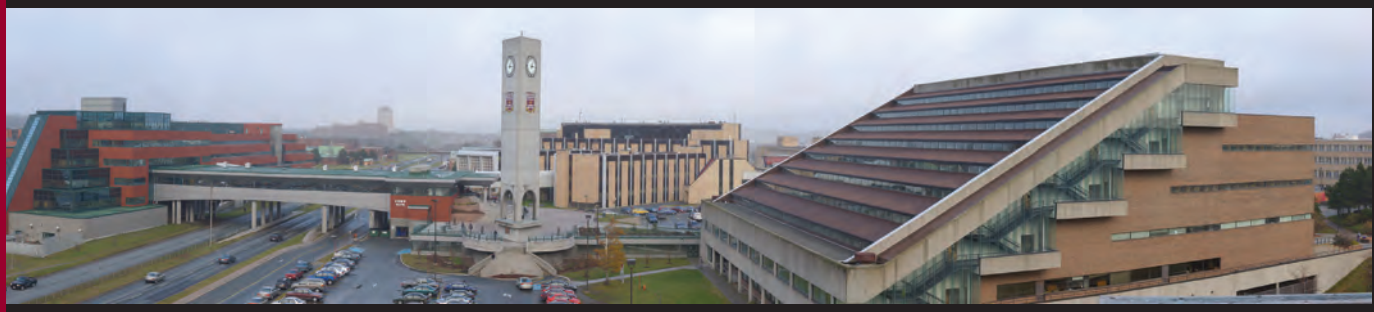
MEMORIAL
UNIVERSITY



Background Report to the Development of the Memorial University Research Plan

February 2010

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www.mun.ca/research/plan

MEMORIAL UNIVERSITY

The Background Report to the Development of the Memorial University Research Plan is published for the Office of the President, Memorial University of Newfoundland. The executive leads on the development of the university research plan are Memorial's vice-president (research) *pro tempore* and vice-president (academic) *pro tempore*. The plan's steering committee consists of the university's academic deans and directors. An external advisory committee consisting of members of the wider community, government, the corporate and business community, and industry have guided this process. To read more about the development of Memorial's research plan, or to provide your input through our online survey, visit www.mun.ca/research/plan/.

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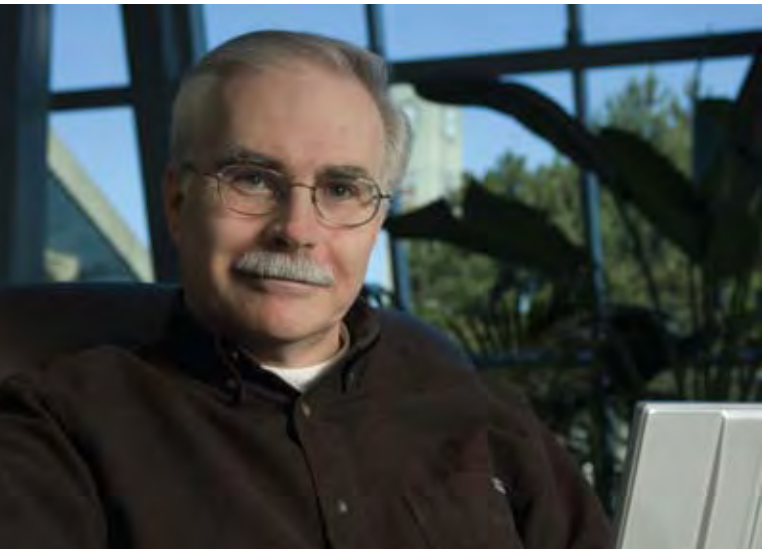
Letter from the President



It is my pleasure to provide you with this background document for the development of the Memorial University Research Plan. It provides some basic information on the history and current status of research activity at Memorial University, along with an external scan of key partners and sources of support for research from outside the university. This includes support from and the strategic priorities of the Government of Canada, the national research funding councils, and partners in the Atlantic region. Similarly, there is information on research support from the Government of Newfoundland and Labrador, and key provincial government priorities that can inform future research opportunities at Memorial. Finally, there is an overview of some research priorities of community, business and regional partners from across the province.

We trust this background information will prove useful to all those who wish to have input into the development of the Memorial University Research Plan, both from within and outside the university. An extensive effort is already underway to identify the research needs and opportunities at Memorial University. During the consultation process which we are now launching, we wish to explore how our needs and opportunities align with those of our partners and stakeholders. Indeed, we see the citizens of Newfoundland and Labrador, as well as our research partners in the province, from across Canada, and around the world as important stakeholders in the development of this research plan.

We will be engaging the people of our province in consultations during the process and we will obtain input from key provincial stakeholders. We have also launched an online survey on the Memorial University website (see address below) to capture the ideas of every individual or group who wishes to provide input into our new research plan, regardless of whether you make it to one of our public consultation sessions or not. If you are currently studying or employed at Memorial, if you are one of our many alumni, if you are a research partner in Newfoundland and Labrador or one from beyond our shores, or if you are a citizen with an interest in research at this great university, I urge you to go to www.mun.ca/research/plan and share your views with us.

Thank you for your interest in, support for and feedback about the future of research, scholarship and creative activity at Memorial University.

Sincerely,

Christopher W. Loomis, PhD
President and Vice-Chancellor *Pro Tempore*
Memorial University of Newfoundland

1. EXECUTIVE SUMMARY

From its earliest days Memorial University has encouraged research activity by its faculty. From very modest beginnings in the early 1950s, research at Memorial has grown steadily so that today research and development activities at the institution are a major enterprise undertaken with support from external sources that is now valued at over $90 million annually. We expect that research, and creative and scholarly activities, will grow substantially at Memorial over the next decade, and the development of a new research plan is timely.

Research complements teaching at a university. It advances knowledge, so that courses and programs deliver the highest level of quality learning and state-of-the-art understanding of the particular field or discipline. It fosters the sense of inquiry that is at the heart of education. Research also places demands on the university. A greater number of graduate students – people earning their master's degrees or PhDs – is a vital element of expanded research activity. More graduate students and more faculty conducting the research that drives graduate studies requires more space than undergraduate education requires. It requires specialized equipment, fieldwork, administrative supports, and a vast array of other supports that vary based on the discipline. A planned approach to research is essential if Memorial is to fulfill its mandate as Newfoundland and Labrador's primary research enterprise.

Origins of the research plan - In 2007 Memorial developed a strategic plan that identified research, creative activity and scholarship as comprising one of the five key pillars to advance the university's mission. The plan included an undertaking to generate "an inclusive process to review and revise the thematic interests set out in Memorial's Strategic Research Plan," which had been developed in 2000. It also committed to developing "these research themes to recognize Memorial's strengths, support the needs of the province and embrace global opportunities." In addition, it undertook to "enhance the research presence at Sir Wilfred Grenfell College, focusing on the strengths of the campus and the needs of the region." The current research planning exercise has its origins in those commitments.

Within the research, creative activity and scholarship pillar, five major goals were identified: focus on high need areas; research collaborations and partnerships; research environment; external funding; and, research engagement and productivity.

DID YOU KNOW

Memorial is home to 26 Canada Research Chairs studying diverse topics such as healthy aging, Irish history, cold ocean systems and human nutrition.

In 2006, we were told that Pluto is no longer a planet. The decision sparked heated discussion and debate among scholars and scientists, but one business researcher says the real controversy should be the assumptions we make about classification. An essay published in *Nature* by Dr. Jeffrey Parsons, and colleague Yair Wand at the University of British Columbia, argued that ill-conceived classifications can prove futile and even harmful to scientific progress. Here on earth, classification systems are used everywhere, from the folder systems that most of us use to organize e-mail to diagnosing illness. Dr. Parsons maintains that we must avoid the trap of imposing a categorization where it does not fit. The consequences of doing otherwise can range from annoyance (such as when we forget where we put a particular email) to disaster (such as when we misdiagnose and mistreat an illness).

Planning process - In November 2009 a process to develop a new research plan was initiated by the president *pro tempore* under the oversight of the vice president (research) *pro tempore* and the vice president (academic) *pro tempore*. It is guided by a steering committee of academic deans and directors and informed by an external advisory committee with membership from different sectors and regions of the province.

Planning will involve a wide-ranging consultative process which is composed of six main phases:

1. Assessment of current research strengths and opportunities;
2. Preparation of a background document that provides a scan of institutional, provincial and national research data and opportunities to inform internal and external consultation;
3. Preparation of a draft roll-up of themes, common strengths, opportunities, gaps and requirements for success;
4. Priority setting for research, creative activity and scholarship;
5. Preparation of draft plan goals, objectives, actions, and targets; and,
6. Plan finalization with consideration by senior executive, Senate and the Board of Regents.

Complete information on the planning process and the documents that will be used to inform the process and its decisions are available on the research plan website, www.mun.ca/research/plan/.

Scope - Memorial has developed research, creative activity and scholarship across the full scope of a modern university and the application of knowledge in those areas. "Research" in the research plan embraces and considers the spectrum of research, creative activity and scholarship. Throughout the rest of this document *research* will be used to represent this spectrum.

Background document - This background document is intended to inform the planning process by providing a synthesis of information on critical factors for the process. It includes background information on the institution and provincial, regional and national entities that have need for and support *research*. It also includes identification of opportunities for financial support of and for potential partnerships. The scan of opportunities presented in this document supplement discipline-specific knowledge of significant research opportunities. Additional information to this report will be available through the research plan website.

Memorial context - A major section of this document deals with a scan of Memorial *research* including academic units and special *research* centres and institutes. A brief history of the early development of *research* at Memorial is presented. An overview of units with *research* mandates and *research* support centres and groups is included, as well as an overview of the development of expertise and graduate programs. There is a discussion of the history and opportunities for *research* funding at Memorial, including the potential for Memorial to be a catalyst and leader in the development of a common *research* agenda for all interested parties based on the portion of revenue from the oil and gas extracted by operating companies that must be devoted to research and development (R&D), education and training in Newfoundland and Labrador. Information is presented on the development of knowledge transfer and exchange

at Memorial, through centres such as the Labrador Institute, Harris Centre and the research office at Grenfell College and through separately incorporated entities such as the Genesis Group and C-CORE, and through community and industrial outreach by the schools and the *research* centres at the Marine Institute.

National context - The national context for *research*, especially in terms of where funding opportunities are likely to occur, is described. The federal government is the largest funder of *research* in the country. The federal government recently released the Science and Technology (S&T) Strategy, which identified its intent to focus its investments in four priority areas – environmental sciences and technologies, natural resources and energy, health and related life sciences and technologies, and information and communications technologies. In addition they have identified 14 specific sub-areas for investment. We anticipate that these areas and sub-areas will be the focus of new and incremental research funding through federal bodies.

Through the national granting councils and federally-supported agencies such as the Canada Foundation for Innovation and Genome Canada, the federal government is a main source of investment in discovery and applied research and salary support for trainees in research for all academic institutions. It is through the investments of these councils that the fundamental core of *research* is creative activity and scholarship is developed and maintained at universities. Information is presented on the strategic goals as well as the major categories of the intended financial investments of the major councils – the Canada Council for the Arts, the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council, and the Social Sciences and Humanities Research Council. Similar information is provided for the Canada Foundation for Innovation and Genome Canada.

Other federal agencies such as the National Research Council of Canada and the departments of the federal government are important performers of and likely partners in *research*. Information on some key departments and agencies is provided. Science-based departments have developed a science technology map that highlights science needs in light of the S&T Strategy. The overlay of the science needs for oceans on this map is provided as an example of how federal department needs can be aligned with the S&T Strategy which can be a guide to development of working relationships between Memorial researchers and federal departments.

Regional context - There are also regional sources of support for *research*, such as Genome Atlantic and the Atlantic Canada Opportunities Agency's (ACOA) Atlantic Innovation Fund. The development of a new pan-Atlantic initiative in innovation that is sponsored by the Association of Atlantic Universities on the urging of ACOA is also described, as Memorial will likely play an important part in any such activity.

Provincial context - The provincial context for *research* has changed substantially over the past decade. The provincial government has developed strategic plans in a number of key areas that identify needs that can only be met with new *research* activity. These plans are described, as well as some of the specific research needs associated with them. The provincial government has also created a new body to provide financial support for R&D activities in the province – the Research & Development Corporation (RDC). The strategic approach and targets of the RDC are also presented.

In February 2008, researchers discovered the gene responsible for ARVC (arrhythmogenic right ventricular cardiomyopathy), a deadly genetic heart condition highly prevalent in Newfoundland and Labrador. As a result of the discovery, a diagnostic blood test has been brought to the world market to determine who carries the gene and doctors can perform life-saving interventions to those with this deadly condition. The research was led by Dr. Terry-Lynn Young from the Faculty of Medicine.

Over the past decade there has been substantial growth in knowledge-based industries in the province, and an increase in the utilization of new knowledge for more established industries. These industries have grown around special opportunities presented by the unique situation in the province and the ability to be competitive in the international marketplace. The potential to form partnerships with the private sector presents a great opportunity for Memorial and its researchers. Participation in the social and economic development of the province has always been a priority of the university. Identification of potential key partners in community and social development and environmental *research* is also fundamental to a research plan for Memorial University.

Revenues generated through exploitation of natural resources have placed Newfoundland and Labrador in a strong financial position. There is currently great opportunity in the province for social and economic development, as well as regional and infrastructural renewal. Memorial must be an essential contributor to these developments. The Memorial University research plan will be a key part of positioning the institution for such contributions.

This document provides some of the background necessary to inform the research plan. Within Memorial, every faculty, school and *research* unit is identifying issues and opportunities. An extensive consultations process will take place through the winter and spring to gain input from within and outside the university. The materials produced through this work and the schedule of consultations are available on the research plan website, along with an interactive survey so that all those who wish can contribute to this essential component of advancing *research* and its application in Newfoundland and Labrador.

Memorial created a buzz straight across the country with the release of its *Research Report 2009: This is the start of something big*, touting its impressive growth in research funding. According to Research Infosource, Memorial ranked as the top Canadian medical/doctoral university for growth in research funding over the period of 2002-07 – growing an astounding 116.7 per cent.

2. INTRODUCTION

2.1 Research, creative activity and other forms of scholarship

There are two fundamental activities that define a modern university such as Memorial University. One is teaching – the nurturing of intellectual development, analytical skills and a sense of inquiry in its students. The second is the generation of new knowledge or finding new ways to examine old knowledge to contribute to the betterment of society. This embraces the activities that are generally referred to as research and other forms of creative and scholarly activities. In the context of the modern university there are no simple definitions of these categories of exploration, nor are there clear demarcation lines between them. This Plan will encompass all these ways of generating new knowledge and new perspectives or understanding of established knowledge.

Research is most often thought of as the generation of new knowledge through a planned process of interrogating some property of the natural universe or of the behaviours and actions of societies to discover some new property that adds to our fundamental understanding of how things "work". Research of this nature is sometimes called fundamental, basic or discovery research. Examples might be a researcher trying to determine how a cell processes a certain compound, or if there are specific characteristics in a society that influence how the society responds to a stress like the closing of a central place of employment. In some cases the research is directed at solving a problem that has been identified in the application of knowledge. This type

of research, sometimes called applied research, could involve a researcher determining what properties of materials would make better survival suits, or attempting to discover what teaching process might be more effective in a classroom. The lines between these approaches are blurred, and categorization is most often counterproductive, as all forms have value.

Creative activities could include composing a new piece of music, or pursuing new forms of writing or new forms of performance. There is a range of other scholarly activities that are important to academic life such as discovering new relationships in existing knowledge or developing new concepts or theories about the physical world or society or new concepts relating to values and logic that underpin the workings of society.

Much *research* is performed from a specific perspective called a discipline, such as anthropology or physics, using a means of questioning and a background of information gained over time and accepted as being a reliable way to acquire new knowledge from a certain perspective. Increasingly, researchers and scholars from different disciplines are working together in an interdisciplinary way so that they can address more of the broader and more complex questions that are relevant to our wellbeing.

All these types of work that are carried out in a university rely on creative and imaginative individuals working alone or in groups to advance knowledge. A critical component of *research* is peer review. When advancing knowledge of any type, universities rely on academic peers who share specialized knowledge in a particular field. When publishing the results of *research*, or applying for funding, peer review is the "gold standard" of testing and confirming the quality of *research* findings and outputs. The independence and integrity of university *research* is protected through peer review. When a national funding council supports a *research* project at Memorial, it is not funding the university – it is funding a researcher or a research team that a committee of peers has judged superior to other applicants. Memorial, through implementation of the resulting research plan, will enhance the "conditions for success" of *research* at Memorial, to advance knowledge and academic inquiry, to support personal and institutional successes, and to transfer knowledge for the benefit of Newfoundland and Labrador, Canada and the world.

2.2 Research planning at Memorial University

Planning in most universities has until recent years been focused around the development and delivery of academic programs. Universities developed clusters of *research* excellence largely in response to opportunities for funding, their location or community context, or responding to requirements of their legislated mandate. In recent decades, opportunities and expectations for university *research* have grown immensely and *research* has taken a more prominent role in overall institutional planning.

