



*St. Francis Xavier University*  
**Strategic Research Plan**  
**Canada Research Chairs Program**  
**October 2010**

**Research at St. Francis Xavier University**

Founded in 1853, St. Francis Xavier University (StFX) is one of the top primarily undergraduate institutions in Canada. StFX offers strong academic programs in the humanities, social sciences and natural sciences, and in applied or professional areas including adult education, business and information systems, education, engineering, human kinetics, human nutrition, music, and nursing.

StFX is committed to the excellence of its research and teaching programs. Faculty are involved in experimental research, reflective inquiry, and creative work, all of which is supported by a strong record of external funding. The University is committed to provide strong administrative support for faculty research and, to this end, has recently appointed the University's first Associate Vice-President Research and related support positions. The University is also continuing to act on its commitment to upgrade and maintain physical infrastructure in support of research. For example, the new Gerald W. Schwartz School of Business and Information Systems building contains laboratory space for research in business and information systems.

StFX has a long tradition of research and education at the undergraduate level. While StFX supports a small but vigorous graduate program in the natural sciences and a larger graduate studies program in education, the introduction of undergraduates to research will continue to be major features of research work in all disciplines. StFX faculty help to develop highly qualified graduates through extensive involvement of undergraduates in their research programs. For many students, this involvement begins in the summer following their first academic year, continues through other summers, and culminates in a senior project and honours thesis. The annual Student Research Day is a showcase of undergraduate research and the number of participants continues to grow yearly. With this background and experience, graduating students are exceptionally well prepared to begin graduate studies or research.

StFX has a history of outreach to the Atlantic region and wider world, both in applied research and in adult learning. The Coady International Institute has educated community development leaders from around the globe for over 40 years. With two major grants from the McConnell Foundation, StFX has also initiated an innovative Service Learning Program for its students. Utilizing course-based and immersion service learning models, the program takes faculty and students to communities across Canada and, through a program of seed grants, promotes research on service learning. The Centre for Regional Studies (CRS) at St. Francis Xavier University is aligned with both the academic and social goals of the University, through its mandate to promote research into the social, economic, cultural and political issues of relevance to Atlantic Canada, and to eastern Nova Scotia in particular. The Centre is also committed to collaborative work with groups and organizations within the region, and to sharing the results of research. It has stimulated a broad array of humanities and social science explorations, which have highlighted important but often neglected dimensions of local and community life. Not only has this resulted in new avenues of scholarship, but it has also nurtured an expanding network of academic investigators and contributed, through the employment of undergraduates, to the training and mentoring of a significant number of emerging young scholars. The day-to-day operations of CRS are funded through a grant from the Social Sciences and Humanities Research Council.

StFX will continue to develop research infrastructure and resources to maintain and enhance a vibrant research culture and will continue to work with community, government and industry to ensure that the benefits of research are realized to address our social and economic environment.

### **Strategic Research Plan (Rationale and Objectives)**

The original StFX Strategic Research Plan was developed to define the research foci of the University in the context of the Canada Research Chairs Program. In order to ensure the most inclusive process for development of the Strategic Research Plan (SRP), the Academic Vice-President and Provost invited faculty to submit proposals for CRCs to the Academic Priorities and Planning Committee (APPC), StFX's senior academic planning body

The APPC adopted a set of guiding principles for the allocation of the CRCs at StFX, including: 1) research thrusts chosen to complement current research niches; 2) the identification of research thrusts that make possible co-operation with other Atlantic universities in fostering support for research; 3) chair positions to build research capacity in areas that complement undergraduate degree programs and provide research opportunities for students; and 4) within the limits established under the CRC allocation, the recruitment of faculty new to StFX.

This current version retains the format of the original Strategic Plan, including identifying research priorities of the University in research clusters. This version contains incremental changes from the previous version (September 2008). These changes are intended to update information on the research priorities of the University, including the research thrusts of the Canada Research Chairs, to provide a more detailed description of the University's approach to research on health and wellness, and to provide concrete examples of current and planned research activities. The examples are intended to be reasonably representative but are not an exhaustive account of research occurring in the research clusters.

