

## CARLETON UNIVERSITY STRATEGIC RESEARCH PRIORITIES SUMMARY, June 2007

### OBJECTIVES

The key objectives of the plan are to delineate fields of research that:

- Identify and build on core strengths that best reflect the dynamic research activities occurring across the campus
- Foster and promote excellence in selected areas of research
- Strengthen research across multiple disciplines, with collaborative partnerships both within and outside of Carleton University
- Advance the integration of teaching and research to enhance the education of undergraduate and graduate students
- Increase the ability to attract, retain and develop exceptional faculty, students and staff.

### STRATEGIC RESEARCH AREAS

The national capital region is a global technology centre with strong sectors in software, telecommunications, photonics, semiconductors, defence and security, life sciences, tourism, wireless technologies, professional services and contact centres. The region has new and growing industry sectors such as biophotonics, environmental technologies, clean energy, electronic pay systems, and micro electromechanical systems. Thus, a research agenda that is complementary to these growth sectors is central to Carleton's forward movement.

Carleton's four research priorities reflect the constellation of interests and research strengths that accrue to a national capital university:

- Global Identities and Globalization
- Science and Technology including Digital Media
- Sustainability and the Environment
- Health and Well-Being

Carleton research themes fall into four broad areas, each encompassing sub-themes.

#### GLOBAL IDENTITIES AND GLOBALIZATION

Wide ranging social science based research into Canada's place in the world, and the social, organizational and business practices that shaped and continue to shape Canada are a strategic priority for the University.

**Canadian Culture and Identity, and Globalization:** Canada is part of an increasingly integrated North America, but Carleton researchers investigate Canada's position in a wider, global context following new opportunities for research which focus on a variety of issues

including regional integration, border policy, immigration, security, mass media and public opinion, the functioning of business within and across regional trade blocs, and the impact of globalization.

**Social Justice:** Research into issues of Social Justice defines Canada's place in the world. The labour movement, the women's movement, the advent of gay and lesbian activism, all of which reflect an increased awareness of discrimination against numerous social groups; violence against, and exploitation of, women and children and the discrimination and disparities associated with globalisation, the migration of populations, and the creation of diasporas are of particular strategic interest to researchers. Further research is undertaken into the way we are governed at all levels, the management of businesses and organizations, and the economics and politics of public finance and fiscal federalism.

**Conflict and Strategic Studies:** Domestic conflict and security issues have increasingly become the focus of research and policy development and more research into the nature of war, peace, terrorism and the roots of conflict, as well as peace-building is ongoing.

#### **SCIENCE AND TECHNOLOGY INCLUDING DIGITAL MEDIA**

Human societies persist and develop because of the ways in which people can interact with their environments. Researchers at Carleton appreciate the powerful and complex relations that obtain between technology and science, technology and humanity, and technology and the environment. Carleton researchers cover the whole spectrum of Science and Technology, varying from pure particle physics, through robotics, to earth sciences and the study of earthquakes. Of strategic importance in the Science and Technology area are:

**ICT/Digital Media:** is again one of the world's strongest and fastest growing economic sectors providing significant R&D opportunities, as exemplified by partnerships between Carleton and the ICT industry. ICT researchers are active across multiple disciplines, including Computer Science, Engineering, Chemistry, Physics, Mathematics, and Business. Carleton has a concentration and speciality for strategic research in Modelling and Simulation.

**Human Interaction with Technology:** Technology does not stand in isolation, and only becomes useful when humans interact with it. Research programs include a focus on human interactions with technology, the impact of technology on individuals, how individuals and groups can interact effectively and efficiently, and the ways in which people can shape and influence the development of technologies and their uses.

#### **SUSTAINABILITY AND THE ENVIRONMENT**

The intensification of social and economic change as a result of scientific discoveries, advanced technologies and globalization has given rise to a number of challenges, such as increasingly complex and worrisome relations with the environment and issues of human security. Carleton researchers examine the human aspects of environmental change, the role of economic change on the environment, and issues of development, underdevelopment and sustainability. For physical science, Carleton research stretches from the level of the molecular to that of built environments and natural ecologies, encompassing sustainable development, ecology and conservation biology, engineering for hazards and risks, natural and built environments, and global environmental change. Disciplines that indirectly support research into environmental issues, such as the development of sensor technology and "smart" environments, have received recent support.

## **HEALTH AND WELL BEING**

A major challenge resulting from the changing global, economic, technological and environmental order is the promotion of effective measures to promote health and well-being. Strategic priorities for research on health and well being at Carleton are not clinical, but include interdisciplinary research covering the analysis of health policy, health issues relevant to aboriginal peoples, and the development of new generation biomedical devices.

**Neuroscience:** A strategic contribution is made by the Dept. of Neuroscience covering psychosocial factors influencing mental and physical health which are second only to heart disease as the illness cluster affecting the greatest number of Canadians. Research focuses on stress and coping, personality and psychosocial processes associated with well-being, and treatment seeking for medical problems, workplace health, HIV/AIDS, substance abuse, women's health, children's health, ageing, chronic illness, posttraumatic stress, and the psychological, behavioural and neurochemical effects of being a victim of violence or gambling addiction.