The first formal strategic research plan for Memorial was developed in 1998 in advance of the first round of applications to the Canada Foundation for Innovation (CFI) for research infrastructure. Shortly thereafter, in anticipation of the initiation of the Canada Research Chairs (CRC) Program, the original plan was further developed after a broad consultation with representatives from across the institution. The resulting 2000 *Strategic Research Plan*[1] outlined four major thematic areas of *research* emphasis for Memorial University: oceans and coastal studies, industrial development and environmental sustainability, health, and North Atlantic/Newfoundland and Labrador Studies.

Subsequent to the development of this *Strategic Research Plan* there have been two other reports with recommendations for *research* at Memorial, each of which has taken somewhat different perspectives on how *research* might be strategically organized and supported by the institution. These reports, prepared by groups led by Peter Tremaine in 2001 and Neil Bose in 2005, are available at the research plan website. They address issues and provide recommendations intended to support the infrastructure for broadly based *research* activity at the university.

Strategic planning for the university as a whole has also been developing in recent decades. *Launch Forth: A Strategic Plan for Memorial University of Newfoundland* emerged in 1994 after two years of university wide efforts as the first collective strategy and vision for the university.[2] *A Strategic Framework for Memorial University* followed in 2000, building upon the original plan and identifying seven priority areas for development, one of which was "Research and Creative Activity".[3]

Memorial is home base for the Canadian Healthy Oceans Network (CHONe), a group of 65 researchers from 15 universities and multiple federal research labs across the country. The network was launched in January 2009. CHONe brings together Canada's marine science capacities and provides a baseline of information against which future changes in the oceans can be monitored and understood. It is led by biological oceanographer Dr. Paul Snelgrove.

Memorial's most recent strategic plan[4], released in 2007, is the result of a comprehensive consultation with the university community and the people and organizations of Newfoundland and Labrador. The objective of the plan is to build on the success of Memorial University's previous plans and to outline the important priorities that will guide the university in its next five years and beyond. The mission for Memorial set out in the 2007 Strategic Plan is that:

> *"Memorial University is an inclusive community dedicated to creativity, innovation and excellence in teaching and learning, research and scholarship, and to public engagement and service. We recognize our special obligation to the people of Newfoundland and Labrador. Memorial welcomes students and scholars from all over the world and contributes knowledge and shares expertise locally, nationally and internationally."*

The 2007 plan identifies five pillars as key areas for strategic action: students; research, creative activity and scholarship; needs of the province; conditions for success; and institutional responsibility. Within the research, creative activity and scholarship pillar five major goals are set out:

- Focus on high need areas;
- Research collaborations and partnerships;
- Research environment;
- External funding; and,
- Research engagement and productivity.

The current process to develop a new research plan was initiated to advance these goals.

2.3 Scope of the developing Memorial research plan

Throughout its faculties and schools, Memorial University has developed *research*, across the full scope of a modern university and the application of knowledge in these areas. The research plan will embrace and consider the full spectrum of basic and applied *research* promoted at the St. John's campus, the Marine Institute, Sir Wilfred Grenfell College, and the Labrador Institute. The research plan will recognize the diversity of the modes of dissemination of the results of our *research*. The plan will be based on the principle of freedom for researchers to pursue *research* that is based on their individual and collective intelligence, curiosity, inventiveness and creativity. It will be based on an objective of striving for excellence and of identifying the resources needed to be able to achieve excellence.

Strong connections to its community have been a hallmark of Memorial University. Universities throughout the world have been asked to contribute not just to the generation and distribution of new knowledge, but to be catalysts for innovation in policy, culture and industry. Throughout our history, Memorial has taken the role of contributing to the quality of life and prosperity of our community very seriously. The research plan will encompass the spectrum of activities that embody those contributions to community through knowledge transfer and exchange and creative and innovative activity.

Significant changes have taken place in the internal *research* environment since the *Strategic Research Plan* was developed in 2000. The external environment influencing

research has also changed, in terms of strategic targets for research support agencies, government priorities for innovation, and the introduction of new government programs that support *research*.

Past strategic decisions by the university regarding the development of our academic capacity play an important role in determining future *research* strategy. Similarly, decisions to create the unique *research* entities that are present at Memorial are important to the current planning process. Knowledge is a powerful resource that must be cultivated and managed over time to bring maximum benefits to its creators and users. Institutional planning and agreement is needed in partnerships between the university, funders, governments, industries, community organizations, the college system and other universities to ensure the partnerships are sustained beyond the individuals who develop them. The research plan development process will include consultations with key stakeholders in *research* activity to develop the institutional supports necessary to promote and sustain *research* partnerships.

Memorial University expects its faculty members to carry out *research*. Faculty members are free to choose the subjects and approaches to their individual activities and whether they carry them out as individuals or in groups. The university provides space, infrastructure and administrative support to enable all faculty members to pursue *research* and scholarly activity of their own choosing. This is an essential foundation of a modern university.

For reasons that may be related to mandate, location, relationship with their community, history of development, among others, modern universities are now developing some areas for particular attention where it is anticipated that they can make special contributions to *research* and to the development of their communities. This plan will consider strategies for the broad supports that enable faculty members to pursue *research* activities of their own choosing as well as identifying and developing selected broad areas that Memorial sees as enabling it to foster *research* strengths involving many faculty members and graduate students, across disciplines. Where these *research* strengths align with the needs of the province, Memorial can further advance its special obligation to the people of Newfoundland and Labrador. The plan will inform how the university will make investments to achieve a balance among these imperatives.

The Memorial University library system holds the largest research library collection east of Montreal and contains more than 1.8 million books.

A new motion simulator is giving Memorial researchers a better understanding of how to make working in harsh environments safer, marrying industrial needs with applied research. The high-tech gear, which includes a small platform with steel rails mounted on a movable base, simulates potentially dangerous work environments such as offshore oil rigs, ships and airplane decks. It has been used in a study involving the School of Human Kinetics and Recreation and the Faculty of Engineering and Applied Science studying the effects of motion induced interruptions and motion induced fatigue.

3. MEMORIAL UNIVERSITY

3.1 The foundations of Memorial

Memorial University was established in 1949 by an act of the new Government of Newfoundland. The importance of a provincial university is seen in the fact that the act was the first piece of legislation passed by the House of Assembly which was not related to creating the mechanisms of the government itself. The debate on the legislation provides insight into how important the legislators saw postsecondary education to be for the province's people, and the high expectations that they had of the institution and its graduates.

The *Memorial University Act* provides for an institution that is expected and fully empowered to act as a modern university providing education and fostering original inquiry in a comprehensive range of fields. Reflecting the important role that the fisheries and forestry played in the economy of the province, the university was mandated explicitly to carry out research in those areas and Memorial continues to see its contributions to the social and economic development of the province as a core element of its mandate.

3.2 Memorial campuses

Memorial University is comprised of three main campuses: the St. John's campus, the Fisheries and Marine Institute at Ridge Road in the capital city, and Sir Wilfred Grenfell College in Corner Brook. The Labrador Institute co-ordinates Memorial's activities in Labrador, with offices in Happy Valley - Goose Bay and Labrador West. The university also has a small campus in Harlow, England. This campus is usually used to provide unique learning opportunities for students, but there may be opportunities for the Harlow campus to form a base for *research* activities.

The St. John's campus encompasses six faculties (Arts, Business Administration, Education, Engineering and Applied Science, Medicine and Science) and five schools (Human Kinetics and Recreation, Music, Nursing, Pharmacy and Social Work), offering undergraduate to professional and doctoral degrees and producing a vast array of *research*. Many of Memorial's *research*-related centres and groups and much of Memorial's *research* infrastructure are based at the St. John's campus.

Sir Wilfred Grenfell College opened in Corner Brook in 1975, under the name West Coast Regional College. Renamed in 1979, Grenfell College offers bachelor degrees in areas such as arts, science, fine arts and nursing. In the last decade, additional degrees in areas such as Education, Tourism and Resource Management have been introduced to meet the ever-changing socio-economic needs of the Western region.

The Fisheries and Marine Institute provides programs focusing on fisheries and marine science and technology, including undergraduate and graduate degrees, advanced diplomas, diplomas of technology, technician diplomas and technical certificates. In 1992, the Marine Institute merged with Memorial. The institute has three schools – the School of Fisheries, the School of Maritime Studies and the School of Ocean Technology – and within these schools a number of specialized centres and units, including: the Centre for Aquaculture and Seafood Development (C-ASD), the Centre for Sustainable Aquatic Resources (C-SAR), the Fisheries Conservation Group, the Centre for Marine Simulation (CMS), the Offshore Safety and Survival Centre (OSSC), Safety and Emergency Response Training (SERT) Centre, the School of Ocean Technology Applied Research Unit (SOTAR), and MI International.

3.3 Development of research at Memorial

In its earliest days Memorial placed emphasis on broad-based undergraduate programs in the arts and sciences, but by the 1950s, a strong *research* presence was burgeoning in the growing institution. Departments began hiring faculty members on the basis of both their *research* and teaching strengths in the early 1950s and developing *research*-based programs. The Chemistry and English departments were the first to offer master's degrees (1954) and doctoral programs (1965). [5]

Early in the 1950s, significant science *research* programs in spectroscopy and organic syntheses were established that were funded by the National Research Council (NRC), and other sources, including industry. Some of the early appointees to the departments of Biology and Geology undertook systematic field *research* around the province in the 1950s, including in Labrador. Newfoundland-based *research* from Science departments included looking for artificial drying techniques for salt cod, designing an experimental fish plant, and investigating the size of fish stocks off Newfoundland.

Early *research* from English, Economics, and History focused on characteristics of the social and economic foundations of Newfoundland and Labrador. For example, faculty members in English studied Newfoundland dialect and the origins of Newfoundland place and family names.

The emphasis on Newfoundland studies was a reflection of practical access to a fertile *research* environment and an interest in responding to the needs of the local community. Closeness to its community, as envisaged by the founders, has always been a striking characteristic of Memorial in comparison to the perspective of many of its sister institutions nationally and internationally. At the same time, while initial *research* activities were largely Newfoundland-based, Memorial was helping to expand the province's cultural and international awareness as well as its prominence globally by recruiting faculty from across Canada, and from the U.S., Britain and other countries.

Memorial's maturing *research* activity during the 1950s was reflected in the 1961 creation of its first dedicated *research* institute – the Institute of Social and Economic Research. The first separate *research*-focused body in natural sciences, the Marine Sciences Research Laboratory located at Logy Bay, was created in 1967. In 1975, the Centre for Cold Oceans Resources Engineering (now C-CORE) was formed to work with Canadian industry to identify engineering challenges and create solutions related to the development of ocean resources. It is noteworthy that these first *research* institutes were multidisciplinary in nature and their basic and applied *research* had substantial focus on the challenges and opportunities of the local and regional community.

In recognition of the growing *research* activity at the university, the Office of Research was created in 1974. The principal charge of that office was to provide the core administrative services related to external *research* funding within the university. In 1983, the first associate vice president (research) was appointed, reporting to the vice-president academic. The continuing expansion of *research* and its emerging position as an important strategic component of the university led to the creation of the separate position of vice-president (research) in 1992.

- **Expertise**

The major *research* resource of the university is found in our people. As part of the research plan process, units of the university have identified areas of *research* strengths, needs, and opportunities. These areas are based on the capacity of the faculty, students and staff and the institutional supports for *research*. Strengths identified are given in detail in the unit reports available on the research plan website at www.mun.ca/research/plan/templates.php.

Among Memorial's researchers are those who have been recognized as having made outstanding contributions in their fields, by election to the highest-level national bodies such as the Royal Society of Canada, the Canadian Academy of Engineering and the Canadian Academy of Health Sciences. Memorial also identifies and celebrates our own outstanding researchers through awarding University Research Professorships, President's Awards for Outstanding Research and the recently announced Terra Nova Young Innovator Awards. In addition, Memorial is home to 26 Canada Research Chairs in the targeted areas identified in the last strategic research plan. The recipients of the distinctions and awards mentioned in this section are listed on the research plan website.

Memorial is also experiencing a significant infusion of new faculty members, who bring their own *research* ambitions and expertise to the university. All these faculty members represent an enormous *resource* of expertise and research capacity.

- **Graduate programs**

Graduate students represent a fundamental driver of university *research* activity. *Research*-based master's programs were developed early in the life of Memorial. Master's programs were introduced in the 1950s with the first ones being in Chemistry and English. Doctoral programs were introduced in the 1960s with the first ones again being in Chemistry and English.

The School of Graduate Studies was created in 1975, which was a strong indication of the commitment of the institution to developing a *research* agenda. The first dean of Graduate Studies was Fred Aldrich who oversaw a substantial growth in disciplinary graduate programs throughout the 1970s, and the introduction of the first interdisciplinary program in Biopsychology (now called Cognitive and Behavioural Ecology).

Today, Memorial offers 85 master's programs and 39 PhD programs (including a joint MD - PhD program) across all faculties and schools and the Marine Institute. In addition to traditional disciplinary-based programs there are now 14 master's and five doctoral programs that are interdisciplinary, encompassing more than one faculty or school.

Graduate enrolment at Memorial has increased by more than 16 per cent over the past five years, from 2,295 in Fall 2005 to 2,673 in Fall 2009. During this period, part-time enrolment of graduate students rose by over 20 per cent while full-time enrolment grew by approximately 14 per cent. The *research* activities of graduate students places increased demand on office space, special *research* supports and *research* administration supports, and as the numbers of graduate students has increased at Memorial, physical space alone has become a critical issue. Memorial needs to keep pace with the *research* infrastructure and supports needed for increased *research* activity.

3.4 Research funding at Memorial

Research has continued to increase in intensity at Memorial. Beginning with a modest National research Council (NRC) grant to the Chemistry department in 1953, support from granting councils for *research* has increased substantially across all faculties and schools. From its earliest days Memorial also found support for *research* activities from other government sources and industry, and those forms of funding have grown as much or more than granting council funding. At the Marine Institute, for example, most research funding has historically come directly from industry and various government departments and agencies. More recent successes by researchers at the Marine Institute in competition for funding from the Natural Sciences and Engineering Research Council will set the stage for the expansion of granting council funding for the institute into the future.

- **The growth of research and development expenditures in Newfoundland and Labrador**

Figure 1 shows expenditures on R&D in Newfoundland and Labrador from 1979 to 2006, by sector performing the research. Note that R&D conducted by private not-for-profit organizations (voluntary associations, philanthropic foundations and research institutes supported by the associations and foundations) is included in the key to Figure 1 (under the headings 'Non-Profit' and 'Prov Research'), but in Newfoundland and Labrador those sectors did not report conducting research in the time period and so do not appear in the graph. Higher education institutions in the province have increased R&D expenditures by almost 8 per cent per year since 1997. Memorial is the primary higher education institution conducting R&D in Newfoundland and Labrador and the graph illustrates the increasing potential for collaborations with other sectors currently conducting research.

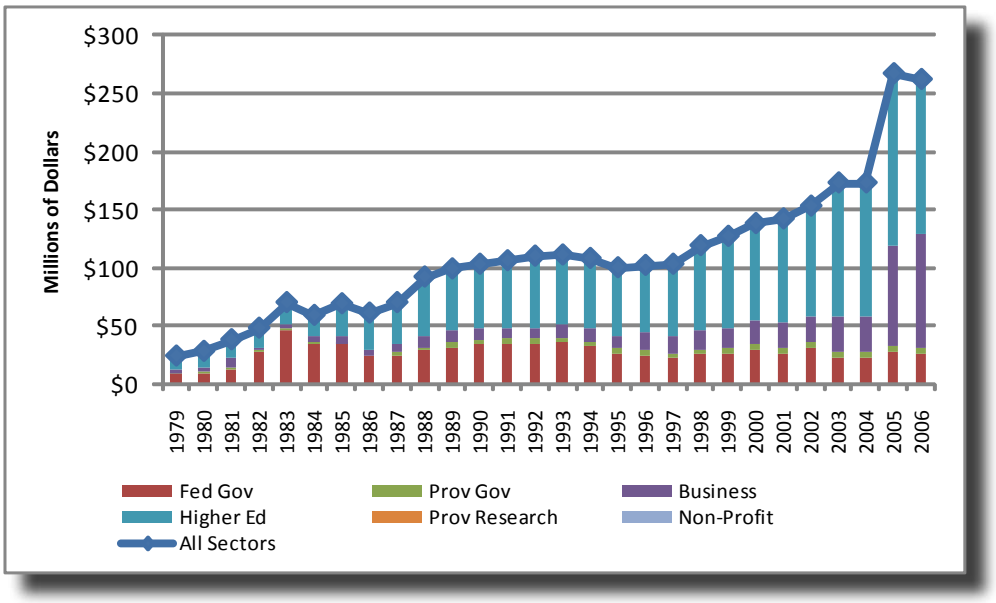


Figure 1. Total Newfoundland and Labrador Research and Development Expenditures by Sector Performing the Research and Development, 1979 – 2006. (Source: Wade Locke, Department of Economics, Memorial University, 2009. From Statistics Canada 88-221-X: Gross Domestic Expenditures on Research and Development in Canada (GERD), and the Provinces-National Estimates 1997 to 2008 and Provincial Estimates 2002 to 2006 (January 2009), Statistics Canada 88-001-X1E: Science Statistics- Total spending on research and development in Canada, 1990 to 2006 and provinces 1990 to 2004, and CANSIM Table 358-0001).