**This version of the Strategic Research Plan was approved by the APPC on October 11, 2010.**

### **Strategic Research Plan Ongoing Development and Assessment**

The StFX Strategic Plan was originally developed to address the areas emphasis of the University in appointing Canada Research Chairs. Subsequent revisions, including this one, have retained the structure of the original Strategic Research Plan but have included incremental updates. Over the next year, the University will complete a review of its strategic research directions, following an extensive faculty-wide consultation process and will reformulate its Strategic Research Plan using the information and advice gathered during this review process. The reformulated Strategic Research Plan will also identify the University's assessment criteria, indicators and evaluation process for research.

### **Research Thrusts at StFX**

#### **A. Oil and Gas, Oceans, and Environment Research Cluster**

1. **Aquatic Ecology**
2. **Colloid Chemistry**
3. **Environmental Sciences, Climate Change and Global Warming**
4. **Modelling and Computer Simulation**

#### **B. New Economy, Governance, and Human Development Research Cluster**

5. **Culture and Human Development**
6. **Indigenous Peoples and Sustainable Development**
7. **Integrative Information Technology Diffusion in Small to Medium Enterprise**
8. **Public Policy and Governance**

#### **C. Humanities Research Cluster**

9. **Renaissance Humanism**

**D. Human Health and Wellness Cluster****10. Biological and Biochemical Determinants of Health****11. Social Determinants of Health and Health Promotion****12. Information Technology for improved Health Outcomes****A. Oil and Gas, Oceans, and Environment Research Cluster**

StFX has established the Centre for Applied Petroleum Sciences to coordinate research activities in oil and gas. Gerry Marangoni's research on Drilling Fluids and Surfactants, funded by \$3.5M from the Atlantic Innovation Fund, is another major thrust of the Centre. In addition, with \$3M in funding from the Atlantic Innovation Fund, Dr. Lisa Kellman, Canada Research Chair in Environmental Sciences, and Dr. Hugo Beltrami (both in the Department of Earth Sciences) have set up the Environmental Sciences Research Centre (ESRC).

**1. AQUATIC ECOLOGY**

St. Francis Xavier University serves a maritime community dependent on natural resources, particularly the oceans, estuaries, and inland aquatic environments. Marine and freshwater fisheries, aquaculture, and tourism are mainstays of the local economy. StFX has embarked on a research initiative centred on the priority area of aquatic sciences. Over the past 25 years, faculty hired in the Biology and Earth Sciences departments have developed productive research programs. These researchers, who work in key areas of aquatic science, have received external research support from funding sources that include NSERC, CIHR, Department of Fisheries and Oceans (DFO), CFI, and Nova Scotia Department of Natural Resources.

**Dr. Ricardo Scrosati**, CRC in Aquatic Ecology, is helping to recruit excellent new researchers and students to the University. Aquatic ecology is an essential discipline and a key complement to the further development of established research programs and StFX aquatic science expertise. Dr. Scrosati is carrying out extensive ecological monitoring and experimentation along the coasts of Nova Scotia and conducting laboratory experiments of species interactions, and mathematical modeling of population and community dynamics, particularly seaweed, phycocolloids and intertidal community dynamics.

StFX has significant characteristics that have proven attractive to recruiting an outstanding CRC in Aquatic Ecology, including: 1) a strong group of colleagues and established research success in interdisciplinary aquatically-oriented research that would promote research synergy; 2) the Gulf of St. Lawrence location with accompanying successful fisheries (crab, scallop, tuna, and lobster), plus mussel, salmon, and oyster aquaculture; 3) close liaison with the Gulf region of DFO and opportunities to leverage DFO funding through research partnerships; 4) excellent physical facilities, especially with recent CFI successes; 5) proven aquatic animal and plant care expertise; 6) ready access to fresh water, estuary, coastal and deep ocean environments of both pristine and polluted types; 7) accessibility to deep ocean research vessels (St. John's and Halifax); 8) established graduate school links with Dalhousie University and University of Prince Edward Island Veterinary College; 9) a successful, proven MSc degree program; 10) aquatic resources research expertise in hydrology, organic chemistry and numerous biological subspecialties; and 11) opportunity to participate in the new cold ocean fish resources Network of Centres of Excellence based at the Ocean Sciences Centre, St. John's.

