

McMASTER UNIVERSITY
STRATEGIC RESEARCH PLAN
February 2006

Introduction

The role of universities in the 21st century extends far beyond traditional knowledge creation and dissemination to encompass new expectations for innovations that will have broader social and economic benefits. For research-intensive universities such as McMaster, the possibilities are both exciting and challenging. As such, it is necessary for McMaster to identify a vision, mission and strategic directions that reflect the expanding role of Canadian universities and inspire the University to respond to the changing environment.

The defining characteristic of McMaster University which underlies all of its planning processes and documents is research intensity. This Strategic Research Plan (SRP) defines McMaster's broad research directions and areas of strategic priority thereby providing the context for ongoing institutional research applications and investments.

Planning Framework

McMaster University began its strategic planning in 1995 with a blueprint document *Directions* under the leadership of the President and in consultation with the University community and planning bodies. This foundational document defined the vision to shape McMaster's direction and its contribution to society in the 21st Century:

To achieve international distinction for creativity, innovation and excellence.

Directions continued to be the central guiding document upon which companion planning and implementation documents, *Directions II, III* and the *Academic Plan*, emerged. The next strategic planning process began in September 2002 and culminated with the document "*Refining Directions*" which identifies an adaptive, dynamic planning framework capable of maintaining its relevance through the foreseeable changes in the university environment. *Refining Directions*, identified McMaster's goals and targets as:

- To achieve the next level in research results and reputation by building on existing and emerging areas of excellence
 - Target: To be consistently among the top three Ontario universities in terms of the quality of students we attract and graduate from our undergraduate and graduate programs as measured by appropriate indicators.
- To attract and retain highly-qualified students by making discovery the centre of the learning experience
 - Targets: (1) To be consistent among the top three Canadian universities as measured by appropriate indicators of research excellence and (2) To increase the importance of graduate education so that McMaster's graduate population reaches 20% of the University's total full-time enrolment and is highly ranked in indicators of graduate educational excellence.
- To build a community with a shared purpose.
 - Target: To ensure that all members of the McMaster community feel recognized and valued for their contributions to this shared purpose.

Key Objectives of University's Strategic Research Plan (SRP):

The objectives of McMaster's SRP are to:

- Build on our strengths and seize new opportunities to achieve (world-class) excellence in selected research areas;
- Help achieve institutional academic goals such as the promotion of inter-disciplinary research and the integration of research and teaching;
- Strengthen and expand existing undergraduate and graduate programs, and develop innovative new programs, to attract high-quality students and increase enrolment of postgraduate trainees in the identified areas of research thrust;
- Protect our investment in areas of strategic importance by recruiting and retaining excellent faculty whose efforts are key to our long-term strategic plans;
- Capitalize on the diverse range of funding opportunities and partnerships, particularly with our affiliated hospitals, to realize integrated capital, infrastructure and faculty renewal objectives;

- Develop the capacity for effective knowledge transfer to maximize the benefit of research to society and
- Foster collaborations and building of research partnerships nationally and internationally.

Institutional Strategic Areas of Priority

The guiding principles for the selection of strategic areas included research excellence, inter-disciplinarity and the potential to forge effective links between research strengths and student and societal demand. These strategic areas are not mutually exclusive and are intended to inform priorities in research as well as teaching at both the undergraduate and graduate levels. The University has invested heavily in these areas by providing new faculty and staff appointments, student support and capital improvements to relevant facilities. The strategic areas that were identified through McMaster University's extensive consultations reflect core strengths and ambitions that will remain indicative of long-term potential and relevance and, together with Faculty priorities, will continue to direct institutional initiatives and investments.

McMaster selected six multi-disciplinary (cross-Faculty) strategic areas as a result of a Strategic Planning Exercises:

- Molecular Biology
- Integrated Health Research (formerly "Environment and Health")
- Information Technology
- Globalization and the Human Condition
- Work and Society
- Science-based Innovation in Manufacturing (Manufacturing and Materials).

McMaster's Strategic Research Plan also takes into account the need for flexibility to respond to our changing environment and societal demands. The identification of "emerging areas" allows us to recognize this evolution and respond to new opportunities and promising areas of strength.

Brief Description of Strategic Research Areas:

Molecular Biology: Our emphasis on molecular biology is broad-based and fundamental to the support of research excellence in health, biomedical, life and environmental sciences. This thrust includes investigations of mechanisms of fundamental molecular processes (such as signaling and transcription), application of molecular knowledge and techniques to the design of innovative therapeutic agents, and problems in environmental toxicology, forensics and evolutionary theory.

Integrated Health Research: (includes the former strategic area of "Environment and Health"): Integrated health research has evolved as a new area of strategic priority replacing the more narrowly defined Environment and Health. Our strategic research thrust in integrated health is inter-disciplinary in nature and brings together a broad range of fundamental and applied research strength with the objective of advancing the quality of health services for the benefit of society. In building on strength, we are investing in the further development of biomedical engineering, medical imaging, medical devices, neuroscience, systems and diagnostic techniques, health economics and policy analysis, health management and health care delivery. A new initiative which will greatly enhance McMaster's strategic research plan through its linkages to Integrated Health Research is the Collaborations for Health initiative. This timely university-wide program will focus on three broad thematic areas which reflect existing strengths at McMaster: Health and the Environment, Health Services and Policy, and Development across the Lifespan.

