

The University of Winnipeg CRC/CFI Strategic Research Plan (2016-2019)

Introduction

The University of Winnipeg is a comprehensive research university with a strong culture of research, scholarship, creativity, and innovation that spans the sciences, social sciences, humanities, and education. Our researchers are highly successful in attracting external grants and contracts, receiving approximately \$6 million annually over the last five years. A strong commitment to the teaching and training students characterizes the University of Winnipeg. Along with our graduate programs, a number of faculty hold adjunct appointments at comprehensive medical/doctoral universities where they provide graduate supervision. Faculty at the University of Winnipeg are among the best in Canada at meaningfully integrating undergraduate students into their active research programs. Our strength in training is illustrated by the numbers of students who successfully compete for a variety of external and internal undergraduate and graduate research scholarships and awards. The University is host to a number of research institutes and centres such as: Institute of Urban Studies, Institute for Women's and Gender Studies, Planetary Spectrophotometer Facility (PSF), Centre for Forest Interdisciplinary Research (C-FIR), Centre for Research in Young People's Text and Cultures (CRYTC), the Prairie Climate Centre, and the Prairie Research Institute for Materials and Energy.

This Strategic Research Plan is based on two key documents; our Strategic Directions (2015) and our Integrated Academic and Research Plan (2016-2021). Drawing from both documents we outline how the Canada Research Chair (CRC) and Canada Foundation for Innovation (CFI) programs will continue to be used to enhance our capabilities. The foundation of this plan is built on five key Strategic Directions established in 2015 and include:

- Academic Excellence and Renewal;
- Student Experience and Success;
- Indigenization;
- Research Excellence, Knowledge Mobilization, and Impact; and
- Financial and Institutional Resilience

Objectives

Extending our capabilities for interdisciplinary/multidisciplinary and/or collaborative research, along with enhancing our existing research abilities and resources are the primary goals of research at the University of Winnipeg. The following four objectives express how we have been working towards these goals. Taken together, the objectives apply to all of the research thrusts described in this strategic research plan.

1. Promoting emerging areas of interdisciplinary/multidisciplinary and/or collaborative research;
2. Fostering research excellence and enhancing the University of Winnipeg's role in the global exchange of knowledge;
3. Elevating faculty renewal by recruiting the highest quality researchers; and
4. Building the infrastructure to support cutting-edge research.

Assessing Success in Meeting Objectives

The success of the CRC and CFI programs is measured by the progress we can achieve using following indicators as the benchmark:

- Increasing in the number of scholars (faculty, post-doctoral fellows, visiting scholars, research associates, adjunct professors) and students (graduate and undergraduate) wishing to be affiliated with the University and its research initiatives.

- Enhancing the number of successful interdisciplinary research teams or clusters of scholars drawn from diverse areas of expertise to work together to develop research granting strategies and applications, and to improve their success rates.
- increasing in the number of scholars who play significant roles in major national and international research programs, conferences and scholarly meetings, grant review panels and editorial boards.
- Building and strengthening relationships with a variety of external organizations (e.g. other universities, NCEs) and other constituencies (e.g. governments, industry, NGOs, community) will be deepened and enhanced.
- Growing our reach in knowledge mobilization and the transfer of intellectual property outside of the university via traditional academic means (enhanced publication records) and to the general public.

Research Thrusts

The University of Winnipeg has identified nine key research thrusts in which to develop or maintain excellence.

1. Applied Health and Medical Research
2. Cultural Studies
3. Environmental Studies and Freshwater Ecology and Hydrology
4. Experimental Physics
5. High Performance Computing Applications
6. Indigenous Development and Studies
7. Materials Science
8. Planetary Science
9. Urban Studies

Research Area Descriptions

1. Applied Health and Medical Research

Applied health and medical research at the University of Winnipeg involves faculty members from the departments of Biology, Chemistry, Geography, Kinesiology, Physics, and Psychology. Since 2004 we have been actively involved in the development of new magnetic resonance imaging (MRI) procedures to study a wide variety of physical, chemical, biological, and material properties in order to locate and/or diagnose injury, disease, and human development. We have more recently broadened our health research to include biomedical studies such as the analysis of biomarkers for colorectal cancer, and examining DNA including active human endogenous retroviruses in neurons of ALS patients. As well, extensive research has been conducted in the area of mental health. The University of Winnipeg's support of the development of research and research training in this area is evidenced by the active collaborative relationships with scientists at other institutes such as: the Winnipeg Health Sciences Centre (HSC), The University of Manitoba, the Robarts Research Institute, the California Institute of Technology and the Mental Health Commission of Canada. It is also evidenced by the hiring of faculty members who specialize in both applied medical research and health research, and the training of undergraduate, graduate and post-doctoral students.