The CRC in Aquatic Ecology complements the existing research balance and research excellence at StFX. This CRC is part of the ongoing strategic thrust in interdisciplinary aquatic-oriented research, and it is attracting and retaining excellent candidates in appropriate disciplines. This CRC is expanding aquatic research in the natural and social sciences as a central theme in StFX's research strategy. The CRC in Aquatic Ecology is also providing broad-based support that is benefiting several departments and the research of many different faculty members.

**2. COLLOID CHEMISTRY**

StFX has a strong group of researchers working in the area of colloid chemistry. Their research program has contributed to the development of surfactant technology by synthesizing and characterizing new surfactants. Research has involved nuclear magnetic resonance (NMR) spectroscopy, calorimetry, theoretical modeling, and surface tension measurements to enhance the understanding of how systematic changes in the surfactant structure alters the delicate balance of forces responsible for their aggregation into micelles, and other structures in more

concentrated systems. Over the past eight years, these researchers have been active in determining the equilibrium and dynamic properties of novel surfactants, reversed aggregates and polymer/surfactant complexes. This research has received support from NSERC and from the petrochemical and pharmaceutical industries.

During the next few years, their research will focus on 1) experiments in NMR spectroscopy and 2) new investigations of the solution properties of two-headed surfactants. These two-headed surfactants, which contain both negative and positive functional groups, are used in industrial applications, but their interaction with polymers and other surfactants defies easy characterization. A wide variety of techniques, including FTIR spectroscopy, fluorescence quenching, calorimetry, and capillary electrophoresis, as well as classical techniques such as measurements of conductance, viscosities, and surface tension, will be used by these researchers to carry out a wide range of fundamental investigations of surfactant properties in fluids related to the production and use of petroleum products. In 2003, Dr. Gerrard Marangoni, Department of Chemistry, was awarded \$3.5M from the Atlantic Innovation Fund to establish a Gemini Surfactant Technologies Research Laboratory for Drilling Mud Remediation; he is also collaborating with industry partners.

**Dr. Derek Leait**, CRC in Colloid Chemistry and StFX's only Tier 1 CRC, is greatly enhancing this well-established research thrust at StFX, by expanding it into the cutting-edge field of colloid diffusion. To date, the Chemistry Department has undertaken fundamental colloid research with some important practical applications, particularly in the oil and gas industry. A CRC is significantly expanding the group's collective expertise and allowing the current researchers to develop additional capacity to investigate problems of particular interest to the hydrocarbon industry. Furthermore, the presence of the CRC is permitting these researchers to broaden their research programs into other important commercial areas, such as food processing, herbicide/pesticide applications and the formulation of detergents. This enlarged research agenda is providing StFX's undergraduates with invaluable research experience and a strong competitive edge for graduate work or employment in industry.

### **3. ENVIRONMENTAL SCIENCES, CLIMATE CHANGE AND GLOBAL WARMING**

At StFX, faculty in Earth Sciences play a significant role in the Interdisciplinary Studies in Aquatic Resources (ISAR) program and in the recently developed Environmental Sciences Program, and have been involved in several successful cooperative research funding proposals, including the Canada Foundation for Innovation (CFI), a Community-University Research Alliances (CURA) SSHRC grant, the St. George's Bay Ecosystem Project, the Environmental Earth Sciences Laboratory (EESL) financed by the Canadian Foundation for Climate and Atmospheric Sciences (CFCAS), and the Environmental Sciences Research Centre (ESRC) financed through the Atlantic Innovation Fund (AIF).

**Dr. Lisa Kellman**, CRC in Environmental Sciences, is actively participating in the research programs at EESL and in the state-of-the-art Environmental Sciences Research Centre located in StFX's new Physical Sciences Complex. Researchers at EESL already play an important role in the Atlantic Environmental Sciences Network (AESN), a multidisciplinary network of environmental science researchers from Atlantic Canadian universities and several government laboratories interested in examining research problems of regional and global scope. A CRC in Environmental Sciences (Climate Change and Global Warming) is further strengthening StFX's role in this regional research network.

