

# **Summary:**

## **Concordia University CRC and CFI Strategic Research Plan: 2008 – 2012**

### **Introduction**

In the past decade, Concordia has strategically strengthened its research base through major initiatives around faculty recruitment and retention. Since 1998 more than 500 new faculty members with strong research records have been hired. This unprecedented cohort of established and new full-time faculty members opens new horizons and possibilities for research alliances and networks. During this same period, Concordia has also been physically transformed through substantial investments in major building and state-of-the-art research infrastructure projects on both its Sir George Williams and Loyola campuses. CRC and CFI funding have been critical sources of external funding contributing dramatically to Concordia's rapid growth in its research sector. This summary covers the key areas of our *Strategic Research Plan* as required by the CRC Secretariat; Concordia's full-length strategic research plan may be viewed at the website of the Office of the Vice-President, Research and Graduate Studies.

### **Objective of the Plan**

The objective of this plan is to provide a blueprint for the future growth and intensification of research activity at Concordia by guiding strategic level resource allocation processes and decision making – such as that relating to the allocation of Canada Research Chairs and CFI investments. In the first part of the summary a snapshot of Concordia's major areas of research strength and critical mass is provided. Next, an overview of CRC deployment and CFI support at the university is presented. And third, this summary outlines how targets for development will be determined, and how success will be measured. It is important to note that Concordia's *Strategic Research Plan* represents much – but certainly not all – of Concordia's research activities; Concordia dedicates significant resources to promote research on all fronts.

### **Major Research Strengths**

Responsive to the needs of society, Concordia researchers are contributing dynamically to the many social, cultural, technological, health, environmental, and economic challenges and opportunities of contemporary life. Consequently, much of the research conducted at Concordia reflects the growing imperatives of adaptability and sustainability as experienced by people, communities, markets, industries, institutions, and countries around the world. With established and evolving research foci in both fundamental and applied research, Concordia's many researchers are engaged in transformative initiatives across six major research thrusts and associated niches of excellence. The research and creative activities underway at Concordia are in areas as diverse as learning and development; identity, expression, and culture; social, economic, organizational and environmental challenges; enabling technologies; advanced materials and nanotechnology; and, energy and sustainability.

## *Cluster 1: The Person and Society*

### **1. Development and Well-being across the Lifespan and across Life Domains**

Human well-being and quality of life are predicated upon a balance of such factors as health, the ability to learn, and the ability to function in society. The importance of learning, behaviour, and health across the human lifespan are of inherent importance to us as individuals and as members of a global, information-driven society facing unprecedented population expansion and transformation. Optimizing the performance and well-being of humans across different life domains, such as education, work, sports and exercise, family, financial welfare, and consumer domains, is crucial to the health of Canadian society.

#### **Niches of excellence:**

- *Learning and cognitive science*
- *Neurobehavioural and therapeutic sciences*
- *Molecular and cellular sciences*

### **2. Identity, Expression, and Culture**

Understanding human diversity and identity, as well as the many expressions thereof, are critical in a multicultural world. New media and new communication technologies are rapidly and continuously transforming our lives, reshaping how we interact and express ourselves, and affecting how we represent the world around us. Fine arts, new media and communication studies, cultural production and analysis, and gender and sexuality studies are areas of research and creativity at Concordia well known for cross-faculty collaboration and social impact. Analysis, creation, production, and social engagement activities characterize the diverse range of knowledge generation, co-generation, and transfer in this thematic area.

#### **Niches of excellence:**

- *Creative expression*
- *Communication and culture*
- *Identity, gender, and sexuality*

### **3. Human Systems in a Global World**

Uncertainty, complexity, conflict, resilience, and adaptive capacity are central considerations in understanding and responding to change in the context of today's global environment. These themes are relevant to the development of sustainable social, cultural, political, financial, economic, and geo-physical systems. Understanding the financing of technological change, and how business, financial, technological and environmental risk is valued, is critical to the success of many organizations. The impact of such factors on industry and technological innovation has far-reaching implications for all sectors of the economy. The ability to respond effectively to such global driving forces is important to society at the local, national, and international levels.

#### **Niches of excellence:**

- *Social and economic entrepreneurship*
- *Corporate environment and organization*

## *Cluster 2: Technology, Industry, and the Environment*

### **4. Enabling Technologies and their Basic Foundations**

Concordia has significant strengths in information and communication technologies including wireless communications and networks, information technology (IT) security, computational interactive media, and bioinorganic and computational chemistry. The application of new tools for measurement and modelling, as well as the storage and retrieval of information, is pivotal to most areas of human activity, including science and technology, business, health, and the environment. Developments in these areas are at the heart of many of the technology-based approaches to building sustainable systems today.

#### **Niches of excellence:**

- *Mathematics, computational methods and fundamental science*
- *Information and communication technologies*

### **5. Advanced Materials and Nanotechnology**

Concordia conducts world-class research in advanced materials, nanotechnology, manufacturing, and transportation. Extensive partner-driven research is conducted in the areas of materials and composites, polymers, coatings, the electronic and optical properties of nano/micro-electro-mechanical systems (NEMS/MEMS), thermo-fluid and computational fluid dynamics, and laser metrics – particularly as they apply to the aerospace industry and vehicle engineering. New sectoral applications are now emerging to include pharmaceuticals, medical devices, food processing, and environmental technologies.

#### **Niches of excellence:**

- *Composites, transportation and manufacturing systems*
- *Nano/microtechnology*

### **6. Energy, Environment, and Bioproducts**

The global imperative to meet the challenges of environmental destabilization begins with a recognition that human well-being depends on the environment and adopting sustainable systems. Concordia's strengths in this area have been developed through a multi-pronged approach to research areas related to energy, environment, bioproducts, and sustainable design. This includes understanding how to adapt to climate change; the development of alternative, renewable, and sustainable sources of energy; energy-efficient buildings and construction technology; and, bioproduct development.