2. Cultural Studies

Cultural Studies at the University of Winnipeg is a strong interdisciplinary/multidisciplinary research area where our researchers seek to explore culture and the arts as part of a social, economic and political environment. Departments involved in this interdisciplinary/multidisciplinary field of research include: Education, English, (Art) History, Geography, Politics, Rhetoric, Writing and Communications, Sociology, and Women's and Gender Studies. The University of Winnipeg has a solid base of researchers working in this area, including the Canada Research Chair in Culture and Public Memory, and the former Canada Research Chair in Young People's Texts and Cultures. The Cultural Studies Research Group, Centre for Research in Young People's

Texts and Cultures (CRYTC), and the Institute of Women's and Gender Studies provides our researchers with a strong support base to begin collaborations with researchers from around the world.

3. Environmental Studies and Freshwater Ecology and Hydrology

The environment is the fastest growing concern among Canadians today. Global warming, air and water pollution, forest and wildlife management, organic chemical contaminants, and community sustainability are the main focus of this important research thrust. Environmental Research is a highly collaborative and interdisciplinary research thrust which involves faculty members from various departments, including Biology, Chemistry, Economics, Education, Environmental Science, Geography, and Sociology. The University of Winnipeg has a solid base of researchers already working in the area of environmental research, including the Canada Research Chair in Environmental Toxicology and the former Canada Research Chair in Dendrochronology. We currently have programs in freshwater ecology, environmental chemistry of organic contaminants, and northern community sustainability. The establishment of the Richardson College for the Environment and Science Complex, along with the Centre for Forest Interdisciplinary Research (C-FIR) provides the University with a strong support base in this research area. As well, the Prairie Climate Centre includes a research partnership with the International Institute for Sustainable Development.

4. Experimental Physics

Recognizing the growing importance of basic research in the global scientific community, the University of Winnipeg hired an experimental subatomic physicist in October 2004. Since joining the faculty the researcher has played an important role in a large number of prestigious research collaborations and in the training of highly qualified personnel. The University has also successfully acquired the needed infrastructure to expand our institution's research capabilities and hired additional researchers to accommodate this growing area. We are now focused on the future of this timely research field. All experimental physics research at the University of Winnipeg is done in close collaboration with Canadian institutions, as well as international groups. The Canadian contingent on most of these projects is represented by groups from the University of Winnipeg, TRIUMF, the University of Manitoba, the University of British Columbia, the University of Northern British Columbia, and Simon Fraser University. The University of Winnipeg is now the lead applicant on a large collaborative experiment involving researchers from Japan by developing a unique and state-of-the-art ultracold neutron source. This infrastructure will be the most advanced of its kind in the world, and will place Canada at the forefront of this research area. The availability of cutting edge equipment and the proximity of researchers from around the world and across the research spectrum will provide a unique training ground for University of Winnipeg students and would greatly enhance the ability to train HQP.

5. High Performance Computing Applications

Large-capacity, low-cost storage and inexpensive sensors have led to enormous growth of data in many fields, in turn revolutionizing the skill sets required to perform research. In particular, many disciplines have grown to depend on the use of applied statistics, data analytics, data mining, data informatics, information retrieval, and machine learning methods – especially when competing at the international level. Moreover, the sheer size of the datasets involved necessitate the use of high performance computing hardware to use the above methods in a timely manner. The result is that researchers in departments of Applied Computer Science, Biology, Chemistry, Mathematics, and Physics have moved toward high performance computing methods, leading to many interdisciplinary, collaborative works and the establishment of the University of Winnipeg GPU Education Centre. Moreover, many more researchers are realizing the benefits of high performance computing, and the University of Winnipeg has committed to aiding researchers incorporate methods and tools into their research programs, as well as enable access to resources like Compute Canada.

6. Indigenous Development and Studies

The University of Winnipeg is proud to have launched its Indigenous Course Requirement in the fall of 2016 which builds on our Strategic Direction. As well, Winnipeg is home to Canada's largest urban Indigenous population. Indigenous peoples of Canada are a diverse population with distinct cultures, languages, religious beliefs, political systems, and histories. There is a multitude of research themes that are currently being explored within both an urban and regional context at the University of Winnipeg including mobility to and from urban and rural contexts, self-governance, education, economic and community development, history, social welfare, policy, and health. This research involves faculty from all areas including: Indigenous Studies, Economics, Education, Geography, History, Politics, and Urban and Inner-City Issues.