- **Developing the funding base**

Both external and internal forces have had a strong influence on the growth of *research* at Memorial over the past decade. Increased investment in *research* by the federal government has presented major opportunities for growth. Access to regional funding though programs such as ACOA's Atlantic Innovation Fund (AIF) has enabled the growth of infrastructure and operating funding and promoted interactions with industry. A major advantage of the regional and provincial investments in *research* has been to enable Memorial to remain competitive in national competitions for funding over that period by providing essential leverage support. A consideration of the sources of support for R&D funding at Memorial over the last decade shows substantial growth in funding received from the granting councils and from other sources, as illustrated in Figure 2.

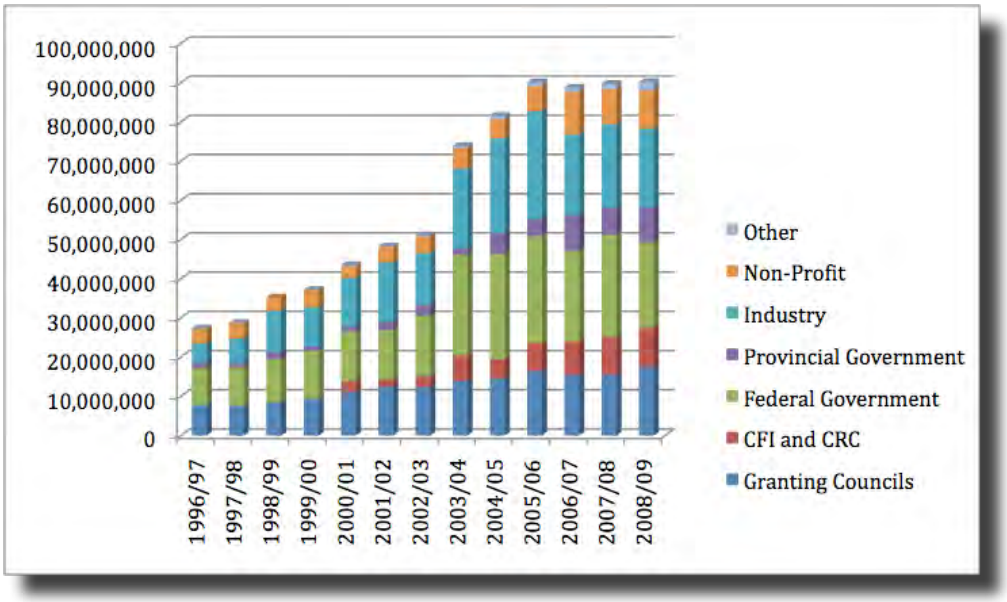


Figure 2. External Sources of Research Support by Sector, 1996/97 - 2008/09 (Source: Memorial University of Newfoundland Fact Book, 1999 to 2007, www.mun.ca/ciap/fact_book.php; Memorial University of Newfoundland Inventory of Sponsored Projects, 2007/08, www.mun.ca/research/publications/Inventory.php; Information from Memorial University of Newfoundland Fact Book, 2009, pending publication). Notes: 'Granting Councils' includes Canada Foundation for Innovation and the Canada Research Chairs Program. 'Other Research' includes grant and research contracts.

Funding from the granting councils (the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council, and the Social Sciences and Humanities Research Council, described below), which is only available to faculty through competitive peer review, is considered to be the "gold standard" for measuring capacity in fundamental *research*. It is that funding that usually enables researchers to establish ongoing *research* activity that underpins their abilities to participate productively in other *research* and development activities.

In addition to funding from the granting councils, grant support is received from a variety of other granting agencies, from federal and provincial government departments and agencies, the private sector, private foundations, non-profit organizations, and foreign public bodies such as the National Institutes of Health in the United States. Funding in the form of contracts for very specifically targeted *research* is also received from organizations in many of these sectors.

- **Major research project funding**

Over the past decade Memorial has been successful in obtaining substantial sums in support of *research* infrastructure from national funders such as the Canada Foundation for Innovation (CFI), from ACOA programs such as the Atlantic Innovation fund, and from partners in industry and the provincial government.

Funding awarded by CFI to Memorial University since 1998 is just over $50.7 million, and when matched with partner funds the total is in excess of $125 million in cash and in kind. Major partner contributions have come from the provincial government (24 per cent), industry (26 per cent), and federal programs (9 per cent). Grants have ranged from support for acquisition of a single piece of equipment or a data set for a new researcher to establish a research program, to funding for major institutional undertakings such as the development of the aquaculture facility at the Oceans Sciences Centre or multi-institutional undertakings such as the development of the Atlantic Computational Excellence Network.

Memorial has received a substantial investment for its research infrastructure from CFI. The figures below indicate the total funds received by Memorial and some comparator institutions since the inception of CFI in 1998. Amounts listed are the CFI direct investments. Given the partnership requirements that CFI has for its funding, the total amounts levered for infrastructure can be estimated by multiplying the CFI numbers by a factor of 2.5. Some categories of CFI funding have institutional allocations, and Memorial has fully used its historical allocation to date.

In order to gain a measure of relative success in CFI funding the amounts received by some comparison institutions are given below:

	$ million
Memorial University	50.7
Dalhousie University	77.9
University of Manitoba	60.2
University of Saskatchewan	155.9*
University of Victoria	109.1*
University of Western Ontario	151.0

**The figures for the University of Saskatchewan and the University of Victoria include $56.4 million and $39.9 million, respectively, for major national projects.*

While there are significant opportunities for federal funding for R&D, the relatively small size of most firms in Atlantic Canada means that the region has not leveraged these programs as much as others areas of Canada.[6]

The Atlantic Innovation Fund (AIF) has played a critical role in offsetting this problem in the region by providing a source of R&D funding over the past decade. At Memorial, AIF has supported a broad range of research and infrastructure investments, including an electronic rural medicine strategy, remotely operated aerial vehicles for environmental monitoring, and equipping and operating a portion of the Inco Innovation Centre. Funding received from AIF to date, including that awarded to C-CORE, has totaled more than $70 million - with partner contributions the value is in excess of $200 million. These figures include the latest round of AIF funding, announced on January 31, 2010, which provided $13.8 million to Newfoundland and Labrador in support of seven research and development projects. Among these seven projects were one awarded to C-CORE, two in Memorial's Faculty of Engineering and Applied Sciences, one in the Faculty of Medicine and one in the Marine Institute.[7] A complete record of funded projects awarded to Memorial and C-CORE to date is available on the research plan website.

- **Research and development investments based on offshore oil production**

The companies that are extracting hydrocarbon resources in the province's offshore are obligated to invest a portion of their production revenues in R&D, education and training in Newfoundland and Labrador. Based upon recent production volumes and oil prices, the required investment over the next 25 years will be very large, in the range of $500 million to $1 billion.

Many scenarios for the funds that will become available are possible, and they depend on certain assumptions on price and production volumes. Below is an example of one of those scenarios that was developed in 2009 by Dr. Wade Locke of Memorial's Economics department. Among other factors, this scenario assumes, conservatively, that there will be no new extractable resources developed.

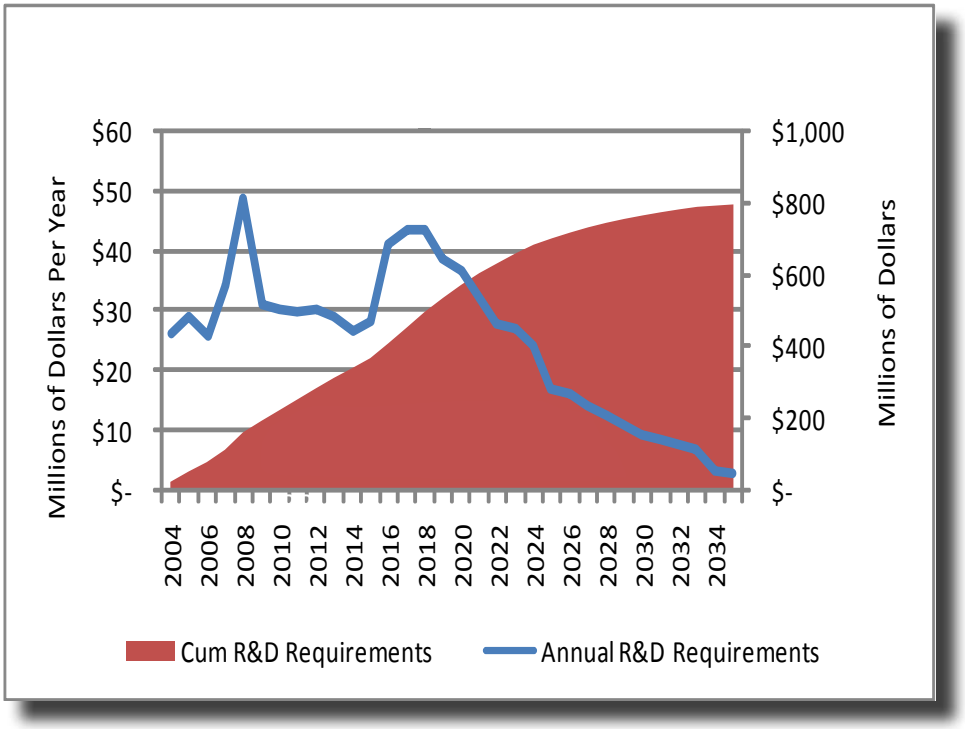


Figure 3. Forecast of Obligations from Existing and Planned Oil Projects in Newfoundland and Labrador to Research and Development, Training and Education, 2004 - 2034 (Source: Dr. Wade Locke, Memorial University Department of Economics, "Offshore Oil and Gas, the Economic Crisis and the Local Economy": Presentation to Newfoundland and Labrador Oil and Gas Industries Association, (June 18, 2009).

The size of these oil and gas obligations, even at the lower range of the estimates, presents an unprecedented opportunity for the province. The operating companies will determine what types of research activities will be supported through these investments, but there are currently no constraints on the ways in which the required investment can be made. Memorial should be a leader in working with the community and the operators to develop an approach for the investments in *research* that will address community and corporation expectations in a collaborative fashion. The Memorial research plan will be a key guide in this effort.

- **Philanthropic sector**

The philanthropic sector is an important source of potential partnerships in *research*. For many years, philanthropic foundations largely supported capital projects – of the bricks-and-mortar variety. In the last decade, they have made *research* a priority. For a time, the gold standard for giving was endowing chairs, to support *research* excellence in areas defined by the terms of the chair position. However this has in turn been surpassed by an emphasis on support for *research* programs, particularly those that involve inter-disciplinary *research*, knowledge transfer with the community and social innovation. In some instances charitable organizations or individual philanthropists will provide financial support for *research* in their areas of interest. In other cases the organizations may operate programs where researchers can seek ideas for *research* or where the organization can be the implementer of new knowledge.

In 2007, federal data reported that there were more than 9,000 registered foundations in Canada, with approximately $14 billion in combined assets. Approximately 100 of these, among those with the most assets, have active university connections. These foundations provide roughly $100 million to universities and university partnerships per year, which is expected to triple over the next decade.[8]

Yaffle.ca, Memorial's research database, continues its upward trajectory, and now boasts more than 1,000 research summaries and 100 community projects. Its profile was further raised when a January 2010 issue of the *Globe and Mail* highlighted Memorial's answer to Google.

Memorial is home to this country's only tier one Canada Research Chair in a music discipline. Dr. Beverley Diamond is director of the university's Research Centre for the Study of Music, Media and Place (MMaP) and cross appointed with the Faculty of Arts and School of Music. In 2009, Dr. Diamond was named a Trudeau Fellow, one of the most prestigious humanities awards in Canada.

3.5 Resources and supports for research

Memorial has developed a range of centres, groups and other entities that facilitate and support the *research* carried out in the faculties and schools. Consultation and collaboration with many of these supporting entities will be key in the development of the research plan.

The Vice-President (Research) is responsible for strategic and administrative leadership on the university's broad range of *research* activities, through building *research* partnerships, attracting *research* funds and enhancing the dissemination, application and commercialization of Memorial *research* outputs.

Research offices are located at the St. John's campus, the Marine Institute and at Grenfell College to develop and implement *research* strategies, provide support for *research* centres and groups, and assist with the identification of *research* funding sources and the development of grant applications and proposal reviews.

Major institutional infrastructure for *research*, creative activity and scholarship is provided through the physical and electronic resources of the Queen Elizabeth II and other libraries, central Computing Services, the Technical Services unit, Animal Care Facilities and the CREAIT (Core Research Equipment and Instrument Training) Network. Access to high-performance computing is available through the Atlantic Computational Excellence Network (ACEnet) led out of Memorial.

Many of the faculties and schools have internal supports for research. *Research* centres and groups associated with faculties and schools can be found at www.mun.ca/research/plan/templates.php. Examples of supporting resource centres and groups that will be important in the development of the research plan include the Bonne Bay Marine Station, Health Research Unit, Institute for Social and Economic Research, and the Maritime Studies Research Unit.

3.6 Research units at Memorial

Memorial also has specialized units across the university that strive to maximize the benefits of *research* activities, from knowledge creation to application – fostering partnerships, assisting with funding, providing facilities, and transferring knowledge to potential users. The effective utilization and development of these units is important in continued research success at Memorial. Units that are not housed within a particular faculty or school, include:

- Botanical Garden
- Research Centre for the Study of Music, Media and Place
- Distance Education and Learning Technologies
- Genesis Group
- Inco Innovation Centre
- International Centre
- Labrador Institute
- Leslie Harris Centre of Regional Policy and Development
- Newfoundland and Labrador Centre for Applied Health Research
- SafetyNet

The above units are described on the research plan website, as well as the opportunities and needs they identified in Phase 1 (www.mun.ca/research/plan/templates.php).

3.7 Knowledge transfer and exchange

Universities have an important role to play in contributing to the development of their surrounding areas, as well as nationally and internationally. Industry, business, government and communities can benefit greatly from the *research*, innovation and analyses conducted by university members. As noted in a recent Organisation for Economic Co-operation and Development (OECD) report, in order to realize their potential benefits to these external stakeholders, universities must "strike a good balance between knowledge exploration (basic research, knowledge dissemination) and knowledge exploitation (commercialization, technology transfer, start-ups)." [9]

Large university institutions can be difficult for external stakeholders to navigate in searching for assistance with their needs and opportunities. Conversely, university researchers can find the external community equally daunting. Specialized units within universities can bridge these divides, providing points of access and opportunities and supports for effective engagement.

Memorial has made substantial investments in aspects of knowledge transfer and exchange (KTE) through specialized centres and groups with a mandate to work with external stakeholders in fostering knowledge application. These units facilitate Memorial in fulfilling its responsibility to contribute to social and economic development, responding to the needs and opportunities facing Newfoundland and Labrador. The first of these knowledge transfer and exchange units was the Memorial Extension Service, created in 1959 to address needs around the province. In recent decades, Memorial has again focused on connecting its knowledge and infrastructure with community needs.

- **Mobilizing research to meet industry and commercial needs and opportunities**

Innovation is an important mechanism for developing a successful knowledge-based economy, where knowledge is the source of competitive advantage in all sectors. In Atlantic Canada, university *research* accounts for approximately 63 per cent of the region's R&D activity.[10] Memorial has several specialized units that assist in maximizing partnerships in and commercialization of these activities.

The Centre for Cold Oceans Resources Engineering (now C-CORE) was established in 1975 with an applied research and development mandate, and was incorporated as a separately incorporated entity to Memorial in 1991. This was the first of a group of such entities created to provide a bridge between the university, governments and the private sector. The concept of Memorial having a company that would carry out commercialization and other activities for implementation of new knowledge was developed in the 1970s, and was made functional by the creation of Seabright Corporation (now Genesis Group Inc.) in 1986.

The Marine Institute's Centre for Aquaculture and Seafood Development offers a complete range of services for seafood processing and aquaculture industries in the areas of applied research, product and process development, technology transfer, advisory services and education and training. The centre can play an integral role in technical development, improving current practices and procedures, adapting technologies from other sources and industrial oriented education and training. The centre's clients can access its modern aquaculture research facility, its federally registered food pilot plant and the Atlantic Canada Fishery By-products Research Facility.

Memorial's development of arm's-length corporations such as C-CORE and the Genesis Group has provided continuing opportunity for interaction with small and large high-technology firms. C-CORE has established an international reputation for excellence in innovative engineering technologies for natural resources sectors. The Genesis Group consists of the Genesis Corporation, which is the university's commercialization arm, and the Genesis Centre, which is mandated to foster the development of new technology companies through providing business incubation services.

In keeping with its original charge to do research in the fisheries, Memorial, together with the Marine Institute (then the College of Fisheries, Navigation, Marine Engineering and Electronics), created the Canadian Centre for Fisheries Innovation to sponsor targeted and applied *research* in the fishing and aquaculture industries. The Marine Institute also houses the Centre for Aquaculture and Seafood Development, the Centre for Marine Simulation, the Centre for Sustainable Aquatic Resources, the Offshore Survival and Safety Centre, the School of Ocean Technology Applied Research unit, the Fisheries Conservation Group and the Safety and Emergency Response Training (SERT) Centre, which were all established to work in the interface of *research* and industrial application.