Dr. Kellman is developing a state-of-the-art research laboratory in the Physical Sciences Complex, attracting research funding from government agencies, expanding StFX's capacity in this fundamental area of research, and engaging graduate and undergraduate students in these research activities. Members of the Environmental Sciences Research Centre (ESRC), including Dr. Kellman, successfully led a multi-university application for an NSERC funded CREATE project. By developing excellence in this field, StFX is providing job opportunities for students, training highly qualified personnel (MSc, PhD, PDF), and contributing to the retention of faculty at StFX by facilitating an excellent research atmosphere in the Atlantic region.

### **4. MODELLING AND COMPUTER SIMULATION**

Simulation uses computers to calculate numerically how models of systems behave in equilibrium or as they evolve over time. Simulation has become a powerful tool to investigate virtually any type of problem, including many beyond the current range of experiment. Computer simulation has become one of the principal ways to obtain answers to complex technical and scientific questions. StFX has developed a reputation in the field of mathematical modelling and computer simulation, and the University intends to build on this competence.

Computer simulations are inherently more accurate the more CPU time and the more memory one can devote to a

particular problem by improving the statistics and reducing finite size effects which, in turn, increase the reliability of the conclusions drawn from the simulation. One way to overcome the necessity of resorting to a supercomputer for simulations is to network a collection of powerful workstations to create a parallel system.

As part of its commitment to support research, StFX was one of the founding institutional members of the ACEnet (Atlantic Computational Excellence Network) computing consortium that provides access to high performance computing through a collaboration of Atlantic Universities. StFX continues to be an active participant in the ACEnet consortium and hosts both staff and physical infrastructure of ACEnet.

This supercomputing facility enables StFX to develop a modelling and simulation centre focused on the CRC that, in addition to conducting its own research on materials and photonics, provides expertise in modelling to researchers in other disciplines, such as the environment, aquatic resources, and surfactant chemistry. This facility permits the Chair holder to investigate applied problems of particular interest to the hydrocarbon industry. Thus, the CRC in the modelling and simulation area serves as a link to other research thrusts and CRCs in the sciences and other disciplines at StFX. Furthermore, this centre provides a service to other research programs in the Atlantic region that benefit from StFX's simulation expertise and computing facilities. **Dr. Peter H. Poole** was appointed to this CRC in July 2002. Dr. Poole was one of the principal investigators of the ACEnet project, which received \$9.9M in funding from CFI, to create a regional high performance computing consortium in Atlantic Canada.

### **B. New Economy, Governance and Human Development Research Cluster**

Faculty researchers in social science disciplines at the University have a long tradition of interdisciplinary, interinstitutional and international collaboration. Three CRCs have been allocated to this cluster, which is focused on applied activities, such as informing public policy and fostering social and economic development.

#### **5. CULTURE AND HUMAN DEVELOPMENT**

The study of the role of culture has a long tradition in psychology and is enjoying a renaissance in current developmental research. The issue of culture is at the core of debate about the forces that underlie human development in both cognitive and social spheres.

The StFX Psychology Department has a strong faculty complement in Developmental Psychology. Its research spans the subfields of infant cognition and social development, language acquisition, attachment and relationship development, symbolic development, cross-cultural influences on human development, and the importance of social factors in cognitive development. All developmental faculty members are active researchers and, as a group, they are internationally connected to many leading developmental researchers. Publication and funding records are excellent. Over the years, this group has been instrumental in bringing together researchers interested in human development through small local conferences, international workshops, and invited addresses. StFX students have benefited tremendously from the national and international network established by the StFX faculty in developmental psychology. A significant number of students have gone on to work with researchers in graduate programs.

**Dr. Petra Hauf**, CRC in Culture and Human Development, is a leading international researcher in action understanding in infancy. She is enhancing the mentoring of undergraduate students in cutting-edge research and broadening the scope of research possibilities in developmental psychology. Dr. Hauf focuses much of her research on the intersection of several key elements of cognitive development during infancy and early childhood: action and emotion understanding, perceptual and motor development, and acquisition of physical knowledge. Using sophisticated technology, Dr. Hauf explores the interplay of self-performed actions and perceived actions performed by others, and its relation to motor development. To further investigate the impact of perception and production and the notion of a bi-directional influence during infancy, Dr. Hauf focuses on infants' motor perception in relation to developing motor capacities, like reaching, grasping, crawling, and walking. Based on her extensive research and knowledge base in these areas, Dr. Hauf is developing a training program to enhance early development of young children at risk for motor delays. To further this goal, she has built strong relationships with local intervention programs to target young children at risk for delays, and in doing so has extended her research beyond the laboratory and into the community.

