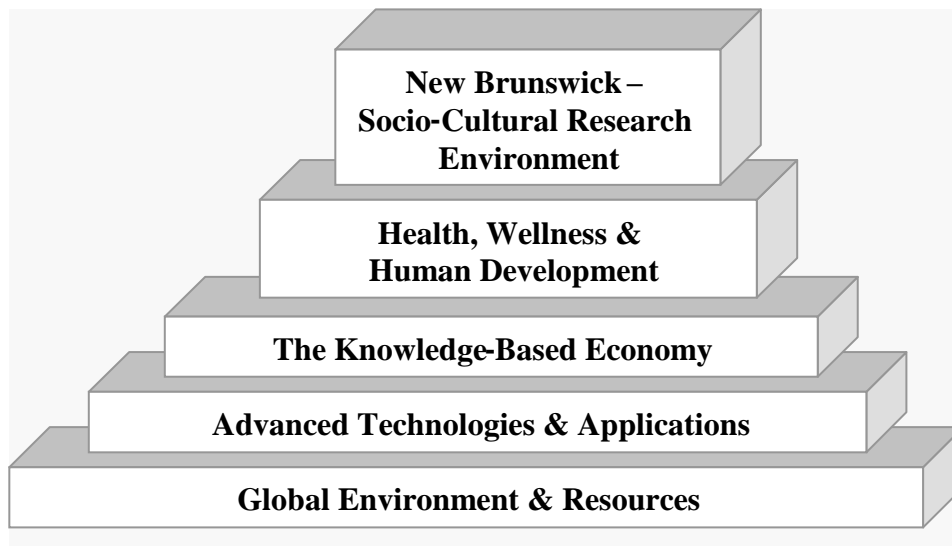


Canada Research Chairs: Strategic Research Plan Summary

Planning and Approval Process: Decisions to nominate specific candidates for Canada Research Chairs are made by a committee consisting of the President, Vice-President (Academic), Vice-President (Saint John), Vice-President (Research), and the Dean of Graduate Studies, following the recommendation of candidates by the Councils of Deans.

Major Thrusts for Research and Research Training: The ultimate aim of society is the ability to sustain a cultural environment of its choosing, for the benefit of its citizens while recognizing the responsibilities owed by that citizenry if such an environment is to remain vibrant and be sustainable. This cannot be achieved in isolation from our history, socio-economic realities or changes within the nation and world-at-large. The five strategic themes – *Global Environment and Resources; Health, Wellness, and Human Development; Advanced Technologies and Applications; The Knowledge-Based Economy; and New Brunswick as a Socio-Cultural Research Environment* – reflect not only these interactions, but the strengths and focus that UNB can bring to the world stage in serving as an intellectual, social and economic driving force for the future of the province, region and nation.

Strategic Research Themes: In establishing strategic directions, we have identified features that make UNB in some way distinctive, or that provide us with natural opportunities. However, using geography and socio-economic history to our present advantage is not equivalent to letting it define and limit our future. The five research themes can thus be viewed as a pyramid with our ultimate dependence on Earth as the base, society as the pinnacle, and the means by which the latter is supported contained within the intervening themes.



Our geography provides us with many research and networking opportunities. These natural geographical strengths are the basis for the research theme **Global Environment and Resources**. Two Chairs supporting this theme provided the catalyst for the Canadian Rivers Institute (CRI), a bi-campus research institute focused on the ecological health of Canadian Rivers. The CRI promotes collaboration between the two UNB campuses as well as other Maritime universities, governments and community groups. The Planetary and Space Science Centre at UNB's Fredericton campus comprises a research team devoted to terrain characterization, impact cratering processes and related mineral resource evaluation on Earth and other planetary bodies. A Tier 1 CRC in Planetary Materials was proposed in 2005 to develop this niche. Likewise, the diverse, yet compact, social environment of New Brunswick comprises a living laboratory formed from its rich historical, cultural and linguistic heritage. This diversity provides many opportunities for historical, cultural and public policy research related to health, education and socio-economic issues and establishes the basis for two strategic themes – **Health, Wellness and Human Development** and **New Brunswick as a Socio-Cultural Research**

Environment. The Muriel McQueen Fergusson Centre for Family Violence Research, which has a national reputation for excellence, addresses both themes through multi-disciplinary, intersectoral action research intended to influence health, education, justice, and human resource policy and practice. The Chair in Literacy and Human Development builds on a need to understand and direct our future by creating scholarship that has both international applications and the power to inform societal decisions.