The Gardiner Centre in the Faculty of Business Administration and the Industrial Outreach Group in the Faculty of Engineering and Applied Science play a similar role in linking the applied *research* and expertise resources of the faculties with the business community.

- **Mobilizing research to meet regional and community needs and opportunities**

Contributing to regional and community development includes having the capacity and expertise to address needs and realize opportunities in areas such as public policy, health, and well-being, education, environment and culture, as well as economic development.

Memorial has a special role to play in addressing these areas, as reflected in its mission statement to be a university that "…contributes knowledge and shares expertise locally, nationally, and internationally." This commitment is evident in the outreach units and mechanisms Memorial has developed to bring Memorial researchers together with external stakeholders.

The Leslie Harris Centre of Regional Policy and Development serves the entire university as a bridge between Memorial faculty, staff and students and the external community (including government, business, community organizations and individuals) on matters of regional policy and development. The Harris Centre works to build capacity at Memorial for addressing regional policy and development in the province and facilitates bringing Memorial researchers together with community stakeholders. Two major 'bridging' programs of the Harris Centre include Yaffle and Regional Workshops.

Yaffle was launched in 2009 as Memorial's user-populated (re)search engine – an online resource created to share the wealth of knowledge at the university. Yaffle promotes the current expertise and projects of the university while also brokering a variety of future opportunities. To date, Yaffle houses more than 1,100 lay summaries of *research*, teaching and outreach activities within Memorial (completed and ongoing), the expertise and *research* interests of more than 450 Memorial researchers, and more than 100 proposals for *research* projects from community members, businesses and governments. To learn more, visit www.Yaffle.ca.

Regional Workshops bring the Memorial community to the regions of the province. To date, 12 workshops have been held in different economic zones throughout the province, generating more than 300 project opportunities for collaboration between researchers and the community. The map of Regional Workshop locations to date is available on the research plan website.

At Grenfell College, the Applied Research Unit was established in 1997 as a single point of contact for businesses, organizations, and individuals within the larger community interested in utilizing the college's expertise, services and resources. In 2000, the Research Office was created to oversee these functions.

The Labrador Institute exists to ensure that Memorial addresses the particular needs and opportunities of Labrador, and to provide resources for *research* conducted there. The institute's mission is centered on bringing the needs and interests of Labradorians to the university and facilitating bringing the university's capacities to bear on those needs and interests.

The Newfoundland and Labrador Centre of Applied Health Research plays a similar role in mobilizing knowledge related to health care, while SafetyNet develops knowledge about and promotes solutions for health and safety issues in marine and coastal occupations.

These and other centres and units play an integral role in facilitating how Memorial faculty, staff and students engage with stakeholders across the province and beyond, in identifying *research* needs and developing partnerships.

Albert Johnson, senior instructional designer with Memorial's Distance Education and Learning Technologies partnered with Drs. Jerome Delaney, Trudi Johnson and Dennis Treslan from the Faculty of Education on a research study to determine students' perceptions of effective teaching at the post-secondary level. The results of this study will subsequently be used to enhance teaching and learning at Memorial.

4. NATIONAL CONTEXT

4.1 The federal granting councils

The bulk of the federal government's support for external *research* and development is directed through funding agencies, including the Canada Council for the Arts, Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council, and Social Sciences and Humanities Research Council. These major Canadian granting agencies have long-established programs that support basic and applied research in Canadian universities, and they provide the major base for investigator-initiated *research* in the country. The major portions of their funds are invested in discovery *research* and support for the salaries of researchers in training and young faculty members. They also invest in *research* activities with more specific targets, and in the promotion of partnerships between academic researchers and other sectors. These targeted programs place particular emphasis on knowledge exchange and utilization.

Given the current federal financial deficit it is unlikely that substantial increases in the allocations to the granting councils are imminent. In the last few years, the granting councils have received 'cost-of-living' increases in their budgetary allocations, but the most recent budget saw decreased allocations. If incremental allocations are obtained in the next couple of years it would seem likely that many will be tied to the federal government's Science and Technology Strategy (S&T Strategy) priorities.

- **Support for inter-council and interdisciplinary research**

The Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council of Canada (SSHRC) are federal funding agencies that support *research* and *research* training in Canadian postsecondary institutions and hospitals. The collective role of these agencies (known together as the Tri-Councils) is to invest in the best *research* and brightest minds in the country, and to facilitate knowledge translation and mobilization, social innovation and commercialization. Individually and collectively, the agencies provide leadership for the nation's *research* community, and ensure that cutting edge Canadian *research* and innovation is well placed on the international stage for the benefit of Canadians.[11]

On the encouragement of the federal government the research granting councils have begun to share funding in a number of new targeted programs. Two recent examples are the NSERC-CIHR program in Medical Isotope Technologies and the collaboration between CIHR, NSERC, SSHRC and the International Development Research Centre (IDRC) on the International Research Initiative on Adaptation to Climate Change. We can expect that more programs shared among these agencies and departments and line departments will be forthcoming in response to the government directive. This can be an opportunity for support for interdisciplinary *research* which was more difficult to fund in the past.

In 2009, CIHR, NSERC and SSHRC collectively released a plan for strategic investment and collaboration to improve Canadian research and development capacity and reach. The document, *Canada at the Leading Edge: Common Vision, Concerted Plan*, highlights the commitment of the agencies to working collaboratively and sets out recommendations to the federal government for investments that will facilitate the agencies in expanding Canada's research excellence, supporting Canada's top postdoctoral fellows and leading strategic partnerships on priority challenges for Canada.

- **Canada Council for the Arts**

The Canada Council for the Arts is a Crown Corporation which "supports, promotes and celebrates the work of Canadian artists and arts organizations." Information on its programs can be obtained through its website www.canadacouncil.ca/.

The strategic plan of the Canada Council released in 2008 identified five priorities:[12]

- Reinforce the council's commitment to individual artists, working alone or collaboratively, as the core of artistic practice in Canada;
- Broaden the council's commitment to arts organizations to strengthen their capacity to underpin artistic practices in all parts of the country;
- Enhance the council's leadership role in promoting linguistic, regional, cultural and Aboriginal equity to ensure that its funding and operations reflect more accurately the demographic and cultural make-up of the country;
- Make partnerships with other organizations a key element in the council's approach to advancing its mandate; and,
- Implement structural changes within the Canada Council to improve communication and strengthen the organization's capacity to implement change.

In 2008-2009 the council had a total budget of $182 million, from which it identified $31.5 million that was available for new strategic investment in the five priority areas listed above. The following table shows the distribution of new investments in 2008-2009:[13]

Summary of allocation of Canada Council new investments for 2008-09

	$ millions
Individual artists	4.9
Arts organizations	20.1
Equity	1.9
Partnership services	0.8
Council's organizational development	3.6

- **Canadian Institutes of Health Research**

The Canadian Institutes of Health Research (CIHR) funds the full spectrum of health research, from molecular mechanisms to the health of populations. CIHR's structure is comprised of a central governing and administrative unit and 13 research institutes. Funding programs are administered through both the central operations and the institutes.

The recently-released Strategic Plan for CIHR identifies four strategic directions:[14]

- Invest in world-class research excellence;
- Address health and health system research priorities;
- Accelerate the capture of health and economic benefits of human health; and,
- Achieve organizational excellence, foster ethics, and demonstrate impact.

CIHR has been rationalizing its large number of funding programs and deadlines. The full range of the programs can be found through the CIHR website www.cihr-irsc.gc.ca/. New interdisciplinary programs are also being introduced by CIHR, as seen on page 24. Support for inter-council and interdisciplinary research, above. As

the councils find ways to respond to the government imperative to work together more effectively and be responsive to the S&T Strategy, opportunities for interdisciplinary research will grow.

Planned CIHR expenditures over the 2009-12 period are as follows:[15]

	$ millions
Open research	1376.2
Strategic priority research	406.6
Researchers and trainees	645.4
Research resources and collaboration	48.5
National and international partnerships	74.1
Knowledge translation	132.3

These projections were formulated in advance of the new CIHR strategic plan, but it is unlikely that the proportion will change dramatically in the next few years.

- **Natural Sciences and Engineering Research Council**

The Natural Sciences and Engineering Research Council (NSERC) is the principal federal agency that supports research and development in natural sciences and engineering. NSERC supports both basic university research through discovery grants and project research through partnerships among universities, governments and the private sector. As well, it invests in the advanced training of highly qualified people. NSERC has enunciated five strategic goals:[16]

- Advancing knowledge, seizing opportunities;
- Building prosperity through research;
- Inspiring the next generation;
- Showing the value of R&D investments; and
- Increasing visibility of research.

A listing of NSERC programs is accessible on the council's website www.nserc-crsng.gc.ca/. The current plans for NSERC expenditures from 2009 to 2012 are:

	$ millions
Students, fellows, faculty	965.3
Basic research	1091.6
Equipment and major resources	137.2
Research in strategic areas	393.2
University-industry-government partnerships	319.0
Support commercialization	100.1

It is noteworthy that investment in *research* in university-industry-government partnerships and strategic areas is anticipated to be 65 per cent of that for basic *research*. That distribution suggests that research that encompasses university-industry-government partnerships or in strategic areas of interest such as those in the S&T Strategy will be emphasized by NSERC. As new programs emerge they will likely follow the S&T Strategy goals and priorities.

- **Social Sciences and Humanities Research Council**

The Social Sciences and Humanities Research Council (SSHRC) is the principal federal funding source for research in social sciences and humanities. SSHRC's Strategic Plan, *Framing our Direction*, released in 2007, identified three key ambitions for the council:[17]

- To enhance the quality of research in the social sciences and humanities;
- To enable connections among disciplines and among researchers and communities; and,
- To increase the impact of research and research training for the benefit of society.

The full range of SSHRC funding programs can be ascertained through the SSHRC website www.sshrc.ca/. The following expenditures are planned for 2009 – 2012:[18]

	$ millions
Fellowships, scholarship, prizes	337.2
Investigator-framed research	254.8
Targeted research and training initiatives	64.0
Strategic research development	80.8
Research dissemination and knowledge translation	23.4
Research networking	67.5

The planned expenditures for targeted research, strategic research development, and networking are substantial. It is expected that SSHRC will also be guided by the federal S&T Strategy as it develops approaches in these areas.

4.2 Other national research funders

• Canada Foundation for Innovation

The Canada Foundation for Innovation (CFI) is an independant, not-for-profit corporation that receives funds from the Government of Canada to invest in research infrastructure. It is required under federal law to provide not more than 40 per cent of the costs of the infrastructure with additional investments coming from provinces, institutions and industry. Its disbursements to date have been in the order of $5.3 billion that, through partnering, has leveraged a total investment of nearly $13.3 billion in research infrastructure over the past decade.

The Faculty of Business Administration leads Atlantic Canadian universities in the number of articles published in the most influential management research journals. The ranking is based on an analysis of 24 major business journals maintained by the University of Texas at Dallas from 2004-08. The increased research success is indicative of the priority placed on research within the faculty and the university as a whole.

CFI strategic investment areas are to:

- Support economic growth and job creation, as well as health and environmental quality through innovation;
- Increase Canada's capability to carry out important world-class scientific research and technology development;
- Expand research and job opportunities for young Canadians;
- Promote productive networks and collaboration among Canadian post-secondary educational institutions, research hospitals and the private sector.

The federal government has indicated that it will provide an allocation of $600 million to CFI for investment in infrastructure in Canadian institutions. It is likely that when that funding is received by CFI the federal government will direct that it be invested in the sub-priority areas of the federal S&T Strategy.

- **Genome Canada**

Genome Canada is a not-for-profit corporation that receives funds from the Government of Canada to invest in large-scale research projects in the area of genomics and related sciences. It has invested $725 million in genomics and related research and according to its requirements for matching funding has levered a total investment of $1,647 million in these areas of research. Genome Canada has the following five objectives:[19]

- The development and establishment of a co-ordinated strategy for genomics research to enable Canada to become a world leader in areas such as health, agriculture, environment, forestry and fisheries;
- The provision of leading-edge technology to researchers in all genomics related fields through regional genome centres across Canada;
- The support of large-scale projects of strategic importance to Canada, which are beyond current capacities, by bringing together industry, government, universities, research hospitals and the public;
- The assumption of leadership in the area of ethical, environmental, economic, legal, social and other issues related to genomics research, and the communication of the relative risks, rewards and successes of genomics to the Canadian public; and
- The encouragement of investment by others in the field of genomics research.

Genome Canada is currently applying to the federal government for new funds to invest in this rapidly evolving area of science.

Researchers from Memorial are working to determine the future of the Humber River Basin on Newfoundland's west coast. The results could indicate how the river will respond to anticipated changes in climate, as well as the potential for continued uses in tourism, aquaculture, agriculture and local light industry. The project is funded through the Humber River Basin Project, an umbrella network of researchers working out of Sir Wilfred Grenfell College. The project had its inception with the regional sustainability focus of the Centre of Environmental Excellence.

4.3 Federal government Science & Technology Strategy

Universities are important contributors to science and technology and receive a major portion of their *research* funding through programs of the federal government. Strategic *research* activities will be significantly influenced by federal government goals.

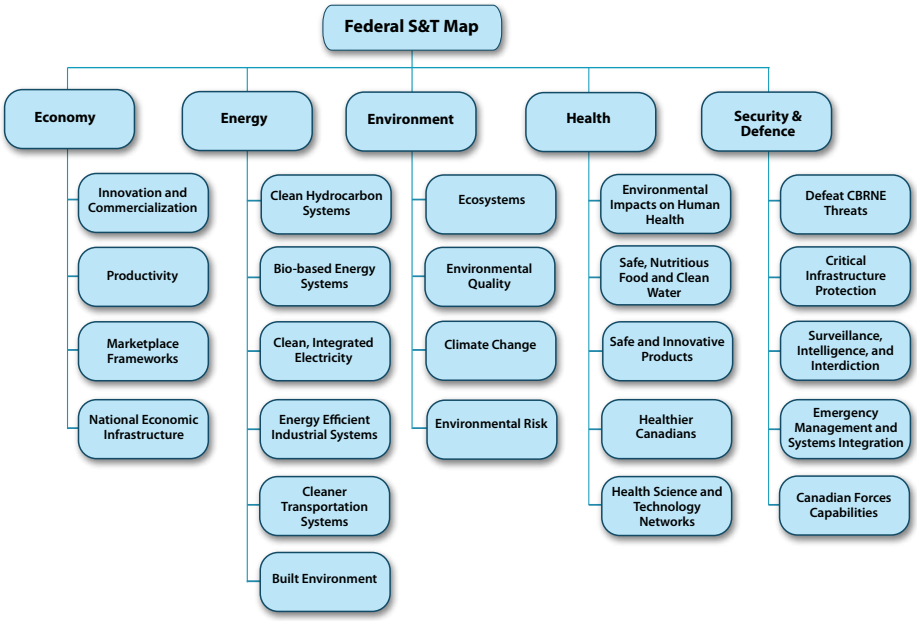
In 2006 the Government of Canada proclaimed a new Science and Technology Strategy (S&T Strategy). All science-based agencies and departments of government are expected to consider this overarching plan in their planning and operational activities.

The S&T Strategy sets high-level goals for the development of three 'Advantages' for Canada – translation of knowledge into practical application (Entrepreneurial), generating new ideas and innovations and achieving global excellence (Knowledge), and developing, attracting and retaining highly skilled people (People). To guide achievement of the Knowledge goal, four priority areas are identified (with more specific targets within each):[20]

- Environmental sciences and technologies (Water health, energy, security; cleaner methods of extracting, processing and utilizing hydrocarbon fuels, including reduced consumption of these fuels);
- Natural resources and energy (Energy production in the oil sands; Arctic resource production, climate change adaptation, monitoring; biofuels, fuel cells and nuclear energy);
- Health and related life science and technologies (Regenerative medicine; neuroscience; health in an aging population; biomedical engineering and medical technologies);
- Information and communication technologies (New media, animation and games; wireless networks and services; broadband networks; telecommunications equipment).

The weight of the S&T Strategy is demonstrated by the alignment of the recent competition of the Networks of Centres of Excellence Program, the current competition for Canada Excellence Research Chairs and the upcoming competition for Centres of Excellence in Commercialization and Research, which are all directed at the priority areas and sub-areas identified in the S&T Strategy.

The assistant deputy ministers who have charge of the science portfolios in federal departments have formed a special working group – the ADM Science Integration Board – to support integrated activity in science and research in areas that cut across departmental mandates. The group recently developed a science map for the federal government in light of legislated responsibilities and the S&T Strategy. They have begun to correlate strategic needs with the S&T Map.



The S&T Map can usefully inform Memorial's strategic planning with regard to future potential opportunities for collaboration in *research* with federal departments and agencies. Several departments have developed strategic science plans, including Environment Canada[21] and Fisheries and Oceans.[22] Natural Resources Canada is currently developing a strategic plan.

4.4 Federal government departments and agencies

The federal government is the major funder of research and development in the country. Most of the funding to universities flows through the granting bodies described above. However, government departments and agencies also have budgets for research, which they conduct in-house or contract to outside researchers. Contract research may be commissioned directly through the government contracting service, or in some instances researchers can work through other entities that have standing offers for research work by the departments.