**Health Policy:** as the population ages, increasing attention is paid by all sectors of society to health policy, which is a strategic research area for Carleton. Health policy affects government priorities, electoral behaviour, participation patterns and service delivery and research is carried out on health and the environment; mortality mapping; the history of medicine and the body; health and ethics; the sociology of medicine; medical anthropology; ethnomedicine; international health; gender, sexuality, and reproductive health; immigrant health; pharmaceutical use and self-medication; the globalization and hybridization of traditional and modern health practices; and the political economy of health and health care in developing countries.

**Medical Imaging and Biomedical Devices:** Carleton has strategic extramural collaborative programs in medical imaging/visualization; and a special research effort is at the intersection of computing and medicine. Examples of work at this interface include new biometric and telemetric devices, improved signal and image processing algorithms, remote operation of surgical robots, and the incorporation of technology into well-designed devices.

**Genomics, Proteomics, Molecular Biology and Bioinformatics:** Bioinformatics is the application of information technology to biological problems, and uses tools from computer science and mathematics to integrate data from fields as diverse as enzymology, genetics, genomics, proteomics, ecology, and animal behaviour. Strategic Carleton research includes molecular biology that leads to technologies that benefit human health, agriculture, and the environment; the production of pharmaceuticals and biofuels; and providing environmentally friendly, value-added products. Devices on the nano scale, such as hyper sensitive molecular sensors, constitute a bridge between these disciplines and biomedical devices.

## **OTHER RESEARCH**

Additional world class research is carried on at the University that is not directly referenced in the list above, in individual laboratories across the campus. Carleton will continue to support individual and clusters of researchers working in these supporting disciplines.

## **GENDER REPRESENTATION**

Carleton CRCs are currently exactly representative of the numbers of female tenure and tenure track positions available nationally (measured by SSHRC vs NSERC vs CIHR related Chairs). Carleton University is committed to equity and has put in place active measures to ensure that

equity considerations are part of its normal recruitment and selection procedures, which includes faculty recruitment for the CRC program.

### CURRENT ALLOCATION OF RESEARCH AREAS VS STRATEGIC PLAN

		Tier 1	Tier 2	Total
Global Identities and Globalization	Canadian Culture and Identity, and Globalization	2	1	3
	Social Justice	0	1	1
Science and Technology	ICT/Digital Media	1	1	2
	Other Science and Tech	2	4	6
Sustainability and the Environment	Other	2	5	7
Health and Well Being	Neuroscience:	1	1	2
	Imaging and Biomedical Devices	1	2	3
<b>Total CRCs</b>		<b>9</b>	<b>15</b>	<b>24</b>

### INSTITUTIONAL SUPPORT FOR THE CANADA RESEARCH CHAIR PROGRAM

Carleton has made a commitment to support its Canada Research Chairs, and its Strategic Research Plan, through the creation of a strong and focussed research environment.

The University supports CRCs with administrative support on an ongoing basis, and provides the required operational support. A modest University cash contribution is traditionally made to CRCs on an annual basis. An additional major area of support is for students (eg graduate scholarships, extra TA and RA positions for working in a CRC program). The University routinely attempts to match pledges from donors through its Advancement Services program, and also assists with interaction between a CRC and their industrial partners, including fundraising and commercialization, where appropriate. Carleton’s location in Ottawa allows the University to interact with a large variety of Federal Government departments and National laboratories. CRCs are generally allocated a substantially reduced teaching load.

The University will continue to seek additional funding for research in all disciplines, and will increase research revenue over the medium term. Additional efforts will be made to integrate undergraduate research under the Strategic Research Plan, and to emphasize the use of research mentors.

## **ASSESSMENT OF RESEARCH PERFORMANCE**

The University uses a number of metrics to evaluate its research performance, including the performance of CRCs. These metrics include

- research funding/expenses;
- research outputs (journal articles, conferences etc);
- numbers of HQP of various levels (undergraduate research, Masters, PhD and Post Doctoral fellow, Visiting Scholar positions);
- level of industry interaction (supported contracts, adjunct professors appointed from industry positions, etc);
- interaction and joint research with federal government labs and departments
- degree of Technology Transfer (invention disclosures, patents, royalties paid to professors)

Carleton attempts to measure the degree of interdisciplinary research that is undertaken both within the University and with outside partners. An increase in cross disciplinary research is regarded as fundamental progress towards the University's research goals.

## **PLANNING AND APPROVAL PROCESSES**

The allocation of CRCs at Carleton is the responsibility of the Vice-President (Research and International) who is assisted by the Deans and Chairs of the various University faculties and departments, and by the Vice-President (Academic) who is responsible for new faculty hires. New faculty who are to be nominated as CRCs will be approved by the VP (Research and International) before an offer of employment is extended to them.

New CRCs and Tier II CRCs that become free after two terms are always allocated according to the University's current strategic priorities.

The Strategic Research Plan is developed by the VP (Research and International), and takes into account the University's overall Strategic Plan as well input from a large number of stakeholders, Research Centres, and internal and external advisors. Individual faculties also produce Strategic Research Plans that are specific to the work being conducted in those faculties, although many research endeavours are now planned to include an interdisciplinary, inter-faculty approach.