their known potential. The right whale is arguably one of the most endangered large whales, and this new research will take us one step closer to developing protocols for aiding in the recovery of the population.

Ulrick Mumburi - Protecting communal livelihoods in the face of 'new wave' land formalisation: the transformation of communal ownership systems in rural Tanzania
This research is an original contribution to understanding the impact of the formalisation program on livelihoods of smallholder farmers, and the specific, necessary and/or sufficient, conditions under which it works (or does not work). The study will be a qualitative case study of land formalisation in Tanzania. The findings will be informative and revealing on these poorly understood phenomena, and are useful in generating capacity and strengthening the political will of local authorities in Tanzania—and, indeed elsewhere where land resource is an important aspect of community's livelihood—to implement appropriate development policies in rural areas. The study findings will be beneficial to Nova Scotian's through enhancing the understanding of better land management which is important in boosting agricultural productivity—especially that of small scale farmers.

Emily Peters - Utilization of growth-promoters to improve biomass productivity of *Arundo donax*
Arundo donax is a Mediterranean perennial grass species with characteristically high growth rate and biomass yield potential contributing to the current success of this species as a source of biofuel in Italy. The objective of this research is to evaluate the growth potential of *A. donax* on low-quality land in Nova Scotia as a purpose-grown advanced biofuel feedstock crop. Complimentarily, various types of growth-promoters will be investigated for their ability to further enhance *A. donax* biomass productivity in lieu of synthetic fertilizers. Evaluating the growth of *A. donax* in Nova Scotia is important to diversify provincial biomass resources without jeopardizing food sources or over-exploiting our abundant natural forests. Expanding on and creating new markets will result in dependable, local economic growth. A diversified biofuel industry could re-ignite similar economic success to that of the pulp and paper industry, as Nova Scotia's natural and monetary resources would be refocused into an industry of the future. Additionally, growing the economy through a biofuel industry can create long-term job opportunities in rural communities to generate incentive for permanent settlement in Nova Scotia.

Shane Theunissen - The Interface Between Global Hegemony and Cultural Marginalization: Agency, Education and Development Among Indigenous Peoples.

My research will operationalize a model of Indigenous education that can effectively create mechanisms which promote noetic spaces, cultural revalorization, and heuristic thinking. By pursuing a transformative education, as outlined in my research, Indigenous Nova Scotian's will be able to determine, to a greater degree, the paths of community development they wish to explore. This would ultimately advance the economic and social well-being of all Nova Scotian's.

Aman Abdulla Tanvir - Modeling and Control of Doubly Fed Induction Generator Based Wind Energy Conversion System

Wind power creates jobs and generates revenue for local communities. Revenue from wind farms helps stimulate local economies that need new roads, schools, libraries, and hospitals. Wind energy is now one of the most cost-effective and environmental friendly sources of new generation, competing with new installations of coal, gas and nuclear power. Nova Scotia is the most potential region for implement of large scale offshore wind farms. Offshore wind farms generates large scale power while reducing the power generation and maintenance cost. If it can implement properly then we can generate power more than our demand and the excess power can be sent to the national grid which will highly contribute in our economic sector. For large scale wind farms, variable-speed generators including Doubly Fed Induction Generator (DFIG) are widely used due to their better controllability and low maintenance cost. However, issues and challenges are still present in the research areas of the modeling, analysis and control of DFIG. My research objective is to develop accurate dynamic models of DFIG to improve the energy conversion efficiency, the fault-ride through capability and the support of grid stability. DFIG system are complex and require high qualified professional to understand and provide adequate services. The aim of this research is to offer an experimental system, based on the OPAL-RT Real-Time HIL/RCP Laboratory, to emulate a real system in an indoor laboratory that can be used in education, training and research. This will allow training of High Qualified Personnel and conducting R&D in renewable energy technology. It will bring contribution to scientific knowledge, solution for industrial issues and can be used as a state-of the art technology in colleges, universities, research laboratories and industry.

K.Tawfique Ahmed - Hybrid Wind-Solar energy system with battery Storage

My research project deals with renewable energies like wind and solar energy, controlling the output power from these resources and extracting maximum power from them. The objective of my research is to develop a hybrid wind-solar system with battery storage. The proposed system will extract maximum power from wind and solar. Also, if both wind and solar power is unavailable, the system will supply power from the battery storage. Currently most of the power is produced from the fossil fuels i.e., coal, gas, oil etc. This is both costly and hazardous for the environment. The Electricity Act requires Nova Scotia to produce 25 percent of its electricity from renewable energy by 2015 and 40 percent by 2020. Wind and solar energy are two widely used renewable energy sources. But, Wind and solar power varies depending on time. As standalone wind or solar energy system lacks in reliability due to intermittent nature, a hybrid wind-solar energy system can be a good option for implementing the power generation from renewable energy. If both of the power sources fail to produce power, battery storage in the hybrid system could be used as back-up power provider. A hybrid wind-solar energy system is reliable and energy efficient. The generated power will be environmental friendly and needs little or no maintenance cost. The proposed project will contribute to research and development in renewable energy, hybrid and storage systems for micro-grid applications. Furthermore, it will bring contributions to scientific knowledge, solutions that can be transferred to industrial applications and for training in colleges and universities in a wide range of areas involving Electrical, Control Systems, and Computer Engineering, which will make Nova Scotia more productive and competitive in renewable energy technology.