- **Federal government departments**

All departments have a range of science and policy needs that can form the basis of collaborative *research* activities with the academic sector. Strategic plans and strategies developed to guide government activities are helpful to researchers in identifying opportunities for funding and collaboration. Fostering strategic longer-term collaborative interactions requires developing relationships with the departments, and understanding their needs for *research* that will underpin policy development, fulfillment of respective mandates and regulations. It is equally important in these relationships to ensure the federal government departments and agencies are aware of Memorial's *research* capacities.

Federal government departments with significant research presence in Newfoundland and Labrador will be especially important to consult in the development of the research plan. Many departments have some presence in St. John's or Corner Brook and taking advantage of that proximity can be important in building awareness on both sides of needs and capacities. Examples of federal departments with presence in Newfoundland and Labrador, through funding and/or proximity, that represent special opportunities for *research* collaborations include:

Department of Agriculture and Agrifoods Canada (AAFC)

Under its current Science and Innovation Strategy, the AAFC identifies seven priorities of national importance that are areas requiring research: 1) enhancing human health and wellness through food, nutrition and innovative products; 2) enhancing the quality of food and the safety of the food system; 3) enhancing security and protection of the food supply; 4) enhancing economic benefit for all stakeholders; 5) enhancing environmental performance of the Canadian agricultural system; 6) enhancing understanding of Canadian bioresources and protecting and conserving their genetic diversity; and 7) developing new opportunities for agriculture from bioresources.

AAFC's Atlantic Cool Climate Crop Research Centre (ACCCRC), located in St. John's, is recognized as a centre of excellence among the province's agricultural communities, with current research focuses on integrated pest management, molecular biology and plant propagation, land improvement, nutrient management and high value crop research.

The AAFC offers significant funding for research through the Growing Forward Policy Framework, which includes science and innovation programs and federal-provincial cost-share programs. A listing of programs available in Newfoundland and Labrador can be viewed on AAFC's website.[23]

Fisheries and Oceans Canada (DFO)

DFO encourages innovation in ocean science activities through its regional headquarters, the Northwest Atlantic Fisheries Centre. The centre is part of the marine S&T 'cluster' based in St. John's (in which Memorial is a partner), providing information and advice to support conservation, protection, and sustainable utilization of marine and aquatic resources. The centre's research priorities are on biology, life history, and resource evaluations of commercially important fishes and marine mammals, oceanography, ecosystem studies, aquaculture, environmental sciences, and habitat protection. [24]

DFO leads the integrated management (IM) processes for the Placentia Bay/Grand Banks Large Ocean Management Area and the western Newfoundland portion of the larger Gulf of St. Lawrence integrated management initiative. These ecosystem-scale inclusive processes require stakeholder and multi-departmental government input, as well as multi-disciplinary research and support. An existing Collaborative Agreement between Memorial University and DFO on oceans management research and monitoring has facilitated partnerships in marine protected area research. In addition, Memorial University is a member of the multi-stakeholder Placentia Bay/Grand Banks Large Ocean Management Area Committee. Memorial University can contribute to a better understanding of the governance, conservation, social, economic and cultural dimensions of coastal and ocean management in the province in support of integrated management plan development and monitoring.

DFO's research presence in Newfoundland and Labrador also includes a technology demonstration platform in Placentia Bay that contributes to integrated management efforts in Placentia Bay. The platform integrates a variety of information generated from existing ocean, land and air-based technology, to build a better understanding of our oceans to support ecosystem based management, while enabling new technology

development. The platform serves as a catalyst for future technology developments, allowing fisheries scientists to develop and test new generation technologies that contribute to the integrated ecosystem management goals.[25]

Natural Resources Canada (NRCan)

The Department of Natural Resources' Canadian Forest Service (CFS) has two centres in Atlantic Canada – one located at Sir Wilfred College in Corner Brook and one in Fredericton, N.B. The Canadian Forest Service is a science-based policy organization within Natural Resources Canada that conducts research to advance sustainability and competiveness of the forest sector.[26] The CFS fosters government-university research collaborations.

Parks Canada

In Newfoundland and Labrador, Parks Canada works to ensure that Canada'a natural and cultural heritage are presented and protected. The department's research interests include examining the structure and function of ecosystems, the historical use of cultural landscapes, and the experiential needs of park visitors. In the protected areas, researchers are able to experience, investigate and interpret the diversity of natural and cultural environments and a broad range of social, economic and cultural conditions in the province.

The ongoing research activities in Newfoundland and Labrador's national parks include fisheries management (including a cod nursery at Terra Nova), forest health, wildlife, human and vehicle impacts and stream ecosystems. Key projects and research interests of Parks Canada include community impact and benefits research, the recently announced Mealy Mountains National Park, the development of the new Torngat Mountains Base Camp in Saglek Bay as an Arctic research station (in collaboration with the Nunatsiavut government, with nearly $2 million per year to be spent on the project), and the potential for a national marine conservation area on the Southwest coast.

- **Federal government agencies**

There are a number of federal agencies with substantial research mandates which can be strategic partners in *research*. The most prominent of these is the National Research Council of Canada which has a mandate for fundamental and applied research in a range of strategic areas.

National Research Council (NRC)

The National Research Council (NRC) is the Government of Canada's organization for research and development that helps build Canada's innovation and technology capacity, supports the growth of Canadian industry, and uncovers solutions to national challenges in health, climate change, the environment, clean energy and other fields.[27]

There are 18 NRC institutes and two centres located across the country with research and development mandates in fields that are relevant to Memorial *research* activities and potential strategic thrusts. Opportunities for Memorial researchers to perform collaborative *research* with NRC institutes are substantial. Of special significance to Memorial is the NRC Institute of Ocean Technology (NRC-IOT). It aims to

contribute to the competitiveness of Canadian industry and the economic viability of communities, to strengthen Canada's innovation system, and to make significant contributions to national priority areas, through objectives that include developing and transfering ocean technology solutions in support of Canada's S&T Strategy, and contributing to a dynamic Newfoundland and Labrador ocean technology cluster.

The NRC-IOT is focused on, and organized around, the key ocean technology areas of Arctic operations, ocean observation and marine safety. These represent current and potential growth areas in the Canadian economy, as well as Government of Canada priorities. NRC-IOT researchers collaborate with private and public sector partners, including individual companies, industry associations, other government departments, regulatory agencies, university researchers and research organizations. At any given time, 10 – (SHORT DASH) 20 Memorial researchers may be using the facilities and collaborating with NRC researchers, and in recent months the majority of these have been from Engineering and Applied Science. The facilities have also been utilized by researchers from C-CORE, the Marine Institute, Physics and Physical Oceanography and Human Kinetics and Recreation.

Through the Industrial Research Assistance Program (IRAP), NRC helps small and medium-sized Canadian firms build their technical capacities across all sectors. IRAP works directly with companies, helping them through advisory services and funding for their innovative R&D. Also, NRC-IRAP is an important agent for linking university expertise and research with company needs: the Marine Institute and the Faculty of Engineering and Applied Sciences manage and deliver NRC-IRAP Network Member Contribution Agreements that fund applied research projects for small and medium-sized enterprises.

Canada Revenue Agency

The Scientific Research and Experimental Development (SRED) Tax Incentive Program provides support to industry for research and development through tax credits or direct rebates of eligible expenditures. While this program is directed at industry, research carried out by universities on contract with Canadian firms can often be eligible for SRED credit, and can provide opportunity for university-industry collaboration in research.[28]

- **Listing of external Federal Government Programs**

A substantial list of federal government programs that have science, research and innovation mandates is available at: http://ito.ic.gc.ca/eic/site/ito-oti.nsf/eng/h_00081.html#fundingByProvinceTerritoryRegion.

The first multidisciplinary and comprehensive study of the Labrador Métis and their history is underway thanks to researchers from the Faculty of Arts. The research objectives of the ground-breaking endeavour include investigating Inuit occupation of Southern Labrador, collecting and analyzing evidence of Inuit-European interactions, documenting cultural changes and bringing the history of the Métis into the present day. The project is headed up by Dr. Lisa Rankin.

5. ATLANTIC REGION CONTEXT

5.1 Atlantic regional agencies and offices of federal departments

There are many opportunities for interaction with Atlantic region offices and branches of the federal departments. These best present themselves when long term relationships have been built and where an understanding of the research needs of the branches is in place.

- **Atlantic Canada Opportunities Agency (ACOA)**

The Atlantic Canada Opportunities Agency works with business and communities to strengthen the Atlantic economy through enterprise development, community development, and national policy, advocacy and co-ordination. ACOA places emphasis on initiatives that foster productivity, commercialization of innovative technologies, improved global competitiveness, and skills development.

ACOA has a range of programs that provide funding in the forms of grants and loans that promote economic development in the Atlantic region. Information on the full range of ACOA programs can be accessed at the following website: www.acoa-apeca.gc.ca/English/ImLookingFor/ProgramInformation/Pages/Home.aspx.

Although many of the ACOA programs provide financial support for partnership opportunities between academia and businesses and communities, the program that provides the most substantial funding for research and development in the context of the university is the Atlantic Innovation Fund.

Atlantic Innovation Fund

ACOA's Atlantic Innovation Fund (AIF) has been a very important source of support for research and innovation in Atlantic universities and industries over the past eight years. Since the fund's inception in 2001, the amount of money invested by AIF at Memorial has amounted to $63 million, and with partner investments the total amount has been leveraged to $191 million. Details of the investments can be found on the research plan website.

AIF's purpose is to:

- Increase research and development (R&D) being carried out in Atlantic Canada research facilities leading to the launch of new products, processes and services;
- Improve the region's capacity to commercialize R&D;
- Strengthen the region's innovation system by supporting R&D and commercialization partnerships and alliances among private sector enterprises, universities, research institutions and other organizations in Atlantic Canada; and
- Enhance the region's ability to access national R&D programs.[29]

AIF focuses on R&D projects in the areas of engineering, natural and applied sciences, as well as in social sciences, humanities, arts and culture, where these are explicitly linked to the development and commercialization of technology-based products, processes or services. The fundamental mandate of AIF is to promote economic development in the region.

AIF encourages partnerships between university researchers and the private sector, and it will accept proposals that are led by universities or industry.

AIF has been very significant in the development of research and development capacity in the universities and industries of the Atlantic region. With the federal government's recent announcement of $13.8 million in AIF support for seven Newfoundland and Labrador research projects, more investments are expected to be leveraged from the funding, at a rate of approximately $1.26 per AIF dollar provided (based on the leverage rates since 2006). Five of the seven projects selected are from Memorial, making the funding and leveraging capacity of AIF of continued significance to the university.

Other ACOA programs

Another ACOA program relevant to university *research* activities is the Business Development Program. The Business Development Program may provide opportunities to support partnerships with business in targeted or applied research and development underpinning innovative products and processes being developed by the business. The Business Development Program also supports knowledge translation and exchange, and provides support for commercialization of research findings. Similarly, the program may support targeted and applied research aligned with the overall objectives of business development.

In special circumstances other programs might be accessed if the research and development or knowledge translation activities fit well with the specific objectives of the program, such as community capacity-building or economic diversification.

5.2 Atlantic regional associations and groups

- **Association of Atlantic Universities Innovation Initiative**

The Association of Atlantic Universities is undertaking a significant project aimed at developing one or two major region-wide innovation initiatives with collaboration of academia, industry and government. The intention of the AAU is to foster inter-institutional collaboration with industry to develop initiatives that would lead to significant collaborative research strength and economic benefit. It is intended that these initiatives would make the Atlantic region internationally competitive in research and innovation in the targeted areas. Based upon consultations with AAU representatives the initial targeted areas are in energy and environment, and new synthetic and biological materials.

Development of the specific projects will present new opportunities for *research* at Memorial. Memorial has a high level of *research* strength in some of these areas, and many researchers at Memorial have experience in working with industry. Memorial also has experience in the development of regional collaborative projects such as the Atlantic Computational Excellence Network (ACEnet), a pan-Atlantic network of world-class High Performance Computing Clusters, made possible through ten universities working together to share capacities.

Suncor Energy, one of this country's leading integrated energy companies, is helping foster a new generation of researchers at Memorial thanks to a donation to the university in October 2009. The creation of the Terra Nova Young Innovator Award will allow awards to be presented annually to researchers in each of the next five years, recognizing, promoting and supporting outstanding and emerging researchers whose innovative work has the potential to significantly impact society. The announcement was made by Suncor's Gary Vokey.

- **Genome Atlantic**

Genome Canada is a not-for-profit organization established in February 2000 with a mandate from the Government of Canada to develop and implement a national strategy for supporting large-scale genomics and proteomics research projects, for the benefit of all Canadians.

Genome Atlantic is a body with a mandate to support large-scale genomics projects in the Atlantic region. It catalyzes the development of, funds, and manages genomics projects, including studies on the ethical, economic, environmental and legal issues associated with individual projects and genomics in general. Although an independent body, it is closely associated with Genome Canada and is effectively the presence of Genome Canada in the region. In its relationship to Genome Canada it has been responsive to Genome Canada strategic priorities. It is the intention of Genome Atlantic to further develop research strengths based directly upon Atlantic Canada priorities.

Memorial researchers are major partners in the two large initiatives currently being financed and managed by Genome Atlantic – one on medical genetics and genomics and the other on cod genomics and broodstock development. Current interests of Genome Atlantic are in human health, aquaculture and fisheries, Atlantic crops, bioenergy, and environment. These may be modified somewhat after some upcoming regional consultations and in light of next-stage funding of Genome Canada, currently under consideration by the federal government.

- **Petroleum Research Atlantic Canada (PRAC)**

PRAC is a not-for-profit, member-based organization formed by industry, government and academia that fosters petroleum-related research and development in Atlantic Canada in fields such as natural, applied, and human sciences, engineering, environments, public policy and socioeconomics, and education and training. PRAC is a significant funding source for Memorial researchers conducting *research* in this area. Between 2000 and 2009, PRAC contributed over $1.3 million in direct funding to projects led by 20 Memorial researchers.

- **Springboard Atlantic**

Springboard Atlantic is a not-for-profit corporation that was created in 2004 by the Atlantic universities to be an agent for commercialization of research across the Atlantic region. Springboard's network – comprised of 18 universities and colleges and their technology/business offices – is designed to foster research and commercial development projects and collaboration with the private sector. Expertise, best practices and specialized facilities are shared among Springboard members and their stakeholders with the goal of increasing the application of knowledge and technology for economic benefit of Atlantic Canada.

Springboard Atlantic undertakes the following activities as core parts of its business operations:

- Assessing the commercial potential of discoveries and intellectual property;
- Funding and managing proof of concept and technology development projects;
- Underwriting prototype development and marketing to industry and entrepreneurs;
- Supporting and mentoring the creation of new companies;

- Developing opportunities for joint research with the private sector;
- Delivering professional development programs relative to intellectual property, commercialization; and
- Organizing events to bring researchers and business together and to engender entrepreneurship in Atlantic Canada.[30]

Springboard Atlantic's management involves key individuals from all four Atlantic provinces with a central office team in Halifax. Core financial support is provided by Springboard's 18 members, ACOA, and NSERC. Springboard also collaborates with other Atlantic Canada organizations where goals are shared and resources can be concerted.

6. PROVINCIAL CONTEXT

Departments of the provincial government play a vital role in identifying *research* needs and opportunities in Newfoundland and Labrador. The departments have budgets to carry out research, and much government research is conducted in-house. There are many departments, however, that seek to engage Memorial researchers through contracts and partnerships.

For example, the Department of Environment and Conservation partnered with Sir Wilfred Grenfell College to create the Institute for Biodiversity, Ecosystem Science and Sustainability (IBES), which provides integrated student-based research programs that combine social, economic, and environmental emphases, focusing on government research priorities in natural resources and community sustainability. Priority research areas include sustainable development, ecological economics and sustainability economics, population ecology, ecosystem ecology, landscape ecology, ethical corporate governance, fisheries and aquaculture science, climate change, human dimensions, land use planning and design, and biodiversity valuation. To date 54 per cent of the projects IBES has supported and initiated have been through Memorial University, and IBES has provided $502,192 in support of student research at Memorial University, with a further $329,533 committed to ongoing projects through 2013.

Another example is the 2007 partnership between the Rural Secretariat, the Harris Centre and the College of the North Atlantic on the SSHRC-funded Knowledge Impact in Society program, which connected researchers with regional councils on matters of importance to the councils.

The Memorial reseach plan can be informed by provincial government strategic priorities and directions. A synopsis of provincial government strategies is provided below, followed by a list of the government's priority research themes, as developed by the Research & Development Corporation.

6.1 Provincial government strategies, initiatives and programs related to research

The strategies and plans developed by the provincial government provide good indications of areas in which Memorial researchers can engage to respond to provincial needs and opportunities. The strategies highlighted below have important implications for researchers involved in areas such as climate change, natural resources management, population, immigration, energy, innovation, poverty and social equality.

- **All the Skills To Succeed: Report of the Newfoundland and Labrador Skills Task Force (2007)**[31]

The Skills Task Force was created to bring together key players and the expertise needed to assess the province's ability to respond to skills needs and opportunities, including those within the existing post-secondary education system.

