

## **THE UNIVERSITY OF MANITOBA CRC/CFI STRATEGIC RESEARCH PLAN SUMMARY**

### **INTRODUCTION AND OBJECTIVES**

The University of Manitoba is the Province's leading research institution. Its vision is to be recognized as a leader among Canadian research-intensive universities and a key player in building Manitoba's social and economic future. The overall objective of the University's Strategic Research Plan is to assist the University in realizing this vision. The specific objectives of the plan are to: enhance capacity in existing areas of research strength; build research capacity in emerging areas of research strength; foster networking, partnerships and collaborations between disciplines and across sectors; and provide unique research training opportunities for graduate students and other trainees including undergraduate students. This Strategic Research Plan outlines the University's major research thrusts, and details how the Canada Research Chair (CRC) and Canada Foundation for Innovation (CFI) programs have been and will be used to enhance our research capabilities in these areas and thereby meet these objectives.

In 2009, the University adopted a five-year Strategic Planning Framework intended to guide major institutional decisions in order to best take advantage of opportunities for the University to focus specific attention on areas of particular relevance in today's world. This framework includes a number of focus areas for enhancement which have been chosen based on their uniqueness, their potential to draw on strengths from across the University and to combine teaching, research, and public service activities, as well as their relevance to Provincial priorities. This Summary is based on the priorities set for research enhancement in the Strategic Planning Framework and other institutional and unit-based research planning initiatives.

### **RESEARCH AND RESEARCH TRAINING THRUSTS**

Eight major thrusts for research and research training are identified in which to develop or maintain excellence: 1) healthy, safe food and novel bioproducts; 2) sustainable prairie and northern communities; 3) human rights and social justice; 4) innovations in public and population health; 5) innovative materials and technologies; 6) culture and creativity; 7) indigenous peoples' health, culture and governance; and 8) biomedical sciences. These thrusts represent areas in which the University has a critical mass of internationally recognized and/or exceptionally promising researchers, as well as emerging areas where the University is building institutional capacity and encouraging new collaborative efforts. Significant institutional support beyond CRC, CERC, and CFI allocations exists for each of these research thrusts, including strategic recruitment of faculty members and support for research institutes and centres, which are identified in the University's broadly-defined Strategic Research Plan. CRC allocations in thrust areas are indicated in the attached chart at the end of this document and a brief description of support for advancement of these research thrusts is provided below.

#### **1. Healthy, Safe Food and Novel Bioproducts**

Key areas: nutrition and functional foods; nutrigenomics; food and feed safety; sustainable agriculture systems; post-harvest systems

A safe, healthy and nutritious food supply benefits both Canada and the world. Much of the world's population struggles with severe famine and malnutrition. Canada and other developed countries have faced recent outbreaks of food-borne illnesses that resulted in death and suffering. Working collaboratively with colleagues from the faculties of Agricultural and Food Sciences, Medicine, Human Ecology, Pharmacy and Science, researchers in this emerging field will work to improve food safety for Canada and the world. Research in this area is supported by the Richardson Centre for Functional Foods and Nutraceuticals, a state-of-the-art research centre that enables research on development of functional foods and nutraceuticals with a focus on the crops of the Canadian Prairies. The Canadian Centre for Agri-food Research in Health and Medicine at Saint Boniface General Hospital enhances this area of research through clinical research studies of functional and health food products and nutraceuticals. Recent support for this research area includes the establishment of a CFI-funded Gut Microbiome Laboratory, which will enable research into food safety and the links between livestock and human disease. In the area of sustainable agriculture, the CFI-funded National Centre for Livestock and the Environment supports research on environmental sustainability of integrated livestock and crop production systems and the Canadian Wheat Board Centre for Grain Storage Research develops processes and technologies to preserve what has been produced for food security and sustainability.

## **2. Sustainable Prairie and Northern Communities**

Key areas: arctic system science; arctic geomicrobiology and climate change; resource and environmental sustainability; ecosystem dynamics and metabolism

Not only is Manitoba the only western province with an arctic sea coast and as such has a unique connection to the North of Canada, but it is also considered a gateway to the West. The protection and preservation of the environment in both regions is a major scientific challenge, and requires understanding of a range of issues including climate change and global warming, water stewardship, ecological diversity, and the acquisition and use of natural, mineral, and energy resources. The sustainability of prairie and northern communities is a concern that cuts across multiple disciplines and requires collaboration from researchers with diverse areas of expertise. The University's established strengths in this area continue to grow as greater attention is turned to this issue by both the scientific community and the public. University researchers continue to build collaborations that will work towards solving some of the most pressing environmental problems facing Canadian communities. The University of Manitoba has internationally renowned programs of research in Arctic systems science, climate change and its effects on Arctic sea ice. The research vessel and icebreaker, the Amundsen, and the Sea Ice Environmental Research Facility, the second such facility of its kind in North America, are only two examples of CFI-funded facilities that promote collaborative research at all levels, in arctic system science, arctic geomicrobiology and climate change. Research into other aspects of sustainable communities has also received significant support, including funding for the Centre for Community-Based Resource Management within the Natural Resources Institute, for studying common resources and environmental governance. A metabolic research lab will advance knowledge on how ecosystems are impacted by changing temperatures and nutritional availability.