In order to expand and strengthen **Health, Wellness, and Human Development**, research addressing the prevention of health problems, health promotion, and social determination of health with the goals of improving understanding, creating innovative interventions, and developing social policy is a priority at UNB. The establishment of the Community Health Clinic focusing on the health and wellbeing of vulnerable individuals, families and communities is evidence of UNB's commitment to strengthening intersectoral and interdisciplinary health research partnerships.

The empowering link between these components of a civil society and the natural environment that sustains New Brunswick in a very direct manner is the need to reduce socio-economic limitations that have traditionally been derived from our geography. In this context, essential research into core technologies that transect an array of disciplines is recognized in the themes - **Advanced Technologies and Applications** and **The Knowledge-based Economy**. UNB's wide discipline coverage, combined with our relatively small size and close-knit character, encourages interdisciplinary research based on these core technologies. The Chair in Magnetic Resonance Imaging is an excellent example of this wherein it is linked throughout the University to elements of materials science research encompassing technique development, resource and environmental studies, as well as innovative new materials studies. We plan to enhance such cooperative interdisciplinary networks, both internally and externally, as evidenced by the Chair within the Canadian Research Institute for Social Policy.

NB is a world leader in information and communications technology with a CA-Net 4 backbone, high bandwidth fibre optic links throughout the province, and high speed internet available to homes in most locations. UNB is one of four lead universities that form the ACEnet consortium, a project funded by the Canada Foundation for Innovation that is expanding high-performance computing facilities to advance research across a range of disciplines in the four Atlantic provinces. This infrastructure, together with the NRC-IIT facilities located on both UNB campuses, provides a highly supportive environment for studying and proto-typing e-commerce and e-business practices and for conducting research on information and communications technology. Moreover, we have long enjoyed a strong reputation in scholarly editing and publishing, which we are now enhancing by developing technical expertise through the Electronic Text Centre. Our nationally recognized journals, such as *Acadiensis* and *Fiddlehead*, speak to our long-established strengths in history, literature, creative writing, language studies, and the social sciences. Enhancing these traditional strengths with state-of-the-art electronic infrastructure is a recognized strategic opportunity.

Existing Chairs at UNB: From the first competition, three NSERC Chairs were awarded under the **Global Environment and Resources** theme. The NSERC Tier 2 Chair in Molecular Systematics & Biodiversity has distinguished himself during the first term, including the award of a Steacie Fellowship, and was UNB's first Chair renewal, through which he is developing a detailed inventory of Canada's marine plants and providing taxonomic training to young scientists. The NSERC Tier 1 Chair in Ecosystem Health Assessment is studying the fish populations of the Saint John River and the effects of industrial and urban effluents (renewed in 2008). The NSERC Tier 1 Chair in River Ecosystem Science is conducting a detailed assessment of the aquatic habitats of the Atlantic salmon population in New Brunswick's rivers and bays (renewed in 2008).

Three Chairs were awarded from the second competition. One NSERC was awarded under the **Advanced Technologies and Applications** theme. The NSERC Tier 1 Chair in Materials Science MRI is applying new methods of Magnetic Resonance Imaging (MRI) to a broad array of problems in materials science. This highly successful Chair (and NSERC Steacie Fellowship awardee, 2000-2002)

was renewed in 2009. Under the **Health, Wellness and Human Development** theme, the Tier 1 Chair in Literacy and Human Development is involved in social policy research, training and program development to aid the education of young students (new chair awarded in 2010).

In 2002, we were awarded a Tier I NSERC Chair in Pulp and Paper Science and Engineering, which addresses the theme of **Advanced Technologies and Applications**. This Chair focuses on the fundamentals associated with paper-making processes and is collaborating with industry in the development of improved technologies. By researching and developing more environmentally sustainable processes, the Chair also supports the strategic theme of **Global Environment and Resources** (renewed in 2009).