#### **6. INDIGENOUS PEOPLES AND SUSTAINABLE DEVELOPMENT**

StFX is located in a geographical setting with a large dependence upon the sustainable use of natural resources. Marine and freshwater fisheries, aquaculture, forestry and tourism are mainstays of the local economy. This holds

true particularly for the region's Indigenous peoples and communities. StFX has developed a commitment over the last decade to deepen its research and educational engagement with the region's First Nation, the Mi'kmaq. The CRC arises from this commitment and is intended to address concretely and constructively social research issues pertaining to Indigenous peoples and sustainable development in local, regional and international settings.

The University's strong Indigenous and community-centred social research capacity is situated in the Departments of Anthropology, Sociology, Adult Education, Business, Economics and Political Science, the Faculty of Education, and the School of Nursing, as well as in the interdisciplinary programs of Development Studies and Aquatic Resources. These faculty members have established expertise, accomplishments and reputations in areas such as community/rural development, Indigenous peoples, First Nations archaeology, fisheries, comparative study of resource-dependent communities, First Nations governance and public policy, and together have formed the Indigenous Peoples Research Cluster and the Committee for Aboriginal and Black Student Success. Ten members of the Faculty of Education are involved in funded research related to Mi'kmaq educational policies and practices, in collaboration with the Atlantic Policy Congress of Chiefs and Mi'kmaq Kinimatnewey.

The University's Coady International Institute and the Extension Department also have research and community development expertise, further demonstrating StFX's continued commitment to fostering community-centred work. The recently launched Indigenous Women in Community Leadership program is designed to develop leadership potential of First Nation, Métis, and Inuit women, who are involved in economic and social development in their communities. In addition, StFX's Centre for Regional Studies supports community and regional level research.

**Dr. L. Jane McMillan**, CRC in Indigenous Peoples and Sustainable Communities, is greatly enhancing and developing the University's current research and educational capacity in the area of Aboriginal communities, natural resource dependent community development, documentation of local and traditional ecological knowledge, treaty rights implementation and 'action' social research. With major new funding from SSHRC's Aboriginal Research program, Dr. McMillan is also intensifying the interdisciplinary linkages and collaborations among various University academic units and the Mi'kmaq people in the area of treaty rights education and research. She is a member of StFX's Indigenous Peoples Research Cluster and Chair of the Committee for Aboriginal and Black Student Success. Dr. McMillan is the principal investigator for the Aboriginal Health Human Resources Initiative at StFX, a Health Canada funded project that has led to the creation of the Aboriginal Student Nursing Seminar Option. As a sociocultural and legal anthropologist, Dr. McMillan works closely with Mi'kmaq service providers and governments to enhance community-based customary law initiatives. Her current work on family violence, funded by Atlantic Aboriginal Health Research Program at Dalhousie University and Tripartite Special Projects, is impacting public policy and governance changes at the local and provincial levels. Additional collaborative research projects include a traditional foods strategy to enhance community economic and social health; an examination of the impact of the intersection of the Gladue Decision, section 718.2(e) and problem-solving courts; and an Atlantic Policy Congress study examining socioeconomic development with the Atlantic Aboriginal Economic Development Integrated Research Program, and another assessing and addressing the impacts of the Indian Residential School Settlement Agreement. Dr. McMillan is part of the Social Economy and Sustainability Research Network CURA Atlantic node at Mount Saint Vincent University, examining Indigenous cooperative development. These applied research initiatives are a natural extension of StFX's long tradition of promoting social justice, community-based empowerment, socio-economic viability and community sustainability. Dr. McMillan is active in regional, national and international Indigenous peoples' research networks; her work facilitates capacity building, training, mentoring and support services for Indigenous students through these networks.