#### **Niches of excellence:**

- *Energy and environment*
- *Sustainable buildings and infrastructure*
- *Bioproducts*

## **Research Chairs and CFI Funding**

The strategic deployment of Canada Research Chairs is an integral part of Concordia's overall plan to promote and develop its research enterprise. Because the University created a Concordia University Research Chairs (CURC) program in 2000 to retain key faculty members, the Canada

Research Chairs program has been used exclusively to recruit outstanding researchers from elsewhere. All chairholders, including industry and endowment-based Chairs as well as CRCs and CURCs, are expected to play a critical leadership role building research capacity, training highly qualified personnel, and developing productive synergies through their activities on behalf of centres, institutes, labs, partnerships, networks or alliances. CFI and CRC support over the past decade has allowed the University to build world-class research facilities aligned with the growth of Concordia's research strengths and strategic development.

### CRC Program Status

Concordia University currently has an allocation of 28 Canada Research Chairs. Twenty of these allocations are currently filled across Concordia's six research thrusts. In the two tables below, all of Concordia's research chairs are listed by cluster and major areas of research. The tables indicate the agency and tier level (when applicable) of Chair allocations as well as the number of women and men holding the appointments.

**Table 1. The Person and Society: Research chairs and CFI funding**

CRC Tier 1	CRC Tier 2	Other research chairs	Total number of Chairs	Share of total funding from CFI <sup>1</sup>
<b>I. Development and Well-being across the Lifespan and across Life Domains</b>				
NSERC – 1M	NSERC – 1M CIHR – 1M SSHRC – 1M	5F, 9M	18	12 %
<b>II. Identity, Expression, and Culture</b>				
–	SSHRC – 2M	5F, 3M	10	36 %
<b>III. Human Systems in a Global World</b>				
SSHRC – 1M	SSHRC – 2F, 3M	2F, 10M	18	2%

**Table 2. Technology, Industry, and the Environment: Research chairs and CFI funding**

CRC Tier 1	CRC Tier 2	Other research chairs	Total number of Chairs	Share of total funding from CFI <sup>1</sup>
<b>I. Enabling Technologies and their Basic Foundations</b>				
NSERC – 3M	NSERC – 2M	--	15	16%
<b>II. Advanced Materials and Nanotechnology</b>				
-	NSERC – 1M	4M, 1F	6	15%
<b>III. Energy, Environment, and Bioproducts</b>				
NSERC – 1M	NSERC – 1M	1F, 3M; (2 IRCs – tbd)	6	19%

As of October 8, 2008 eight vacant CRC allocations remain to be filled: one CIHR, Tier 2; two NSERC, Tier 1; one NSERC, Tier 2; two SSHRC, Tier 1; and, two SSHRC, Tier 2. Calls for Letters of Intent will be issued in 2008/2009 to fill these allocations. As for gender, the tables above plainly indicate there is a significant gender imbalance in the Chair allocations with only two of

<sup>1</sup>Percentage of Concordia's 10-year CFI funding total (over \$24 million) by major research area.

20 CRC appointments held by women. Correcting this imbalance to reflect the overall distribution of faculty is a major priority for future nominations. The tables also indicate that Tier 2 Chairs outnumber Tier 1 appointments by a ratio of 14:6. Experience at Concordia has shown that recruitment efforts have favoured Tier 2 candidates as more senior faculty members are leaving the workforce and are being replaced by a younger demographic. In some cases, the prevalence of Tier 2 appointments also reflects emerging or new areas of scholarly activity. There is an even split in CFI funding between Concordia's two research clusters: The Person and Society; and, Technology, Industry, and the Environment.

### **CRC Projections and CFI Target Areas**

Concordia's institutional goal for the period covered by this *Strategic Research Plan* is to implement and fine-tune the comprehensive research development programs and policies currently being established. Central to this process is the strategic deployment of Canada Research Chairs in the University's six leading areas of research and creative activity. In addition to selecting nominees who have the potential to provide leadership in research and build critical mass, the deployment of future CRCs will support established and emerging areas of critical mass in each of Concordia's four faculties, and address the gender imbalance in our current allocations. Concordia's approach to CFI programs and competitions will be to target projects that are most closely aligned with the University's six main research thrusts.

### **Measuring Success**

In light of the major new developments at Concordia University in research administration and supporting programs, the focus of Concordia is on the monitoring and revision of newly created funding envelopes and internal processes that govern the building of research capacity in order to ensure their effectiveness. Broadly speaking, Concordia's success as a major contributor to new knowledge will be measured by results that: strengthen and promote faculty contributions to Concordia's research capacity and performance; foster the development of new leadership opportunities in innovation; favour the emergence of critical mass and ensure long-term productivity; reinforce and capitalize on a pool of qualified graduate students and postdoctoral fellows; promote and support interdisciplinary research initiatives; enhance Concordia's reputation as a world-class research institution; demonstrate congruence with local industry and community needs; and, intensify activities that amplify benefits to society.

### **Planning and Approval Process**

The *CRC and CFI Strategic Research Plan* was developed through an iterative and collaborative planning process under the leadership of the Vice-President, Research and Graduate Studies in consultation with all Faculties, through the Associate Deans of Research, as well as Concordia's Faculty Councils and Senate Research Committee. The *Plan* was then endorsed by the President and approved by the Senate. The Concordia Board of Governors was thusly informed.