The UNB-sponsored Vice-Chancellor's Research Chair (commenced in November 2008) carries on the work of the former Tier II NSERC CRC in Rehabilitation Cybernetics following the end of the CRC term. Linked to the strategic theme of **Health, Wellness, and Human Development**, this university Chair is a valuable addition to the established research group at the Institute of Biomedical Engineering. The Chair has expertise in artificial limb development, complementing UNB's strengths in myoelectric signal processing, and is broadening the university's capabilities in this area.

Located within the Faculty of Engineering, the Chair in Groundwater – Surface Water Interaction (NSERC Tier II, commenced in July 2003, renewed in 2008) is developing new field and numerical modelling techniques that will be applied to water resources issues, supporting the strategic theme of **Global Environment & Resources**. Research themes include the investigation of thermal regimes in groundwater-fed streams; the implications of riverbank filtration for safe drinking water; and the effects of groundwater-derived nitrogen loading on coastal estuaries. The research related to drinking water quality also supports the strategic theme of **Health, Wellness, and Human Development**.

The Tier I NSERC Chair in Forest Conservation Genomics and Biotechnology (commenced January 2005) supports the **Global Environment & Resources** theme and provides an excellent opportunity for UNB to increase our strength in genomics, bioinformatics and conservation genetics of our plant resources through the establishment of an Institute for Genomics and Conservation Genetics Research. The Institute will create a cooperative, interdisciplinary academic/government/ private research network on forest tree and crop genomics, bioinformatics, biotechnology, and conservation and sustainable management of forest tree/plant genetic resources.

The Tier II NSERC Chair in Chemical Contamination of Food Webs (commenced July 2004 & renewed in 2009) supports the strategic research theme of **Global Environment and Resources**. It focuses on understanding the mechanisms and significance of global food contamination. The Chair examines food web contamination and potential transfer of contaminants to humans via food, thereby also supporting the **Health, Wellness and Human Development** theme.

The Tier II SSHRC Chair in Adolescents' Sexual Health Behaviour (commenced July 2006) supports the research themes of **Health, Wellness and Human Development** and **New Brunswick as a Socio-Cultural Research Environment**. This Chair is examining dating contexts among New Brunswick youth to further our understanding of health needs facing adolescents and the importance of understanding relationship contexts of sexual risk (renewal approved in 2011).

The Tier I NSERC Chair in Planetary Materials (commenced April 2006) investigates the effects of high strain rate deformation on planetary materials with emphasis on earthquake mechanics and hypervelocity impact processes. Supporting the research themes of **Global Environment and Resources, Advanced Technologies and Applications**, as well as **Knowledge-Based Industry**, the Chair is an outgrowth of our Planetary and Space Science Centre and the Institute for Materials Visualization and Analysis. The Chair will be the catalyst for the development of a unique, world class centre for research and training in planetary materials and related technologies, enhancing our understanding of Earth in relation to other planetary bodies.

Our Geodesy and Geomatics Engineering Department hosts a Tier II NSERC Chair in Advanced Geomatics Image Processing for Geo-Spatial Information. Strongly embracing the theme of **Advanced Technologies and Applications**, this Chair (commenced in April 2008) is developing breakthrough technologies for geo-spatial information acquisition from remote sensing imagery and for advancing online mapping technologies.

Supporting the Health and Education Research Group in our Faculty of Education, our Tier II SSHRC Chair in School to Work Transition (commenced in July 2009) is strengthening research under the **Health, Wellness and Human Development** and **New Brunswick as a Socio-Cultural Research Environment** themes by focussing on social and physical health consequences of completing post-secondary education programs and pursuing a career.

The Tier II NSERC Chair in Aquatic Molecular Ecology (commenced in November 2009) is developing techniques to better understand molecular events underlying toxicity in fish to predict stress and reproductive failure, strengthening research groups already established in the Department of Biology and the Canadian Rivers Institute at UNB-SJ in support of the **Global Environment and Resources** theme.

The Tier 2 SSHRC Chair in Population and Social Policy (commenced in July 2010) highlights recent efforts to strengthen our research base in the area of social policy, with emphasis on the current provincial priority of increasing immigration to New Brunswick. It complements the 2008 addition of the Andrews Senior Fellow in Social Policy and provincial initiatives through the Population Growth Secretariat. The Chair underscores UNB's broader resolve to enhance the evidence base for informed social policy, which is essential for good governance, in strong support of the **Health, Wellness and Human Development, the Knowledge-Based Economy, and New Brunswick as a Socio-Cultural Research Environment** themes.