#### **7. INTEGRATIVE INFORMATION TECHNOLOGY DIFFUSION IN SMALL TO MEDIUM ENTERPRISES**

A recent National Research Council of Canada report highlights that 'Canada's nearly two million small and medium-sized enterprises (SMEs) are the key drivers of job and wealth creation in all sectors of the economy. In view of SMEs' major impact on the economy, efforts to raise Canada's standing as a world leader in R&D and improve economic performance must take into account the vital role of SMEs. These firms have an ongoing need to access, develop and exploit new technologies and knowledge essential for their growth and prosperity.'

Small and medium enterprises (i.e., < 500 employees, < \$20M in sales) must not, however, blindly adopt such technology. Numerous researchers and business leaders have highlighted that only inter- and intra-firm efforts to increase flexibility and eliminate uncertainties can create the level of performance needed for long-term competitiveness and ultimate survival. As a result, investments in information technology by SMEs must not only

improve integration and flexibility within their own company, but also along their supply chain network, if sustainable firm performance and economic growth are to occur.

Achieving such integration is a difficult task, and yet the need for such integration among Canadian SMEs is more critical now than ever before. Increased international competition, scarcity of raw material, and a strong Canadian dollar have caused Canadian SMEs to seek out and eliminate waste, integrate and streamline their business processes across departments and with members of their supply chain (e.g., customers, suppliers), and improve their ability to respond to uncertainty in order to compete effectively. Efforts in this area have been hindered, however, by a general lack of integrated information systems, such as enterprise resource planning systems (ERP), within SMEs and between members of their supply chain.

The research of CRC **Dr. Todd Boyle** on Integrative IT Diffusion and its Impact on Small and Medium-sized Enterprises focuses on the processes, technology, and management issues associated with the adoption of continuous quality improvement (CQI) and supportive integrative information technologies by Canadian community pharmacies. Dr. Boyle's research is fully funded by SSHRC, NSHRF, CFI, NSRIT, and the Canada Research Chairs program. It is also supported by significant in-kind contributions from the Nova Scotia College of Pharmacists (i.e., provincial pharmacy regulatory authority) and the Institute for Safe Medication Practices Canada (ISMP-Canada). Dr. Boyle's latest projects include SafetyNET-Rx and quality related event (QRE) (i.e., medication errors and near misses) reporting and learning in community pharmacies. Developed by the research team (i.e., St. Francis Xavier University and Dalhousie University), Nova Scotia College of Pharmacists, and ISMP-Canada, SafetyNET-Rx is a continuous quality improvement program that enables community pharmacies to apply integrated information technologies (IT) and various quality management practices in order to reduce, better report, and learn from QREs. Key elements of SafetyNET-Rx include a web-based integrated error reporting and analytic tool, reporting errors to a national database for analysis at the national, provincial, and store levels, a CQI process customized for community pharmacies (i.e., SafetyNET-Rx Cycle), and pharmacy tailored root-cause analysis. The focus of Dr. Boyle's NSHRF-funded research is on the technology, process, management, and regulatory determinants of QRE reporting, service recovery, and learning in Canadian community pharmacies. The research involves testing a SEM for such determinants and outcomes, and developing an online self-assessment tool, so that pharmacy managers can benchmark their QRE reporting, recovery, and learning practices against the best, better, and promising practices used throughout Canada.

## **8. PUBLIC POLICY AND GOVERNANCE**

StFX has a longstanding commitment to the investigation of questions of democratic governance and their relationship to economic and social development. This commitment springs from the institution's historic role in scholarly inquiry into these issues, and in training social justice and community development activists. Consistent with these concerns and activities, the University supports faculty research and teaching expertise on government and public affairs.

Over the past decade, in particular, a significant core group of active researchers has emerged within the Faculty of Arts, who have a shared interest in public policy and governance issues. The University intends to continue the development of the Public Policy and Governance Centre, which will draw on the expertise of researchers in the social sciences and in the University's interdisciplinary programs, including Aquatic Resources, Development Studies and Women's Studies.

### **C. Humanities Research Cluster**

StFX has a rich history of teaching and research in the humanities. One University Research Chair is situated in this interdisciplinary cluster.

## **9. RENAISSANCE HUMANISM**

Community and business leaders have stressed the centrality of the humanities for creating a well-rounded, self-fulfilled citizenry and workforce. These leaders point to the need to be able to reason critically (philosophy), to understand institutional and cultural development (history), to appreciate the spiritual and aesthetic side of existence (religious studies and art history), and to be able to express oneself in all of these dimensions (English, languages, and the fine arts).