"Strategies for Success," outlines the Skills Task Force's recommendations for addressing both existing and future skill needs. These are organized under seven broad strategies for ensuring the province has appropriate and responsive training, education and support systems to meet labour market demands:

- Changing attitudes and opening doors;
- Improving access, performance and outcomes;
- Improving apprenticeship programs and journeyperson opportunities;
- Supporting access for under-represented groups;
- Retaining and recruiting skilled workers to come or return here;
- Assessing and responding to industry needs; and
- Ensuring strong partnerships.

Each strategy identifies objectives and specific actions by relevant stakeholder group(s). The ensuring strong partnerships strategic direction seeks to build and strengthen strategic partnerships among government, industries, communities and training institutions to support training and human resource planning partnerships with industry sectors, particularly those that have been identified as important to the province's ability to compete in external markets. To this end, the Skills Task Force recommended that post-secondary institutions increase partnerships in research and development activities (Action 48-f).

- **Canada/Newfoundland Fishery Industry Renewal Strategy (2007)**[32]

The Fishing Industry Renewal Strategy aims to develop an integrated Ocean to Plate policy framework and industry restructuring strategy to support the industry in adapting to, and maximizing benefits from, resource and market conditions. To make the fishing industry more economically viable and internationally competitive, the federal and provincial governments work together to implement elements of the strategy. The province provides support, through programs such as the Fisheries Technology and New Opportunities Program, for research and development initiatives that introduce new species, products, markets and techniques to harvest, handle, process and market the marine fish resources of Newfoundland and Labrador.

In 2008/09, more than 50 projects were awarded a total of $2.1 million through the Fisheries Technology and New Opportunities Program. This program will help the fishing industry become more innovative and competitive, while building a safer and more stable foundation. These initiatives will help ensure the Newfoundland and Labrador seafood industry continues to be a major economic contributor to the provincial economy. The focus of the program is research and development work in the harvesting and processing sectors with emphasis on more efficient utilization of traditional species, better use of under-utilized species and enhanced value-realization of all fisheries resources. Emphasis is also placed on recovery of raw material wastage and reduced discarding of fishery by-products. Market research, development and promotion will be undertaken in support of these various initiatives. Priority is given to opportunity identification and quantification, including test fisheries, gear demonstrations, resource surveys, mitigation of gear impacts, by-catch reduction, new technology and product and market development. As well, the program allows for development of innovative methodologies to improve final product quality.[33]

- **Climate Change Action Plan, 2005**[34]

The provincial *Climate Change Action Plan* complements many of the provincial government's ongoing policy objectives and commitment to sustainable development. The plan connects key environmental and energy issues, including waste management, air quality and review of the province's electricity policy.

The plan outlines 40 initiatives, relating to government, transportation, human health, ecosystem health, education, municipalities, industries, the building sector and natural resources. Some of the initiatives build on previous ones, such as energy efficiency in government buildings; others will require partnerships with the federal government and other stakeholders.

The plan identifies Memorial as a key partner with a leadership role in addressing climate change under the plan, as both a major user of energy and a centre for climate change research.

- **Comprehensive Regional Diversification Strategy (2005)**

The Diversification Strategy was developed by the Department of Innovation, Trade and Rural Development (INTRD) in conjunction with other provincial departments and it builds upon the development of natural economic regional clusters, which exist or have significant potential to exist, adopting a hub and spoke philosophy for cluster development. The strategy addresses the need to support regions and clusters with education and training, research and development and industrial infrastructure linked to smaller more disbursed communities. The strategy encompasses the following principles:

- Emphasizing regional industrial diversification;
- Developing economic policy/programming around industrial development that has direct links to small and medium enterprises;
- Recognizing the linkages between social and economic planning;
- Utilizing innovation and technology as cornerstones for development and diversification; and,
- Developing strategies and strategic sectors in regions of the province that will create new business operations and long term sustainable employment.[35]

Through this strategy, the provincial government has identified short, medium and long-term strategies to generate new industry, small business and employment. Examples include the mining industry in Labrador West, the environmental industry in Humber region, and aquaculture on the Connaigre Peninsula. Key to implementing the regional strategies is effective co-ordination between government and business, well-developed policies, and effective financial programs around regional development initiatives and small and medium enterprises. Capacity building and infrastructure development linked to business start-up and expansion are seens as instrumental to effecting meaningful growth in all regions of the province.

- **Creative Newfoundland and Labrador: The Blueprint for Development and Investment in Culture (2006)**[36]

The Blueprint for Development and Investment in Culture provides a framework of major policies and directions to guide the provincial government and its partners in recognizing and celebrating cultural identities and promoting a creative, vibrant and proud society and economy. The blueprint addresses all of the province's cultural resources, including traditions and customs, traditional knowledge, languages, religion, music and song, skills and belief systems. The blueprint identifies ten key priorities and related actions that aim to:

- Support excellence in artistic endeavour;
- Improve conditions under which professional artists and other cultural workers create and produce;
- Protect and commemorate significant tangible and intangible cultural heritage resources;
- Support the professionalization of the arts and heritage sectors in the province;
- Increase the sustainability and effectiveness of arts and heritage organizations in the province;
- Enrich the visitor experience and support sustainable growth in the tourism

Arctic and cold region engineering research at Memorial got a major boost in November 2009 thanks to one of the largest research chair contributions at the university. Dr. Shawn Kenny was appointed the Wood Group Chair in Arctic and Cold Region Engineering, a position sponsored by international energy services company, John Wood Group PLC which invested $500,000 to sponsor the chair over a five-year period. The Research & Development Corporation (RDC) of Newfoundland and Labrador also contributed $500,000 through its Industrial Research and Innovation Fund.

industry through our cultural assets and strengths;
- Stimulate social and economic development, especially in rural Newfoundland and Labrador;
- Increase the access of residents and visitors to the province's arts and heritage;
- Secure the cultural diversity of the province and celebrate Newfoundland and Labrador's distinctive identity; and
- Connect the province's culture to people throughout the province and around the world.

- **Creating a Province of Choice: A Youth Retention and Attraction Strategy (2009)**[37]

The Youth Retention and Attraction Strategy lays the foundation for building a new, long-term partnership between youth, the provincial government and other stakeholders that will help make Newfoundland and Labrador a province of choice for young people to live in and work. To develop the policy framework that will create a province of choice, the strategy sets out eight policy directions and actions in:
- Strengthening capacity for youth engagement in policy, development and democracy,
- Increasing awareness about opportunities, benefits and services in Newfoundland and Labrador positioning and promoting Newfoundland and Labrador,
- Strengthening access for youth to affordable and quality education opportunities,
- Increasing availability of and access to quality jobs and workplaces for youth,
- Engaging youth in maintaining and strengthening quality of life in the province and increasing access to services in all regions,
- Promoting and celebrating cultures and diversity,
- Strengthening Labrador's role in the province, and
- Increasing incentives for young people to stay in, or move to, Newfoundland and Labrador to live and work.

- **Diversity – "Opportunity and Growth": An Immigration Strategy for Newfoundland and Labrador (2007)**[38]

The Immigration Strategy outlines initiatives aimed at attracting and retaining immigrants, as an important component of the province's growth agenda (economic, social and cultural), and complements other government strategies to promote regional diversification and innovation. Specifically, the strategy aims to help address the province's demographic challenges and specific skill shortages, and to support the overall development of the labour force. The strategy sets out nine elements for focus and action: awareness building, attraction and promotion, welcoming communities, integration and retention, international students, provincial nominee program, linking to other provincial strategies, Francophone immigration, and partnering with the federal government.

Educational institutions are named as key partners in implementing the strategy. With respect to research, the strategy seeks partnership with Memorial University (specifically the Harris Centre) to develop a research plan for sound local research on immigration issues.

- **Focusing Our Energy: Newfoundland and Labrador Energy Plan (2007)**[39]

The Energy Plan seeks to protect Newfoundland and Labrador's environment while maximizing opportunities to the province for current and future development. The goals set out in the plan are to support and develop environmental leadership, energy security, sustainable economic development, maximization of electricity export value, maximization of the long-term value of oil and gas (i.e. effectively investing the value received from these resources to ensure current and future generations benefit from their development, while still providing a fair return to oil and gas companies that participate in the development of Newfoundland and Labrador's resources), and effective governance.

The plan contains 107 key actions related to five areas: Newfoundland and Labrador's energy warehouse, oil and gas; electricity; energy and environment; energy and economy. Additionally, the Department of Natural Resources is undertaking the development of an energy roadmap for the province through ongoing consultations.

- **Innovation Newfoundland and Labrador: A Blueprint for Prosperity (2006)**[40]

Through the Blueprint for Prosperity, the province has identified the following four strategic directions as it builds and strengthens the fundamentals required for a strong innovation economy:

- Fostering a culture of innovation that encourages new ideas and collaboration among business, labour, government, educational institutions and other stakeholders throughout the province;
- Positioning Newfoundland and Labrador as a competitive economy with internationally-recognized strengths and advantages;
- Broadening education and skills development, and aligning them with the future economic direction and labour market development needs of the province; and

SmartBay, a project led by the Marine Institute's School of Ocean Technology, provides customized weather and sea state forecast information using data gathered by four oceanographic buoys strategically placed in Placentia Bay. The information is updated four times daily and is available to the public in near-real time at www.smartbay.ca. Fishers, shipping companies and other users in the area routinely log on to the site to gain information that helps them make better decisions about their operations in the bay. MI won the Provincial Government's Distinction in Innovation Award for its work with SmartBay at the 2009 Export and Innovation Awards, an honour that recognizes an individual or group that makes an outstanding contribution towards Newfoundland and Labrador's innovative culture.

– Supporting enhanced R&D capacity, and improving financing and investment tools to facilitate commercialization.

The creation of the Research & Development Corporation was a component of the response to the Innovation Strategy. Departments of government will be expected to align with the strategy in their activities, which will create opportunities for research and development by Memorial researchers.

- **Labour Market Development Agreement**[41]

As of November 2009, the provincial government, through the Department of Human Resources, Labour and Employment (HRLE), assumed responsibility for the design and delivery of approximately $133 million annually in a range of employment and training programs and services under the Canada-Newfoundland and Labrador Labour Market Development Agreement (LMDA).[42] The programs delivered under the LMDA seek to: assist individuals to prepare for, find and keep employment; assist employers in accessing the workers they need; and help ensure that communities and regions throughout Newfoundland and Labrador are well equipped to respond to labour market opportunities and challenges.

The LMDA Labour Market Partnerships (LMP) program provides funding to businesses, organizations, municipalities, band/tribe councils, and public health and educational institutions to sponser activities that support labour market stakeholders (employers, employer or employee associations, community groups and communities) in developing and implementing labour market strategies and activities for dealing with labour force adjustments and meeting human resource requirements. To be eligible, activities must involve partnership, focus on an identified labour market issue and be likely to have a positive impact on the labour market. The LMDA is able to support research projects that meet this criteria, including data collection, analyses and knowledge transfer.

- **Newfoundland Forest Sector Strategy (2008)**[43]

The Forest Sector Strategy addresses key issues around the allocation of timber, land tenure, land-use conflicts and effective land-use planning and provides recommendations for moving forward. Among the recommendations are two that call for close partnership with Memorial, with the expectation of gaining 1) improved clarity about what values can be derived from various uses of forest resources at any location on the island or within the province and 2) a widely understood and accepted basis for decision-making about acceptable uses of forests (and other natural) resources within the province. The strategy calls for the government to:

– In Corner Brook, increase investment in and support for the Geospatial Research Facility at the College of the North Atlantic and for the work of Centre of Environmental Excellence, which connects Grenfell College to the provincial Division of Forestry within the Department of Natural Resources; and

- Establish a working group that could involve, and perhaps be led by, the Leslie Harris Centre of Regional Policy and Development at Memorial University with a mandate and resources needed to ensure that appropriate management and operational capacity will be in place within community groups that express intent to take on control and management of community forest resources.

- **Northern Strategic Plan for Labrador (2007)**[44]

The Northern Strategic Plan for Labrador was developed to establish social and economic priorities that will enable strategic decision-making by government for the benefit of Labradorians and the province, as a whole.
The plan sets out four strategic directions that provide the framework for future planning in Labrador:

- Supporting equitable programs and services and improving infrastructure to facilitate enhanced accessibility for the residents of Labrador;
- Fostering the progression of social development in Labrador;
- Providing leadership and supporting maximization of economic development opportunities; and
- Encouraging communications and partnerships with governments, Aboriginal people, communities, organizations and other stakeholders.

- **Oceans of Opportunity: Newfoundland and Labrador's Ocean Technology Sector Strategy (2009)**[45]

As part of the Blueprint for Prosperity (above), the provincial government identified ocean technology as a natural sector for growth. *Oceans of Opportunity* aims to accelerate activity among the business and educational communities to further develop applied research and development, and commercialization activities enabling improved offshore safety, advanced simulation and modeling, smarter fishing, and enhanced aquaculture practices.

A team of international scientists has found that the world's last remaining "pristine" forest is under increasing threat. The boreal forest stretches across large portions of Canada, Russia and other northern countries. Grenfell College Environmental Science Professor Dr. Ian Warkentin, along with colleagues from the University of Adelaide in Australia and the National University of Singapore, are now calling for the urgent preservation of existing boreal forests in order to secure biodiversity and prevent the loss of this major global carbon sink. The boreal forest comprises about one-third of the world's forested area and one-third of the world's stored carbon, covering a large proportion of Russia, Canada, Alaska and Scandinavia. To date, it has remained largely intact because of the typically sparse human populations in boreal regions. That is now changing, said Dr. Warkentin and his colleagues.

Oceans of Opportunity is a five-year, $28 million strategy, launched in June 2009, designed to capitalize on opportunities and expand the local ocean technology sector. The strategy recognizes that educational and R&D institutions, and their private sector partners, are central to the sector's sustained growth, and attests to the provincial government commitment to supporting initiatives as they support local industry in positioning the province as a centre of ocean-related expertise, and ensuring the required human resources are in place.

Four of the initiatives named in the strategy relate strongly to oceans research and innovation:
- The Ocean Technology Development Fund (OTDF)
- Strengthening ties between industry and educational institutions;
- Institutional research, and education and training capacity; and
- Ocean observation

The Marine Institute was one of the first recipients of this program having received $250,000 to support its SmartBay Ocean Observation System in Placentia Bay, an applied research and development project undertaken in collaboration with industry partners.

- **Reducing Poverty in Newfoundland and Labrador: An Action Plan for Newfoundland and Labrador (2006)**[46]

The Poverty Reduction Strategy is closely related to a variety of ongoing government initiatives. The strategy takes a long-term, comprehensive and integrated approach, connecting poverty and gender, education, housing, employment, health, social and financial supports and tax measures. Based on the key directions to prevent, reduce and alleviate poverty, the input received and research undertaken, the following goals have been developed for the next four years:
- Improved access and co-ordination of services for those with low incomes;
- A stronger social safety net;
- Improved earned incomes;
- Increased emphasis on early childhood development; and
- A better educated population.

Ongoing research and policy development work will be a necessary and important part of the Poverty Reduction Strategy. Evidence-based decision making through research, public engagement and evaluation is a critical component of the strategy and opportunities to partner with Memorial University are welcome. The strategy could benefit from further academic research in areas such as: food security, Aboriginal issues, intergenerational poverty, issues relating to housing and homelessness and the long term broader health implications of growing up in poverty. Specific research priorities identified to-date include:
- Research to gain a better understanding of the causes of poverty for those aged 55 to 64 and develop solutions;
- Development of mechanisms and tools to analyze combined impacts of programs on an ongoing basis, including tax implications;
- Review and policy development work on access to essential services, such as dental care and medical transportation;
- Review of earnings exemptions policy for income support clients to continue to re move barriers for income support clients to work;
- Research minimum wage to keep mandatory rates on par with the rest of Atlantic Canada;
- Review of employment skill programming needs for groups vulnerable to poverty; and
- Removal of barriers to post-secondary education with an increased focus on academic upgrading.

- **Strategic Partnership: Province, Business, Labour (2002)**[47]

The Strategic Partnership brings together business, labour and government to improve the quality of life of the people of Newfoundland and Labrador through sustainable and balanced economic and social development. The partnership provides a forum for open dialogue among government, labour and business, represented respectively by the Government of Newfoundland and Labrador, the Newfoundland and Labrador Federation of Labour, and the Newfoundland and Labrador Business Coalition. The partnership has developed a set of priorities, including a focus on labour market development, employment relations, innovation, population, and transportation and communications infrastructure.

The partnership currently has five active committees working in these areas and pursuing a broad range of research goals. In partnership with Memorial's Harris Centre, the partnership provides funding for student research into factors affecting the province's competitiveness and it supports the Harris Centre's Applied Research Fund, which supports (with matching funding from ACOA) applied research on issues relating to regional policy and development in Newfoundland and Labrador. The partnership will play a key role as research projects are completed by assisting with the mobilization and dissemination of research findings.

- **Violence Prevention Initiative (2000)**[48]

The Violence Prevention Initiative (VPI) is a six year, multi-departmental, government-community partnership to lay a solid foundation for the long-term goal of reducing the incidence of violence in the province. The vision of the Violence Prevention Initiative is that women, children and youth, Aboriginal women and children, seniors, persons with disabilities and others who are victims of violence because of race, ethnicity, sexual orientation, or economic status will face less violence and live and work in communities where violence is considered unacceptable.