Proposed Chairs for 2010-2011: For April 2011 submission we have nominated a Tier 1 SSHRC Chair in Atlantic Studies. We wish to complement and extend the current research and graduate studies of the Department of History, provide leadership in the establishment and operation of the Faculty of Arts' interdisciplinary Atlantic Canada Studies Centre, and foster collaborative research. The proposed Chair will also fill the gap left by the retirement of our Tier 1 Chair in Atlantic Canada Studies, and work in collaboration with our Electronic Text Centre to strengthen the "Atlantic Portal," a bilingual, multi-layered Web site that explores the use of communications technology to support research related to the Atlantic Provinces of Canada.

For October 2011 submission we have nominated a Tier 2 NSERC Chair in Chemical Process & Catalysis. We have advertised for candidates in the Chemical Engineering field with proven research in the development of novel chemical conversion routes, catalyst development, or catalytic processes for biomass to fuels in support of our **Global Environment and Resources and Advanced Technologies and Applications** research themes.

University Support for the Chairs: Chairs benefit from established support systems, enhanced by their solid fit with existing university research activities and a strong commitment of financial and technical resources. Overhead and administrative costs are absorbed by UNB, including relocation costs, start-up funds, travel budget, research assistantships to support graduate students, secretarial, clerical and technical support, library resources, multimedia facilities, networking support, and provision of office/lab space, as required.

Assessing Overall Success of Objectives: In addition to the numerical measures of many of the specific objectives, the significance of our contributions will be measured by the academic and public recognition of our creative and scholarly publications; the high profile excellence of the research centres and industrial research chairs that we support; the sustained and rapidly-growing funding that our

researchers have attracted; the policy-effective relationships established with a wide variety of communities beyond our campus; and the quality of the graduate students and post-doctoral fellows whom we attract. Together with the intellectual, cultural, social and economic vitality with which they are all strongly linked, these are the performance indicators we will regularly monitor.

Within the lifetime of the CRC program, UNB will have established international recognition for research with collaborative networks (CRISP) and multi-disciplinary models for research centres (Atlantic Canada Studies). The utilization of quantitative methodologies and the introduction of innovative technologies (Electronic Text Centre) in support of humanities and social science research will be pursued. Our ability to support multidisciplinary research in the sciences and applied sciences rests on the development of core technologies that enable cross-pollination across traditional research boundaries. A simple measure of assessment will be flourishing research groups addressing a range of “non-traditional” materials science issues. UNB continues to pursue major increases in health and wellness research. The continued rejuvenation of the Institute of Biomedical Engineering and interaction of researchers from both the applied and social sciences will be measures of this success.

Accomplishing our Overall Goals: To implement this Plan, UNB has pursued new appointments in each of the strategic theme areas. The University launched a major fund-raising campaign in 2003 in support of this Plan. The Atlantic Innovation Fund (AIF-ACOA) and the New Brunswick Innovation Foundation (NBIF) have played a major funding role by enhancing research infrastructure, assisting with additional proposals to the CFI, promoting more active partnerships between university, government, and private sector constituencies, and enhancing the Canada Research Chairs program. Specifically, the University has made support of the research programs of the Canada Research Chairs a targeted priority for its proposals to the Atlantic Innovation Fund; for example, the Chair in Magnetic Resonance Imaging was part of a combined multimillion dollar successful AIF/CFI project. The University intends to continue to use existing programs such as the NSERC Industrial Research Chair program to strengthen our research capacity in support of the Plan. We are actively pursuing new and innovative relationships with government and private sector research agencies that reflect the recognition that research, both fundamental and applied, is central to the viability and sustainability of socio-economic conditions compatible with a materially sound and intellectually rich civil society.

Encouraging Protected Groups: Each call for nominations emphasizes the university’s strong desire to identify qualified nominees in the four protected groups. In our Annual Report to CRC for 2002, the Vice-President (Research) set a goal of having half of our Chair nominations in Years 4 and 5 being in the four protected groups. The University is monitoring progress towards achievement of this goal during each remaining call for nominations. As of April 2011, we have three female Chairs out of our total present complement of 15 (Of three additional female chairs, one recently retired, one left the university, and one was not renewed). Currently, four chair holders are in visible minority groups.