7. Materials Science

Modern technologies are becoming increasingly more reliant on fundamental research into the magnetic and electronic properties of materials, be it for "green" methods of energy storage, more efficient power grids in inner cities, or the superconducting materials in MRI magnets. The University of Winnipeg hired a materials chemist in 2009 to establish a world class materials institute to address these problems. As a result, PRIME was established (the Prairie Research Institute for Materials and Energy) – a materials center which involves Brandon University, The University of Manitoba, The University of Saskatchewan, and the University of Alberta. The institute has resulted in the training of highly qualified personnel, enhanced collaborations between chemists, physicists and engineers, and increased output of scientific papers. Materials Science research is a highly interdisciplinary and involves large collaborations among many institutions and national laboratories such as the Canadian Light Source and Chalk River National Laboratories. International collaborations have already been established through connections with Oak Ridge National Laboratories (US), the National High Magnetic Field Laboratory (US), and the Institut Max Von Laue – Paul Langevin (France).

8. Planetary Science

Planetary exploration and the adaptation of planetary remote sensing techniques to various terrestrial applications is a strong research area at The University of Winnipeg. Exploration into the solar system, particularly Mars, is now the focus of Canadian and international space agencies. Research performed in our Planetary Spectrophotometer Facility (PSF), and Centre for Scientific and Curatorial Analysis of Painting Elements (C-SCAPE), plays a major role in this exploration. Research conducted within the PSF is supporting analysis of data from a number of existing and future planetary missions. The research in this area being conducted at the University is done in close collaboration with Canadian institutions, international groups and academic institutions, and Canadian companies. The expertise and world-class mix of research instrumentation housed within these research centers has resulted in a number of potentially commercializable projects being launched. These include work on low-cost, real-time analysis of diamond indicator minerals and oil sand cores.

9. Urban Studies

Research in this area focuses on the issues urban centres face and will face in the coming decades. These include growing disparities of wealth, shrinking household size, urban migration and integration of Indigenous and newcomer populations, housing and community renewal, and the role of community organizations in urban redevelopment planning. As an institution we are particularly interested in contributing to the development of policies and programs that will address the needs of the Indigenous, refugee, and immigrant communities that make-up the largest proportion of Winnipeg's inner-city neighbourhoods. This is an area which is interdisciplinary and action-based by nature and involves collaboration with community organizations and

government departments. As an urban institution we are uniquely positioned as an active community member which gives us the opportunity to conduct research within our surroundings community as well as nationally.

Gender and Diversity Representation in CRC Nominations

The University of Winnipeg has a strong commitment in its faculty and staff hires to achieve equitable representation. Within our institutional Employment Equity and Diversity Policy (June 1, 2015) we identify measures for removing barriers to the recruitment, selection, promotion and retention of individuals without regard to ancestry, including colour and perceived race; nationality or national origin, religion or creed or religious belief, religious association or activity; age; sex, including pregnancy; gender identity, sexual orientation, marital and family status, source of income, political belief, physical or mental disability, or social disadvantage. To date the university has appointed 50% of its Canada Research Chairs to females, and 10% of appointments have identified as being a member of a visible minority.

Planning and Approval Process

The University of Winnipeg's planning and approval process for CRC and CFI opportunities is open and includes consultations with all Departments and Faculties and is articulated within our current Collective Agreement.

For Canada Research Chairs, a nomination selection committee consisting of faculty members elected by their peers, the appropriate faculty Dean, the Vice-President, Research and Innovation and the Provost and Vice-President, Academic is formed. This committee puts forward a call for nominees which are then vetted and interviewed before a final applicant who will be put forward as the institutional nominee is selected.

For CFI opportunities, the Vice-President, Research and Innovation initiates an open invitation to faculty members to submit a letter of interest to apply for CFI funds. This letter includes a 3-5 page summary of the proposed infrastructure and project, and a budget justification. An ad-hoc internal committee reviews all proposals and determines which will be asked to prepare an external application. Final approval comes from the Vice-President, Research and Innovation and the President.

Postscript

This CRC/CFI Strategic Research Plan outlines the thematic areas in which we are deploying our CRCs and focusing our requests for CFI infrastructure. It does not address all research strengths at the University of Winnipeg. This plan will be reviewed and updated in 2019.