## **3. Human Rights and Social Justice**

Key areas: human rights and law, human rights and social justice, peace and conflict studies

While many Canadians may take our rights and privileges as citizens for granted, there is much political debate globally surrounding the differing definitions of human rights and the concept of social justice. Establishment of the Canadian Museum for Human Rights, located in Winnipeg, will serve as a unique centre for international education dedicated to the promotion and respect of human rights and diversity. With more than 150 researchers from faculties including Arts, Education, Law, and Social Work focusing on human rights related issues, the University of Manitoba has identified this thrust as an emerging area of research strength and is committed to becoming a world-class leader in this field.

The University of Manitoba has a dedicated source of expertise and research focus in human rights research through the Arthur Mauro Centre for Peace and Conflict Studies, which promotes the advancement of human rights, conflict resolution, global citizenship, peace, and social justice through research, education, and outreach. This capacity has been enhanced by the recent creation of the Centre for Human Rights Research Initiative, which will facilitate research-driven knowledge, public policy and intellectual debate on issues related to human rights and social justice. The new Canadian Journal of Human Rights, created by the Faculty of Law, leads the way in the dissemination of this important research.

## **4. Innovations in Public and Population Health**

Key areas: individual, population, and global health; healthy living and aging

Population and public health, including global public health, and evidence-based health policy are long-standing areas of strength at the University of Manitoba. The university's contributions to public health include local, national and international collaborations ranging from Manitoba Aboriginal and aging communities to applied public health interventions for controlling the AIDS epidemic in Kenya and India. In the area of population health, the Manitoba Centre for Health Policy is an internationally-recognized research unit that houses sixty researchers, graduate students, systems analysts and support staff. Their work involves six major studies annually on health and social issues, which involve policy-makers, planners and clinicians. The Centre has received significant CFI investments towards the implementation of health information databases to identify determinants of health and recommend policy changes. In the area of global health, the Centre for Global Public Health engages in the design and implementation of international health and development projects in several countries, primarily in the areas of HIV and STI prevention. Research on healthy aging is supported by the Centre on Aging, which provides a focus for the interdisciplinary study of aging at the University of Manitoba and

promotes the public dissemination of this research. The Centre on Aging will also host the Manitoba data collection for the CFI-funded Canadian Longitudinal Study on Aging facility.

## **5. Innovative Materials and Technologies**

Key areas: earth and composite materials; civil structures; IT and telecommunications; astronomy and astrophysics, biomedical engineering

Materials science is an established, multi-disciplinary research area at the University of Manitoba. From characterization of minerals to materials physics, nanomaterials, microelectronics and medical textiles, researchers are collaborating with local, national and international colleagues, industries and governments to improve materials used in aerospace, medicine and manufacturing. CFI investments include support for the Crystallography and Mineralogy Research Facility which allows for the examination of mineral structure and complex chemical reactions at a molecular level, the Manitoba Regional Materials and Surface Characterization Facility for research surrounding the chemical, structural and morphological nature of surfaces and bulk materials, and a new laboratory for medical textiles. Research in materials science is further supported by the Manitoba Institute for Materials, a research node to increase collaboration within the University and with other academic institutions and industry. In support of IT and telecommunications research, the CFI-funded Applied Electromagnetics Laboratory leads the way in development of compact antennas used in wireless and satellite communications, remote sensing, telemedicine, smart vehicles and navigation systems. The High Performance Computing Centre, part of the Compute Canada/Westgrid initiative, allows University researchers to perform rapid complex calculations and simulations.