Taking Action Against Violence, 2006 – 2012, [49] is the initiative's blueprint for building stronger, resilient communities with strategies and resources to stop the growth of violence and reduce violence dramatically in Newfoundland and Labrador. The plan sets out six strategic priorities for taking action against violence:

- Increasing awareness and attitudinal change;
- Increasing community participation;
- Improving legislation, policy, programs, services, information and facilities;
- Supporting Aboriginal women and children;
- Enhancing research and development;
- Improving leadership, co-ordination and accountability.

Through enhancing research and development, the VPI aims that by 2012 the provincial government will have developed a research plan with priorities, indicators of violence, and appropriate data collection and measurement tools.

- **Research priorities identified by the Research & Development Corporation**

The Research & Development Corporation (RDC) has been working with provincial departments to compile governmental research priorities and shared its preliminary findings for this report. Major government research priorities identified to date by the RDC include:

Control and care of the environment

- Waste diversion
- Climate research
- Water resources

Exploration and exploitation of the Earth

- Geosciences
- Energy research
- Offshore/onshore oil and gas research
- Forestry research
- Ocean observation

Animal health
- Animal disease research (zoonotic)
- Animal / prey monitoring technologies

Public health and safety
- Public health research

Social development
- Economic and social research on social problems in Newfoundland and Labrador, for instance:
  - o School-to-work transitions focused on attracting and retaining students and young professionals
  - o Impacts of the aging workforce on the social and economic structure of Newfoundland and Labrador
  - o Rural community and region issues
  - o Social development research to help inform the creation and improvement of programs and services

6.2 Provincial Research & Development Corporation

The Research & Development Corporation (RDC) was created in 2009 to strengthen the province's research and development for the long-term economic benefit of the province. The RDC will play an important role as a catalyst and funder for research and development projects in academia and industry. After an extensive provincial consultation the RDC has chosen ocean technology and energy for its initial primary areas of focus.

It will support the developmental research of industry through vouchers for R&D services and the funding of proof of principle studies. These support mechanisms will be accessible only by industry, but industry recipients could involve Memorial researchers as partners and performers of the research.

Academically-initiated research and development can be supported through RDC's Industrial Research and Innovation Fund (IRIF). In addition to its primary focus on energy and ocean technology, RDC has indicated that under the IRIF it will support R&D needs in other areas including "health and life sciences, marine science, advanced manufacturing, information and communications technologies, aerospace and defense, and value-added natural resource industries (aquaculture, mineral processing and others)." [50]

IRIF has three competitive funding elements:
- LeverageR&D – which will provide up to 50 per cent of eligible funds to match those provided by partners such as regional and national agencies, the private sector, or other sources;
- IgniteR&D – which will support the development of highly qualified personnel such as graduate students, fellows or technicians; and
- CollaborativeR&D – which is intended to build capacity in priority areas and foster local, national and international collaborative R&D among academic researchers and industry.

It is noteworthy that while there are targeted areas for support, the support is open to all disciplines. This could present opportunities for innovative approaches to addressing these targeted areas

6.3 Regions, municipalities and Regional Economic Development Boards

Municipalities and development boards can be important partners in *research* activities. For municipalities and regions that are home to Memorial campuses, opportunities for collaboration are often easier to foster. Memorial *research* engagement extends to all parts of the province, though, and the research plan will build on existing and potential research partnerships to maximize benefits for all regions.

- **Municipalities Newfoundland and Labrador (MNL)**

Municipalities Newfoundland and Labrador (MNL) exists to assist communities in their endeavour to achieve and sustain strong and effective local government.[51] The priority issues in doing so that MNL has identified are:

- Sustainability of the municipal system – governance capacity (number of people running for council, number of councils without a full slate, general lack of democratic efficacy), administrative capacity, financial capacity;
- Economic viability of rural communities and the role municipal government can play in improving same;
- Regional cooperation/municipal service sharing and the potential for regional government models;
- Adequacy of infrastructure (particularly drinking water and waste water) in terms of existing capacity, age of current stock, technical capacity of municipal staff to run and maintain it; and
- Weak planning capacity within, and available to, the municipal system.

More than 600,000 digital objects – ranging from audio and video files to historic maps and books – are at the fingertips of researchers from around the world thanks to Memorial. The Digital Archives Initiative website – launched in 2008 – allows researchers, scholars, students and the general public to view material – some of which is hundreds of years old and very delicate – housed in Memorial's archives and library collections without visiting the university.

MNL is interested in working with Memorial and its researchers on:

- Developing planning capacity;
- Fundamental research on the nature and importance of local democracy in small, North Atlantic jurisdictions;
- Applied research/partnership on technical and management solutions for provincial municipalities in the areas of infrastructure, service provision, HR management and planning, and labour market analysis and planning; and
- More service learning and co-op placement opportunities (or efforts to promote/encourage placements in rural communities).

• Regional Economic Development Boards

With support from the Department of Innovation, Trade and Rural Development and the Atlantic Canada Opportunities Agency, the province has 20 Regional Economic Development Boards mandated to facilitate and coordinate economic development for the communities in the economic zones they represent.

Memorial, through the Harris Centre, has partnered with REDBs in delivering regional workshops (See page 23) in each of the economic zones, to bring together Memorial research and expertise with community economic and development stakeholders. More than 400 Memorial projects taking place in communities and regions throughout the province have been identified and presented to the relevant regions.

The Newfoundland and Labrador Regional Economic Development Association (NLREDA) represents the Regional Economic Development Boards (REDBs) on issues of common concern.[52] As part of its role, NLREDA undertakes, collects and disseminates research to its membership and its strategic partners in economic development. This research usually relates to economic policy, economic development, business development, communications, planning, management, and governance.

NLREDA's research priorities for the next three years will be on capacity building and opportunity management. Capacity building focuses on research of methods and approaches to increase the ability or desire of individuals, groups and/or organizations within a region to effectively participate in economic development activities. Examples of capacity building research include knowledge mobilization strategies, not-for-profit management / governance best practices, and peer oriented instructional approaches for adult learners. Opportunity management refers to research of tools, processes and techniques to assist community stakeholders in the identification of business and community development opportunities that sustain or improve the local economy. Examples of opportunity management research include innovative approaches to idea generation, effective methodologies for recognizing and prioritizing opportunities, and the development of options for advancing identified opportunities.

• Northeast Avalon region

The Department of Municipal Affairs and 15 municipalities have come together to participate in the preparation of a new regional plan that will guide future growth and development in the Northeast Avalon. The Northeast Avalon Regional Plan will provide a vision that responds to current issues including population growth, development demand, the need for new economic opportunities and regional services.

Over 2009 - 2011, the process of developing the Northeast Regional Plan will include a comprehensive review and analysis of current issues and opportunities. With research and input from groups, organizations and the public, a vision and guiding principles for the future will be established. Potential scenarios for achieving the vision will be proposed, and from these the Northeast Avalon Regional Plan will emerge.

The Northeast Avalon Regional Plan will address a range of important issues facing the diversity of communities in the region, including regional servicing, infrastructure, transportation, and recreation; balancing development with environmental protection; climate change impacts on land use; preservation of coastal areas; heritage preservation; waste management; comprehensive land use planning policy; vibrant rural communities; agricultural development; aggregate resources; and hazards and limitations of development.[53]

- **City of St. John's**

Home to Memorial's St. John's campus and the Marine Institute, the province's capital city presents many opportunities for research. Some partnerships exist now between Memorial and the city, but there is great potential for more strategic partnerships. The City of St. John's and Memorial can advance mutually beneficial programming to support and cultivate St. John's as a university-research city to the benefit of the community and the province.

The City of St. John's is part of the developing Northeast Avalon Regional Plan (above), and has committed to becoming a city of oceans excellence, as part of the OceansAdvance cluster initiative. Within the realm of city plans, programs and responsibilities, there are many potential areas for research support and collaboration. Recent strategies released by the city have focused on large societal issues, including housing, urban forests, recycling, water supply, recreation and parks, arts and culture, bicycling, and development of particular areas.[54]

Opportunities exist in public policy to support research in areas of municipal fiscal regimes and there may be opportunities to link health and lifestyle research with recreation programming. Capital programs and general infrastructure maintenance may be supported by research in engineering, simulation and geography. New technologies, processes and learning that can improve health and safety training and productivity are areas of interest to the City of St. John's. On an operational level, there may be opportunities for research programs that have application to city operations to align with relevant city departments and programs.

- **City of Corner Brook**

The City of Corner Brook, home to Sir Wilfred Grenfell College, has expressed interest in several key research areas, including: integrated community sustainability plans, competitive industrial development in smaller cities, housing and socioeconomic issues concerning housing, 'smart growth', business and professional recruitment and retention, soil erosion, waste management, and 'green' communities.

For the past several years, a group of stakeholders have worked to establish the City of Corner Brook and surrounding region as a centre of excellence for environmental education, research, technology, and development. The area now boasts an emerging

environmental base that broadly encompasses forestry, wildlife, tourism, information technology, and environmental industries. There also exists a strong core offering of environmental educational programming through the two public post-secondary institutions in the city. Additionally, there are strategic partnerships between public/private and economic development interests that consider the environment as a key stimulant for industry in this region.

- **Labrador**

Labrador is a region comprised of many distinct peoples, interests, needs and opportunities. Important to the development of the research plan are consultations with, and input from, various organizations on partnerships and projects in Labrador. Among those organizations are: the Nunatsiavut Government, the Innu Nation, the Métis Nation, industry, and government. Aboriginal groups within Labrador are distinct, but share interest in some research areas. The environment and natural resource management is key, as much of aboriginal culture, lifestyle and economic future are tied to the land and water. Other high priority areas for research include: health, community sustainability, cultural heritage (including language and education). Labrador has great research potential (in areas such as extraction and energy industries, economic development, humanities, basic and applied science, health, education, etc.). The secondary benefits of local research will manifest themselves through various teaching and training opportunities for Labradorians and the economic and social development of the region.

The Nunatsiavut Government is a regional ethnic government that represents Labrador Inuit. As a newly established government, the Nunatsiavut Government is in the process of developing research priorities for the Labrador Inuit Settlement Area. A big step that will be taken in June 2010, with the first large-scale research workshop in Nunatsiavut, entitled Tukisinnik ('to understand'). This workshop will focus on providing an integrated synthesis of research that has taken place in Nunatsiavut and its relevance to Inuit followed by a newly developed research agenda based on Inuit values and interests. It is hoped that the outcomes of this workshop will provide the priorities, vision and agenda for the two new research centers that are being built in Nunatsiavut in summer 2010 (one in Nain and the other in Saglek Fiord just south of the Torngat Mountains National Park). Broadly speaking, however, there are current issues of importance in Nunatsiavut including sustainable and economic development, land use planning and decision-making, challenges and opportunities pertaining to adaptation to climate change and modernization, community development and infrastructure, socio-economic development, traditional and Inuit knowledge, holistic understanding of health and environment, archaeology, cultural and eco-tourism, renewable and non-renewable energy, culture and language retention, protected areas management, and research as a tool for education and outreach.

As Memorial's division in Labrador, the Labrador Institute (LI) seeks to stimulate, co-ordinate, and support major Memorial projects and programs to expand the Labrador knowledge base. The coming LI research facility in North West River, the new Nunatsiavut research site in Nain, expanded research facilities in the Torngat Mountains National Park, and the Heritage Research Centre in Point Amour, provide infrastructure to support an increased level of research in Labrador.

6.4 Community and service organizations

Community organizations that serve social needs and opportunities present significant opportunities for partnership in *research*. These organizations address a myriad of important issues and require assistance in obtaining baseline data, analyzing policy and developing solutions. Many community and service organizations are not able to present significant funding to interested researchers, but by partnering with these organizations on their issues, researchers will often be able to draw from funding sources that share in the organizations' concerns.

Community and service organizations with significant mandates and interests related to *research* will be consulted for input in the development of the research plan. These organizations include various non-governmental organizations (NGOs), for example the Community Sector Council Newfoundland and Labrador (CSC, previously Community Services Council Newfoundland and Labrador).

The CSC is dedicated to advancing the community sector through volunteerism, social innovation, entrepreneurship and knowledge exchange. The CSC seeks a prosperous and inclusive society that supports individuals, families and communities, and in its activities promotes social and economic well-being province-wide, through encouraging citizen engagement, promoting the integration of social and economic development and providing leadership in shaping public policies.

In 2007, the School of Pharmacy marked a new era for skills development and research in pharmacy education with the opening and revitalization of its Professional Practice Laboratory.

The CSC engages in research related to a broad array of needs and opportunities in Newfoundland and Labrador that are of interest to some Memorial researchers, including: community capacity building, social and economic development, social economy, the voluntary community-based sector and public policy. The CSC and Memorial have worked together as partners in the recent past – partnering on Values Added, a Community University Research Alliance (CURA), which concluded in 2008. Values Added assessed the prominence and success of the provincial government's Strategic Social Plan in facilitating interdepartmental collaboration, public consultation and citizen engagement, and in linking voluntary organizations and communities to government.[55]

Many other NGOs are active provincially and locally addressing a wide-range of issues that present research needs and opportunities, including health, housing, anti-poverty, youth and aging, disabilities, and the environment.

6.5 Regional health authorities

Regional health authorities and their constituent organizations are important potential partners in *research*. Facilities and support within the health care institutions are essential for clinical research. The authorities have programs that are operated in the community such as health promotion activities. Within the limitations of appropriate privacy considerations the authorities may have health data that can be explored for new ideas about treatments, or about the effectiveness of their own operations.

The Eastern Health Authority partners extensively with Memorial's medical and health-related faculties and schools and houses the medical school. Clinical faculty of the Faculty of Medicine have appointments with both the university and the regional health authorities. In Corner Brook, Grenfell College is presently investigating the establishment of a provincial centre for the study of healthy aging, consistent with the provincial government's Healthy Aging Policy Framework and

Faculty from the School of Nursing are one part of a five-year $2.5 million project that looks at issues around chronic pain management. Drs. Sandra LeFort, left, and Shirley Solberg are leading the project. They're carrying out focus groups, reviewing scientific policy and lay literature on the subject, and exploring best practices in managing pain.

enhancing the province's capacity for aging-related research. The Western Health Authority is represented by two members on the committee working on the centre proposal. The location of the centre is proposed to be in Western Health's new long-term care facility, which will open this spring.

Information about the regional integrated health authorities is available on their websites: Central Health (www.centralhealth.nl.ca/), Eastern Health (www.easternhealth.ca/), Labrador-Grenfell Health (www.lghealth.ca/), and Western Health (www.westernhealth.nl.ca/).

6.6. School boards

The four anglophone and one francophone school districts in Newfoundland and Labrador have been and continue to be important partners for collaboration in research for the Faculty of Education. Faculty members and graduate students have been given access to schools, classrooms and other educational settings to undertake research that is relevant for the province and for practitioners. A number of district personnel have special arrangements with the faculty, such as adjunct professorships, and often engage in teaching and research through the Faculty of Education.

Other educational agencies, for example the Newfoundland and Labrador Teachers' Association, the Department of Education (K-12 and post secondary divisions) and the Newfoundland and Labrador School Boards Association often commission research through the Faculty of Education. This arrangement has been beneficial to faculty members and the sponsoring agency. The school districts have developed protocols for ethical research and the Faculty is compliant with district expectations in this area.

Information about the province's school board districts is available on their websites: District 1 – Labrador (www.lsb.ca), District 2 – Western (www.wnlsd.ca), District 3 – Nova Central (www.ncsd.ca), District 4 – Eastern (www.esdnl.ca), District 5 – Conseil Scolaire Francophone (www.csfp.nf.ca).

6.7 College of the North Atlantic

In the provincial government's 2005 *White Paper on Public Post-Secondary Education*, the government called for Memorial and the College of the North Atlantic (CNA) to "employ a system-wide approach to new program planning in areas of potential overlap or where co-operative and collaborative efforts may enhance design or delivery" (Section 9.2, Strategic Planning). The Memorial University research plan will contribute to this goal by seeking out opportunities for institutional partnerships with CNA. Memorial and CNA each have strong research interests and capacities, and there is great potential for enhancing the benefits brought by the strengths of each through partnership.

The College of the North Atlantic (CNA) is Newfoundland and Labrador's public college – one of the largest post-secondary educational and skills training centres in Atlantic Canada, with a history dating back more than 40 years. Today, CNA has 17 campus locations throughout Newfoundland and Labrador and one in the Middle East state of Qatar.

The Office of Applied Research at CNA fosters exploratory activity through programs leading to the application of new knowledge to sustainable economic activity. As a geographically-distributed organization with considerable regional and international facilities, expert human resources, technology deployment and a modern communication network, CNA leads the pan-provincial College Research and Innovation Network (CRIN). The CRIN serves industry and community needs through a number of coordinated activities including: generation of new knowledge, clustering and partnerships, research grants management, intellectual property and technology transfer.