The term 'humanism,' taken from the Renaissance program of studies called the *studia humanitatis*, designates a

literary movement based on a rebirth of classical ideals. This movement had profound implications for theology, philosophy, the fine arts, science, and politics. It is clearly discernible in Italy as early as the 13<sup>th</sup> century and in England as late as the 17<sup>th</sup> century. Humanism formed an entire culture in Europe for some 300 years. The importance of an education in grammar, rhetoric, poetry, history, and moral philosophy – the core of the *studia humanitatis* – can be seen in figures as diverse as Dante, Shakespeare, Erasmus, Calvin, Pomponazzi, and Montaigne. Humanism spurred religious reform, political activism, artistic creativity, and even the birth of Galileo's new science. No other intellectual movement so united the disciplines now called the 'humanities' as did Renaissance Humanism. Contemporary disciplines are rooted therein, as is the modern sense of the primacy of the self.

**Dr. Sharon Gregory**, the Erasmus Research Chair, understands the broad history of Renaissance Humanism, both in itself and in relation to its Classical and Mediaeval roots. As well, she grasps the importance of humanistic learning for scholars and students today; such learning unites the various disciplines in a shared culture. Her primary research focus is investigating the relationships cultivated by visual artists, literary figures, and humanists in 16<sup>th</sup>-century Italy from a variety of perspectives, including art theory, and book publishing and illustration.

#### **D. Human Health and Wellness Cluster**

The University is developing a cross-disciplinary research approach to the fundamental determinants of human health and wellness. While the activities in this cluster are divided into the three areas below, it is particularly important to emphasize that these are not seen as isolated areas of research, but that they interact with each other and with research that is described under other clusters, such as environmental research, indigenous peoples and sustainability, integrative information technology, and humanities research.

#### **10. BIOLOGICAL AND BIOCHEMICAL DETERMINANTS OF HEALTH.**

This component is concerned with the fundamental biological processes of both the body and disease organisms that affect human health. Current research includes ongoing research in Biology, on microbial pathogenesis through studies of *Campylobacter* infection of intestinal epithelial cells, and in Chemistry, through a developing program of research into protein-protein interactions that allow invasion of host cells by a parasite. Research in biology also includes studies of the role of pulmonary surfactants in airway structures. The importance to human health of understanding the role of these chemicals in airway diseases is underlined by the fact that over two million Canadians suffer from asthma. Neurobiology research, which includes studying the analgesic effect of cannabinoids, may produce new analgesic treatment approaches, and studies of the neurobiological basis of addiction are intended to help understand how sociological, environmental and biological factors are related to drug addiction. Health and activity are fundamentally connected, and the University is developing as part of its biological and biochemical determinants of health research, a program to study how metabolism in skeletal muscle is related to specific metabolic and physiological variables in blood. The long-term goal of this research is to determine optimal exercise regimes for promoting human health.

#### **11. Social Determinants of Health and Health Promotion**

The health of rural Nova Scotians is a major concern, both because of the aging population and because of the high incidence of chronic diseases in Atlantic Canada. The correlations between human health, including the incidence of chronic disease, and the socio-economic factors, referred to as the social determinants of health, are well established, and much of the research focus has shifted to how change at both community levels and policy levels can reduce the negative effects of these determinants on health, as well as the inequities in health and health care related to these determinants.

StFX is committed to developing research with health authorities, including GASHA, and with communities to address the social determinants of health. For example, faculty in the Human Nutrition Department and faculty in the School of Nursing are members of an interinstitutional team with community partners, working on a food security project that is funded by the SSHRC Community University Research Alliance (CURA) program. Health equity, particularly in the context of primary care, is an important lens through which the determinants of health can be viewed, and this forms a major area of research activity. Healthy Child Development is a determinant of health, critical to the future well being of Canadians and the Canadian Health Care system. Research at StFX is developing approaches to healthy child development from early stage mother-child relationships to monitoring and reducing obesity in youth. There is clear evidence that atypical development in children affects their social cognitive

development. Dr. Hauf’s research on motor development in infancy and early childhood (see part 5 above) is enhancing our knowledge on how to foster early motor activities. Culture is both a determinant of health and a modifier of other determinants of health such as early development. Both of these aspects of culture will be considered in the research program on determinants of health.