## **6. Culture and Creativity**

Key areas: archaeology; Canadian history and culture; globalization and cultural studies; business innovation and entrepreneurship

The cultivation of creativity permeates the work of the university. With increasing globalization, culture is being recognized as an important component in sustaining vibrant local and national communities and securing peace and prosperity. Effective trade within a global economic system requires the development of cross-cultural competencies. Within the new knowledge and information economy, understanding and negotiating cultural differences become valued skills and creative contributions may engender competitive advantage. The University of Manitoba has a long-standing interest and research strength in this area and is positioning itself to take a leadership role in understanding the changing roles of culture within the evolving global system, advancing citizen learning for effective participation in facing the challenges ahead and nurturing creativity within traditional and new media of cultural expression. Archaeological research at the University is supported by the CFI-funded Bioanthropology Digital Image Analysis Laboratory, which provides 3D modeling and printing capabilities for analysis of skeletal remains, as well as by CFI-funded infrastructure for remote study and preservation of Northern Canadian heritage resources. Cultural research is supported at the University through the Centre for Globalization and Cultural Studies, which promotes inquiry into the potential contribution of research into globalization and the analysis of cultural practices to furthering trans-cultural understanding and interdisciplinary collaboration. The Centre for Creative Writing and Oral Culture supports research into oral and literate cultures, as well as creative works.

## **7. Indigenous Peoples' Health, Culture and Governance**

Key areas: indigenous politics and governance, indigenous knowledge and social work, aboriginal health

Canada's Indigenous peoples are a significant and important part of Canada and Canadian culture. Manitoba has a large and growing Aboriginal population and recognizes that increased educational success of Aboriginal people is critical to the social, cultural and economic development of Manitoba and Canada. The University has strengthened its Departments of Native Studies, Political Studies and History by recruiting in these areas. The University of Manitoba has a long history in interdisciplinary research on a range of Aboriginal issues from researching linguistic structures in Algonquian language, to studying the historical position of Aboriginal peoples in Western Canada, to researching land claims. Further, the University has a specific concentration and strength in researching Indigenous peoples' health, culture and governance and

is home to centres for the study of Aboriginal health and Indigenous Governance and community-based research governance. Recent CFI support has allowed for the creation of Mamawipawin, a space for community-based research into issues of indigenous governance within the University. The Manitoba First Nations Centre for Aboriginal Health Research has also been established as a centre of research excellence. Researchers within this Centre are working collaboratively on projects related to the health of indigenous peoples in Manitoba, Canada and internationally. The University's Swampy Cree Suicide Prevention Team brings together representatives from Swampy Cree communities with University and international experts in psychiatry and Aboriginal health. CFI funding support in this area includes the creation of a population-based studies laboratory with a partial focus on Aboriginal suicide prevention.

## **8. Biomedical Sciences**

Key areas: neuroscience and mental health; regenerative and molecular medicine; cardiovascular sciences; applied pharmaceuticals and rational drug design; immunology and infectious disease, systems biology

Modern medicine is becoming increasingly complex. As greater understanding of the molecular bases of both normal development and disease are achieved, it is important to integrate these findings into cellular, tissue and whole animal models of disease in order to further our understanding of disease processes, their diagnosis, treatment and prevention. University of Manitoba researchers excel in a wide spectrum of biomedical research. Biomedical researchers are a cornerstone of Manitoba's health care system and are working towards discoveries that will improve the health of Manitobans, Canadians and global citizens. University of Manitoba researchers have access to the Health Sciences Centre's newly constructed Kleysen Institute for Advanced Medicine, a clinical research facility with state-of-the-art technology for the study of neurosciences, infectious diseases, advanced imaging and medical informatics. In the area of neuroscience and mental health, the University has allocated six new tenure-track faculty positions in neuroscience within the Faculty of Medicine. Research groups including the Mood and Anxiety Disorders Research Group and the Psychiatric Neuroimaging Research Group facilitate collaborative investigation into neurosciences research topics. The Regenerative Medicine Program, the first in Western Canada to focus on this novel research area, has been made possible through investment into a newly constructed state-of-the-art research space and five new tenure-track faculty positions. The University of Manitoba has a dedicated team of 15 researchers in the Institute of Cardiovascular Sciences (ICS), a partnership between the University and the Saint Boniface General Hospital Research Institute, who lead research in cardiovascular sciences, both nationally and internationally. Recent CFI investments include an advanced small animal cardiovascular imaging laboratory located at ICS, which will assist in the development of novel dietary and pharmaceutical strategies to limit cardiovascular failure and its associated morbidity and mortality and a live cell fluorescence imaging platform to enhance the viral and cell culture facilities for molecular cardiology research. Biomedical sciences research has received significant CFI funding to establish research facilities including the Canada-Kenya International Collaboration on Infectious Diseases Research and the Manitoba Centre for Proteomics and Systems Biology.

**MEASURING THE PLAN'S SUCCESS** Given the plan objectives previously enumerated, measures of the plan's success include indicators of: (a) research capacity-building (b) networking, partnership and collaboration (local, national, international, within and between disciplines/sectors); and, (c) training opportunities for graduate students and other trainees (both extent and nature).