Tianyuan (Cathy) Yu - American Businessmen's Interactions with Chinese Political Elites in the 1930s-1940s: A Critical Hermeneutics Analysis of Pan-Am Expatriates' Narratives

This research is a critical hermeneutics analysis of two Pan-Am representatives' autobiographies which witnessed historical, intercultural interactions between American businessmen and Chinese political elites involved in the operation of China National Aviation Corporation (CNAC), an early Sino-US joint venture, from 1933 to 1949. The research will deepen our understanding of how China and the West have influenced and will continue to influence each other in the international political economy. The intercultural communication experiences of the forerunners can be illuminating for today's Sino-western cooperation programs, whether nongovernmental or governmental, business or political. The research will ultimately advance the economic and social wellbeing of Nova Scotia because of her ever growing exchanges with China in various areas.

Cara (Lopresti) Scheuer - Discursivity and Media Constructions of the Intern: Implications for Pedagogy and Practice

This research project aims to improve upon young people's early work experiences, with particular attention payed to improving upon health and wellness outcomes, such as psychological and physical health, and economic and social wellbeing. More specifically this project exposes and then challenges the oppressive and exploitative tendencies of internships, which has been a global concern, Nova Scotia included.

Samantha Penney - Leading a Psychologically Healthy Workplace

In order to promote psychologically healthy workplaces I am integrating psychologically healthy workplace models and transformational leadership theory. My dissertation entails (a) developing a measure to assess leaders' psychologically healthy workplace behaviours, (b) validating the measure, (c) developing and conducting a leadership intervention to promote psychologically healthy workplaces, and (d) examining the relationship between psychologically healthy workplaces and employee job stress and well-being. My dissertation has the potential to advance the economic and social well-being of Nova Scotia employees by reducing job stress and increasing employee health and wellness. Reducing job stress and improving employee health has the potential to significantly reduce the high economic costs and both individual and organizational costs associated with job stress and poor employee well-being. Moreover, improving the psychological health of Nova Scotian organizations has the potential to not only improve the health and wellness of employees but also help reduce turnover, absenteeism, health problems, and health care utilization of employees. This research is also practical, timely, and necessary given the recent release of the Psychological Health and Safety in the Workplace National Standard of Canada (Mental Health Commission of Canada, 2013) and the prevalence and cost associated with job stress and poor employee health.

Vinod Bachhav - Designing a LabVIEW interface for renewable energy systems (solar and wind) using National Instruments equipment

Aim is to design control interface which is at the heart of all of the components involved in the system. Functions of control interface fall into three main categories: data acquisition and logging, communication, and control. Control Interface will be designed to facilitate all these three functions in an efficient manner to maximize power output and hence the efficiency. Control part plays important role in this, as it will decide the best control method depending upon ambient environment to maximize power output. E.g. at high wind speed pitch control i.e. blade angle can be adjusted to limit power output by changing aerodynamic force on the blade. To achieve this goal all systems involved need to act in precise manner and control interface ensures that action.

Catherine Sedge - Mechanisms of Platinum Group Element Transportation and Precipitation in the Afton Cu-Pd-Au Porphyry Deposit, Kamloops, BC

This study is looking to evaluate a hydrothermal system by determining fluid temperature, fluid source, metal content, and distribution of palladium by conducting the first fluid inclusion study of the Afton Cu-Pd-Au porphyry deposit. The aim is to provide new information on PGE-rich porphyry deposits and determine how the

relationship of Pd grade and alteration can be used for exploration. This will help Nova Scotia by enhancing the exploration model for PGE-rich porphyry deposits which will help assist Nova Scotia in locating new deposits.

Julianne Acker-Verney - Research Making a Difference: Tools and Practices Required to Support the Inclusion of Women with Disabilities in Nova Scotia

This research employs a feminist and critical disability approach to identifying the diverse and complex support needs of women with disabilities wanting to participate in social research. The project will benefit cross-sectoral stakeholders to plan research and consultative processes that are inclusive and accessible to members of a population often excluded from, or silenced through, social discourse. In addition to addressing a gap in academic literature, this research will identify tools and practices that ultimately support the development of policy and programs that enhance the health and wellness of all Nova Scotian's including women with disabilities.

Gurpreet Kaur Cheema - Big Data Analytics for Understanding how Galaxies Form and Evolve

The goal of this research is to develop and apply data analytics techniques to large datasets to identify statistical trends and draw inferences about the formation and evolution of galaxies soon after the Big Bang. This research aims to advance the understanding of our place in the universe while developing data-handling techniques and skills that will also be transferable to other areas of research as well as industry.

APPENDIX 2

-- NOT FOR CIRCULATION OUTSIDE OF SMU --

Key to eight "Comparator Universities." Universities were selected based upon their location (regional, central Canada, and western Canada) and their amount of externally sponsored research in 2003.

Univ #1	Acadia
Univ #2	STFX
Univ #3	CBU
Univ #4	Mount Allison
Univ #5	Moncton
Univ #6	UdQ Outaouais
Univ #7	UOIT
Univ #8	Winnipeg