An essential element of StFX’s commitment to working with health authorities, front-line practitioners and communities, to improve the health of Canadians and to see improvements in global health, is the translation of knowledge generated through research into forms which can be used by practitioners, decision makers, policy makers and communities to improve health. Knowledge transfer results from research projects, such as those on food security and early child development mentioned above. In addition, as part of its commitment to knowledge transfer to improve health, StFX will continue to host the National Collaborating Centre for Determinants of Health, which is one of six National Collaborating Centres established and funded by the Government of Canada, as part of the Public Health Agency of Canada’s National Collaborating Centre for Public Health. The flow of knowledge in University-Health Authority-Community partnerships is not all outward from the University. The University acknowledges and welcomes the process of knowledge exchange, in which the partners benefit from knowledge generated by research, and the University’s research is informed by other forms of knowledge held by the partners.

**12. Information Technology for Improved Health Outcomes**

Improved health outcomes through the application of information technology and artificial intelligence will remain a substantial component of the health research agenda at StFX. This includes research such as that being undertaken by Canada Research Chair Todd Boyle, which is described above (section 7) and the work of the Centre for Logic and Information led by Dr. Wendy McCaull. The Centre is funded, in part, by the Canadian Foundation for Innovation and the Atlantic Innovation Fund, and its work is carried out in collaboration with both private sector and health authority partners. In addition it is contributing to the training of HQP at StFX at the senior undergraduate, graduate, and postdoctoral levels. The focus of this research is the use of information technology to assist health care practitioners with decision making and to provide health care clients with a seamless system of care.

**Distribution of Research Chairs**

The University has strategically placed its Canada Research Chairs (CRCs) in the clusters indicated above to facilitate research capacity development in the areas identified. One University Research Chair is situated in the Humanities Research Cluster. The allocation of Research Chairs is as shown in the table below.

<b>Research Cluster</b>	<b>Affiliated Chair (S)</b>
<b>Oil and Gas, Oceans and Environment Research Cluster</b>	<p><b>Dr. Ricardo Scrosati, CRC in Aquatic Ecology (Tier II-Special, Biology Department)</b></p> <p><b>Dr. Derek Leait, CRC in Colloidal Chemistry (Tier I - NSERC, Chemistry Department)</b></p> <p><b>Dr. Lisa Kellman, CRC in Environmental Sciences (Tier II-Special, Earth Sciences Department and Environmental Sciences research Centre)</b></p> <p><b>Dr. Peter Poole, CRC in Modeling and Simulation (Tier II-NSERC, Physics department)</b></p>
<b>New Economy, Governance and Human Development</b>	<b>Dr. Petra Hauf, CRC in Culture and Human Development (Tier II-Special, Psychology Department)</b>

	<p><b>Dr. L. Jane McMillan, CRC in Indigenous People and Sustainable Communities (Tier II-SSHRC, Anthropology Department)</b></p> <p><b>Dr. Todd Boyle, CRC in Integrative Technologies (Tier II-SSHRC, Faculty of Business)</b></p>
<b>Humanities</b>	<p><b>Dr. Sharon Gregory, Erasmus Research Chair (Fine Arts Department)</b></p>
<b>Human Health and Wellness <sup>+</sup></b>	<p><b>Dr. Petra Hauf, , CRC in Culture and Human Development (Tier II-Special, Psychology Department)</b></p> <p><b>Dr. L. Jane McMillan, CRC in Indigenous People and Sustainable Communities (Tier II-SSHRC, Anthropology Department)</b></p> <p><b>Dr. Todd Boyle, CRC in Integrative Technologies (Tier II-SSHRC, Faculty of Business)</b></p>

<sup>+</sup>Note: The Human Health and Wellness Research Cluster was not one of the original StFX Research Clusters but reflects an emergent interdisciplinary research area of emphasis. Several of the CRCs affiliated with the original clusters are also contributing to research in this cluster, as indicated.

All Canada Research Chairs currently allocated to the University are filled as indicated above.