**DESCRIPTION OF THE PLANNING AND APPROVAL PROCESS** In terms of development of the University's strategic research plan and the associated CRC allocation plan, the process began with a call for chair proposals by the Vice-Presidents (Academic) and (Research) to deans and directors of faculties and schools. Based on the submissions received as well as other institution-wide planning initiatives, a draft plan and chair allocation strategy was developed by the University's senior executive committee. Both the University's Senate Planning and Priorities Committee and the Senate Committee on University Research provided commentary on this plan and associated strategy, which were endorsed by the Senate Committee on University Research. The plan and associated chair allocation strategy were subsequently approved by the University's President who, as stipulated in the CRC Program Guide, is accountable for the strategic research plan.

**GENDER REPRESENTATION IN RELATION TO CRC NOMINATIONS** As the current focus of the University is to use the CRC program to *recruit* leading researchers to the University, the issue of gender representation will be addressed by ensuring that recruitment processes are free of barriers to nominating women to CRC positions and proactive with respect to the nomination of female candidates, particularly in disciplines/fields where they are under-represented in terms of these positions. This includes: ensuring appropriate gender balance on all search committees; including a statement

in CRC advertisements that particularly encourages women to apply; mandatory training of all search committee chairs on process and issues related to equity and diversity, including providing information on the placement of advertisements specifically directed at women; the appointment of the associate vice-president (research) to all search committees and the review, by the Office of the Vice-President (Academic), of all search processes to ensure that each has adopted a proactive approach to the identification of qualified females for CRC positions.

### Summary of Allocation by Research Theme

Research Thrust	Council	Tier I	Tier II	Total
Healthy, Safe Food and Novel Bioproducts	NSERC	<ul style="list-style-type: none"> <li>Recruited – 1 (Jones)</li> <li>To be recruited – 1</li> </ul>	<ul style="list-style-type: none"> <li>Retention – 1 (Beta)</li> <li>Recruitment – 1 (Eck)</li> </ul>	4
Sustainable Prairie and Northern Communities	NSERC	<ul style="list-style-type: none"> <li>Retention – 1 (Barber)</li> </ul>	<ul style="list-style-type: none"> <li>Retention – 1 (Tenuta)</li> <li>Recruitment – 1 (Treberg)</li> </ul>	4
	SSHRC	<ul style="list-style-type: none"> <li>Retention – 1 (Berkes)</li> </ul>		
Human Rights and Social Justice	SSHRC		<ul style="list-style-type: none"> <li>To be recruited – 1</li> </ul>	1
Innovations in Public and Population Health	CIHR	<ul style="list-style-type: none"> <li>Retention – 1 (Chochinov)</li> </ul>	<ul style="list-style-type: none"> <li>Retention – 1 (Menec)</li> <li>Recruitment – 2 (Blanchard, Driedger)</li> </ul>	4
Innovative Materials and Technology	NSERC	<ul style="list-style-type: none"> <li>Retention – 2 (Shafai, Hawthorne)</li> <li>Recruitment – 2 (Chakraborty, Cadogan)</li> </ul>	<ul style="list-style-type: none"> <li>Retention – 2 (Freund, Kazem-Moussavi)</li> <li>Recruitment – 5 (Buchanan, El-Salakawy, Wang, Stetefeld, Fayek)</li> <li>Retention – 1 (Safi-Harb)</li> </ul>	12
Culture and Creativity	SSHRC	<ul style="list-style-type: none"> <li>Recruitment – 1 (Brydon)</li> </ul>	<ul style="list-style-type: none"> <li>Retention – 4 (Hoppa, Stirling, Perry and Cariou)</li> <li>To be recruited – 1</li> </ul>	6
Indigenous People's Health, Culture and Governance	SSHRC		<ul style="list-style-type: none"> <li>Recruited – 1 (Ladner)</li> <li>To be retained – 1</li> </ul>	2
Biomedical Sciences	CIHR	<ul style="list-style-type: none"> <li>Retention – 7 (Hasinoff, Plummer, HayGlass, Del Bigio, Davie, Hatch, Kirshenbaum)</li> <li>Recruitment – 1 (Gardiner)</li> </ul>	<ul style="list-style-type: none"> <li>Retention – 2 (Yang, Marshall)</li> <li>Recruitment – 2 (Ding, Halayko)</li> <li>To be recruited – 2</li> <li>Unallocated – 1</li> </ul>	19
	NSERC	<ul style="list-style-type: none"> <li>Retention – 1 (Loewen)</li> </ul>	<ul style="list-style-type: none"> <li>Recruited – 2 (Marcus, Kelly)</li> <li>To be retained - 1</li> </ul>	
<b>Total</b>		<b>19</b>	<b>33</b>	<b>52</b>