CNA's strategic areas of research strength are:

- Leading innovation in engineering disciplines, particularly in electrical, mechanical, manufacturing, petroleum and industrial technologies;
- Creating new products and services in information technology, particularly in digital animation, simulation, etc.;
- Exploring innovative applications in communication technology;
- Advancing optimal utilization and management of natural resources;
- Developing technologies to deal with current issues in environmental sciences; and
- Exploring interdisciplinary innovations in natural, biological and health sciences.[56]

Current major research and development projects at CNA include:

- Wave powered pumping of seawater for onshore use and electrical generation (Burin) - This innovative project aims to harness ocean wave energy for onshore commercial applications;
- Petroleum applications of wireless systems (Seal Cove) - This multi-million dollar initiative is jointly operated by three Atlantic Canadian post-secondary institutions (University of Cape Breton, College of the North Atlantic, University of New Brunswick) and aims to develop a fully automated wireless control system for oil and gas installations;
- Geospatial research (Corner Brook) - This multi-million dollar, CNA-led, research initiative is funded through AIF, CFI and other partners, and aims to develop capacity for comprehensive assessment of terrestrial resources in the province of Newfoundland and Labrador using the most modern mapping, sensing and data collection techniques;
- Manufacturing technology – At CNA's Manufacturing Technology Centre, the province's manufacturers and entrepreneurs access applied research and advanced technological capabilities; and
- Agrifoods – CNA's Agriculture Centre of Excellence is dedicated to supporting Newfoundland and Labrador's agriculture industry in its endeavor to develop and diversify, realize opportunities, and maximize the potential for long-term growth and sustainability. The Centre's secondary processing facility can assist in the development of value-added products.[57]

7. BUSINESS AND INDUSTRY

The research plan will be informed by industry associations (including those representing sectors such as oil and gas, oceans, fisheries, aquaculture, technical industries, manufacturing and tourism, culture and heritage), business associations such as chambers of commerce and boards of trade, and professional associations. There is a growing high technology private sector in the province. Industries in technology and natural resources sectors are seeking new ideas and technologies to increase productivity, and can benefit from Memorial researchers and facilities.

Industry and business associations will be consulted on *research* needs and opoprtunities. In addition, they present opportunities as funders in research relevant to their sectors, especially in leveraging funding from federal sources (such as AIF). There is high potential for further developing research partnerships with business and industry at the provincial, Atlantic, Canadian and international levels, and the consultations for the development of the research plan will seek to further cultivate these opportunities. The strategic partnership between business, labour and government described in the provincial government strategies section will play an important role in developing dialogue and partnerships between Memorial researchers and business and labour.

In addition, organizations committed to the development of industry clusters within regions, such as Oceans Advance[58] and the Centre for Environmental Excellence (CEE)[59], will be particularly important as research priorities are established. These associations present opportunities to develop partnerships in targeted research, and for joint approaches to funding sources for industry-relevant research. The CEE is described above in Section 6.3.

Oceans Advance represents more than 80 private and public sector members of the Newfoundland and Labrador oceans technology sector. This cluster of oceans technology is rapidly becoming recognized as leading the country. Memorial is part of the cluster, and the cluster presents enormous opportunity for Memorial both to contribute to and benefit from this growing network of firms and research and development partners. Oceans Advance recently released a strategic agenda for the ocean technology sector – *Outward Bound 2015*. The strategic agenda identifies the need for a range of competencies that would be based in the companies and in institutions like Memorial University. The need for partnerships with Memorial for technical development and for training of highly qualified people through graduate programs is specifically discussed. The strategic agenda identifies three market-driven strategic thrusts for the ocean technology industry:[60]

- Arctic/remote energy – providing solutions for development of energy resources in the arctic and other remote and harsh ocean environments;
- Next generation intelligent ships – developing "intelligent" information systems for efficient monitoring and control of vessels; and
- Ocean intelligence – monitoring, collection, analysis and dissemination of information about ocean systems.

Industry partners will come from the province, as well as from the Atlantic region, the rest of Canada, and many will be international. Given recent developments in Newfoundland and Labrador, international industry partners are likely to be important to Memorial's research efforts in these areas. Partner needs and research requirements and the continuing nurturing of these partnerships and opportunities will be critical.

8. NEXT STEPS IN ADVANCING THE MEMORIAL UNIVERSITY RESEARCH PLAN

Research, creative activity and scholarship are a central pillar of Memorial's strategic plan and we are confident the research plan developed through this process will help advance the excellence and relevance of Memorial *research* into the future. This background information document will be supplemented with additional information on the research plan website at www.mun.ca/research/plan. Consultations will be held this winter and spring with citizens and stakeholders in Newfoundland and Labrador and all are encouraged to complete our online survey on the research plan website. The research plan will build on the strengths identified by Memorial research units, on opportunities identified in this document, as well as on the many opportunities participants will present in the consultation dialogues.

GLOSSARY OF ACRONYMS

Terms:

KTE	Knowledge Transfer and Exchange
NGO	Non-governmental Organization
R&D	Research and Development
S&T	Science and Technology

Memorial University:

C-ASD	Centre for Aquaculture and Seafood Development
C-CORE	Centre for Cold Oceans Resources Engineering
C-SAR	Centre for Sustainable Aquatic Resources
CEE	Centre for Environmental Excellence
CMS	Centre of Marine Simulation
CREAIT	Core Research Equipment and Instrument Training Network
IBES	Institute for Biodiversity, Ecosystem Science and Sustainability
ISER	Institute of Social and Economic Research
LI	Labrador Institute
MI	Marine Institute
OSSC	Offshore Safety and Survival Centre
SERT	Safety and Emergency Response Training Centre
SOTAR	School of Ocean Technology Applied Research Unit

Federal Funding Councils and Agencies:

CFI	Canada Foundation for Innovation
CIHR	Canadian Institutes of Health Research
NSERC	Natural Sciences and Engineering Research Council
SSHRC	Social Sciences and Humanities Research Council

Federal Government Departments and Agencies:

AAFC	Agriculture and Agri-Foods Canada
ACOA	Atlantic Canada Opportunities Agency
DFO	Fisheries and Oceans Canada
NRC	National Research Council of Canada
NRCan	Natural Resources Canada

Federal Research Supports:

ACCCRC	Atlantic Cool Climate Crop Research Centre (AAFC)
AIF	Atlantic Innovation Fund (ACOA)
BDP	Business Development Program (ACOA)
CRC	Canada Research Chairs (Government of Canada)
IOT	Institute of Ocean Technology (NRC)
IRAP	Industrial Research Assistance Program (NRC)

Provincial Government Departments and Agencies:

HRLE	Department of Human Resources, Labour and Employment
INTRD	Department of Innovation, Trade and Rural Development
RDC	Research & Development Corporation

Provincial Research Supports:

IRIF	Industrial Research and Innovation Fund

Non-governmental Organizations:

AAU	Association of Atlantic Universities
CSC	Community Services Council
MNL	Municipalities Newfoundland and Labrador
NLREDA	Newfoundland and Labrador Regional Economic Development Association
OECD	Organization for Economic Co-operation and Development
PRAC	Petroleum Research Atlantic Canada
REDB	Regional Economic Development Board

LIST OF FIGURES

REFERENCES

1. Memorial University of Newfoundland and Labrador, "Strategic Research Plan", www.mun.ca/research/overview/strategic.php.
2. Memorial University of Newfoundland and Labrador, *Launch Forth: A Strategic Plan for Memorial University of Newfoundland*, www.mun.ca/strategicplanning/LAUNCH94.pdf.
3. Memorial University of Newfoundland and Labrador, "President's Report 2000 – 2001", www.mun.ca/2001report/index.php?includefile=menu/home.php&section=1&includefile1=content/home/framework.html.
4. Memorial University of Newfoundland and Labrador, *Memorial University of Newfoundland Strategic Plan*, www.mun.ca/strategicplanning/strategicplanjan25webfinal.pdf
5. Baker, M and Graham, J, *Celebrate Memorial: A pictorial history of Memorial University of Newfoundland, Memorial University* (1999), pg.18.
6. Garlick, et al, "Supporting the Contribution of Higher Education Institutions to Regional Development: Peer Review Report - Atlantic Canada", www.oecd.org/dataoecd/35/59/38455547.pdf.
7. Atlantic Canada Opportunities Agency, "Government of Canada Invests $62.4 Million in R&D to Drive Growth in Atlantic Canada, $13.8 Million in Newfoundland and Labrador" (News Release, January 31, 2010), mediaroom.acoa-apeca.gc.ca/e/media/press/press.shtml?4662.
8. Philanthropic Foundations Canada, www.pfc.ca.
9. "Supporting the Contribution of Higher Education Institutions to Regional Development", Ibid.
10. "Supporting the Contribution of Higher Education Institutions to Regional Development", Ibid.
11. Canadian Institutes of Health Research, et al, *Canada at the Leading Edge: Common Vision, Concerted Plan*, www.nserc-crsng.gc.ca/_doc/Reports-Rapports/SSHRC-NSERC-CIHR_Final_eng.pdf.
12. Canada Council for the Arts, *Moving Forward: Strategic Plan 2008-11, Values and Directions,* www.canadacouncil.ca/NR/rdonlyres/06782D43-21B4-4B26-BD60-1B4D96A00921/0/MovingforwardStrategicPlan200811.pdf.
13. Canada Council for the Arts, *Moving Forward Action Plan 2008-11*, www.canadacouncil.ca/aboutus/strat_plan/gi128473082052102038.htm.
14. Canadian Institutes of Health Research, *Health Research Roadmap: Creating innovative research for better health and health care (Strategic Plan 2009/10 – 2013/14)*, www.cihr-irsc.gc.ca/e/40490.html.
15. Treasury Board of Canada Secretariat, "Reports on Plans and Priorities, 2009-2010, Part III: Canadian Institutes of Health Research", www.tbs-sct.gc.ca/rpp/2009-2010/index-eng.asp?acr=1361.
16. Natural Sciences and Engineering Research Council of Canada, "Statement of Values and Goals", www.nserc-crsng.gc.ca/NSERC-CRSNG/values-valeurs_eng.asp.
17. Social Sciences and Humanities Research Council, "Framing Our Direction", www.sshrc.ca/site/about-crsh/publications/framing_our_direction_e.pdf.
18. Treasury Board of Canada Secretariat, "Reports on Plans and Priorities, 2009-2010: Social Sciences and Humanities Research Council", www.tbs-sct.gc.ca/rpp/2009-2010/inst/ssh/ssh02-eng.asp#II.
19. Genome Canada, "Vision, Mission, Objective", www.genomecanada.ca/en/about/vision.aspx.
20. Department of Industry Canada, "Minister of Industry Accepts S&T Strategy's Sub-Piorities Recommended by the Science, Technology and Innovation Council" (News Release, September 2, 2008), www.ic.gc.ca/eic/site/ic1.nsf/eng/04160.html.
21. Environment Canada, "Environment Canada's Science Plan: Executive Summary", www.ec.gc.ca/scitech/default.asp?lang=En&n=616C9E06-4&offset=1&toc=hide.
22. Fisheries and Oceans Canada, "Collaboration in Science and Technology", www.dfo-mpo.gc.ca/science/collaboration/index-eng.htm.
23. Agriculture and Agri-Food Canada, "Programs and Services by Region – Newfoundland and Labrador", www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1204570257718&lang=eng.
24. Canada's Aquatic Environments, "Northwest Atlantic Fisheries Centre (NAFC)", www.aquatic.uoguelph.ca/Human/Research/Webresearchinst/East/NorthwestAFC/nafc.htm.
25. Fisheries and Oceans Canada, "Canada's Oceans Action Plan", www.dfo-mpo.gc.ca/oceans-habitat/oceans/oap-pao/page06_e.asp.
26. Natural Resources Canada – Canada Forest Service, www.cfs.nrcan.gc.ca.
27. National Research Council Canada, "Our Research", www.nrc-cnrc.gc.ca/eng/research/index.html.
28. Canada Revenue Agency, "Overview of the Scientific Research and Experimental Development (SR&ED) Tax Incentive Program", www.cra-arc.gc.ca/E/pub/tg/rc4472/README.html.
29. Atlantic Canada Opportunities Agency, "Program Overview", www.acoa-apeca.gc.ca/English/ImLookingFor/ProgramInformation/AtlanticInnovationFund/Pages/AIFProgramOverview.aspx.
30. Springboard, "About Us", www.springboardatlantic.ca/about.html.
31. Government of Newfoundland and Labrador, *All the Skills to Succeed: Report of the Newfoundland and Labrador Skills Task Force*, www.ed.gov.nl.ca/edu/publications/postsecondary/stfreport.pdf.
32. NL Department of Fisheries and Aquaculture, "Fishing Industry Renewal", www.fishaq.gov.nl.ca/industry_renewal/index.html.
33. NL Department of Fisheries and Aquaculture, "Fisheries Technology and Opportunities Program: Program Brochure" (2007), www.fishaq.gov.nl.ca/research_development/research/ftnop_brochure.pdf.
34. NL Department of Environment and Conservation, *Climate Change Action Plan, 2005*, www.env.gov.nl.ca/env/Env/policy%20and%20planning/climatechangereport/climatechangeplanfinal.pdf.
35. Government of Newfoundland and Labrador, "Backgrounder: Comprehensive Regional Diversification Strategy", www.releases.gov.nl.ca/releases/2005/intrd/0318n02back.htm.
36. Government of Newfoundland and Labrador, *Creative Newfoundland and Labrador: Blueprint for Development and Investment in Culture, 2006*, www.tcr.gov.nl.ca/tcr/publications/2006/culturalplan2006.pdf.
37. NL Department of Human Resources, Labour and Employment, *Creating a Province of Choice: A Youth Retention and Attraction Strategy for Newfoundland and Labrador (2009)*, www.lmiworks.nl.ca/yras/pdf/Youth-Retention-and-Attraction-Strategy.pdf.
38. NL Department of Human Resources, Labour and Employment, *Diversity – Opportunity and Growth: An Immigration Strategy for Newfoundland and Labrador*, www.nlimmigration.ca/media/2842/strategydoc-mar07.pdf.
39. NL Department of Natural Resources, *Focusing Our Energy: Newfoundland and Labrador Energy Plan* www.nr.gov.nl.ca/energyplan/EnergyReport.pdf.

40. NL Department of Innovation, Trade and Rural Development, *Innovation Newfoundland and Labrador: A Blueprint for Prosperity*, www.intrd.gov.nl.ca/intrd/innovation/FullReport.pdf.
41. Government of Canada and Government of Newfoundland and Labrador, *Canada and Newfoundland and Labrador Labour Market Development Agreement*, www.hrsdc.gc.ca/eng/employment/partnerships/labour_market_development/nfld/transf/nl_lmda.pdf.
42. Government of Newfoundland and Labrador, "Province Assumes Responsibility for Labour Market Development Agreement" (News Release, Nov. 2, 2009), www.releases.gov.nl.ca/releases/2009/hrle/1102n04.htm.
43. NL Department of Natural Resources, *Newfoundland Forest Sector Strategy* (2008), www.nr.gov.nl.ca/forestry/publications/ForestSectorStrategyFinalReport.pdf.
44. Department of Labrador and Aboriginal Affairs, *A Northern Strategic Plan for Labrador*, www.laa.gov.nl.ca/laa/northern_strategic_plan/nspl.pdf.
45. NL Department of Innovation, Trade and Rural Development, *Oceans of Opportunity: Newfoundland and Labrador's Ocean Technology Sector Strategy*, www.intrd.gov.nl.ca/intrd/sectordev/Oceans_of_Opportunity_Book.pdf.
46. NL Department of Human Resources, Labour and Employment, *Reducing Poverty: An Action Plan for Newfoundland and Labrador (2006)*, www.hrle.gov.nl.ca/hrle/poverty/poverty-reduction-strategy.pdf.
47. NL Department of Innovation, Trade and Rural Development, "The Strategic Partnership", www.intrd.gov.nl.ca/intrd/regionaldev/strategicpartnership.html.
48. Government of Newfoundland and Labrador, "Backgrounder: Violence Prevention Initiative" (March 2000), www.releases.gov.nl.ca/releases/2000/exec/0322n24.htm.
49. NL Status of Women Newfoundland and Labrador, *Taking Action Against Violence, 2009-2012: Violence Prevention Initiative*, www.gov.nl.ca/VPI/publications/ActionPlan2006_2012_1.pdf.
50. Research & Development Corporation, "Industrial Research and Innovation Fund (IRIF)", www.researchnl.com/funding/irif.htm.
51. Municipalities Newfoundland and Labrador, "Our Vision", www.municipalitiesnl.com/?Content=Home/Vision.
52. Newfoundland and Labrador Regional Economic Development Association, www.nlreda.ca.
53. Northeast Avalon Regional Plan, "Project Overview", www.nearplan.ca/project-overview.htm.
54. City of St. John's, "Publications", www.stjohns.ca/cityhall/publications.jsp.
55. Community Sector Council Newfoundland and Labrador, "Values Added: Community University Research Alliance", www.envision.ca/templates/cura.asp?ID=3667.
56. College of the North Atlantic, *Strategic Research Plan*, www.cna.nl.ca/oar/StrategicPlan.pdf.
57. College of the North Atlantic, "Research at College of the North Atlantic", www.cna.nl.ca/oar/research.asp.
58. OceansAdvance, www.oceansadvance.net.
59. Centre of Environmental Excellence, www.ceenl.ca.
60. OceansAdvance, *Outward Bound 2015 – A Strategic Agenda for Accelerating Growth of the Ocean Technology Sector in Newfoundland and Labrador (2009)*, pg. 11.

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