Information Technology: Information Technology has been focused in two areas. The primary emphasis has been in Engineering and specifically, Electrical and Computer Engineering and the Department of Computing and Software where there has been a significant influx of new faculty over the last several years. The other focus is on fostering research strength in multimedia in the Faculty of Humanities. A recent development in Information Technology is the establishment of the School of Computational Engineering and Science. Through multidisciplinary research and education programs, the School will connect engineering, science, mathematics and computer science to create new, powerful tools for real-world discovery and understanding.

Work and Society: This strategic area examines the impact of social, economic and demographic variables on

workers and their workplaces. Examples include investigations of occupational health and safety, women and work in the health sector, social policy influences on health and labour economics. This research thrust encompasses investigators in Social Sciences, Humanities, Business and Health Sciences. Formal research entities in this strategic area include the McMaster Centre for Work in a Global Society, the McMaster Research Centre for the Promotion of Women’s Health, the Canadian International Labour Network and the Centre for Health Economics and Policy Analysis.

Globalization and the Human Condition: This strategic area, which supports research on the influence of globalization phenomena on the human condition, consists of several McMaster researchers located primarily in the Faculties of Social Sciences and Humanities. The area supports the interdisciplinary McMaster Research Institute on Globalization and the Human Condition. Areas of investigation include culture, social welfare, community identity and economic trade and development.

Science-based Innovation in Manufacturing (Manufacturing and Materials): This strategic area was created to foster synergies between our already internationally-recognized strengths in both manufacturing and materials. This area encompasses researchers primarily in Engineering, Science and Business and includes the Brockhouse Institute for Materials Research, the Centre for Electrophotonic Materials and Devices, the Intelligent Machines and Manufacturing Research Centre, the McMaster Manufacturing Research Institute, the McMaster Institute for Polymer Production Technology, the Computer-aided Polymer Process Analysis and Design Group and the McMaster Advanced Control Consortium. The central aim of this strategic area is to understand and optimize the process leading from the design of new materials to their manufacturing and application.

Integration of priorities within the McMaster community

In addition to the university-wide strategic planning process, each Faculty implemented its own process to identify specific priority areas. Faculty priorities were informed both by the institutional strategic directions and by the key strengths and interests within the Faculties. The result is a cohesive and natural integration of university and Faculty focus, often with initiatives that span a number of our identified priority areas. Decisions regarding investment in research and academic activities are grounded in our institutional and Faculty strategic directions. Existing and planned initiatives include support for human capital, infrastructure, graduate and undergraduate training as well as alignment with or creation of complementary institutes and centres. The following table demonstrates the *interaction* between Faculty-identified priority areas and institutional strategic directions.

Examples of Faculty-identified activities

Examples of Faculty-Identified Priority Areas/Activities	Related University Strategic Areas
Biomedical Engineering/School for Biomedical Engineering	<ul style="list-style-type: none"> • Science Based Innovation in Manufacturing • Integrated Health Research
Manufacturing and Materials Nano & Micro Technologies	<ul style="list-style-type: none"> • Science-Based Innovation in Manufacturing • Information Technology • Integrated Health Research
Infectious Diseases	<ul style="list-style-type: none"> • Molecular Biology • Integrated Health Research • Globalization and the Human Condition
Control of the Cell Cancer/Stem Cell Research	<ul style="list-style-type: none"> • Molecular Biology • Integrated Health Research
Collaborations for Health Initiative	<ul style="list-style-type: none"> • Integrated Health Research • Globalization and the Human Condition
Bertrand Russell, Peace and the 20 th Century	<ul style="list-style-type: none"> • Globalization and the Human Condition
Social & Economic Policy	<ul style="list-style-type: none"> • Integrated Health Research • Globalization and the Human Condition • Work and Society

Building Research Capacity

McMaster University's research enterprise has experienced significant growth over the last five years. This growth reflects our strong competitive participation in new research investment opportunities available through federal and provincial sources as well as private sector cost-sharing partnerships

Our institution-wide and faculty-specific strategic directions provide the framework for institutional research grant and infrastructure applications, institutional resource allocations (e.g. faculty appointments and capital expenditures) and for ongoing fundraising. McMaster University and its affiliated hospitals use an integrated approach to opportunities provided by these programs. These new and vital opportunities allow us to sustain and further enhance our areas of research strength as well as to engage in inter-disciplinary, cross-disciplinary and multi-institutional research initiatives. McMaster and its hospital partners strive to capitalize on their collective strengths to develop collaborative research both regionally and more broadly (e.g., with other institutions provincially, nationally and internationally). CFI, in particular, has spawned several multi-institutional initiatives which could not have otherwise developed.

A number of strategies are employed to capitalize on the federal and provincial programs. For example, institutional priority for CFI applications is given to those research programs which most closely align with one or more of McMaster's strategic directions. Further, emphasis is placed on coordinating CRC appointments with CFI applications to maximize the positive impact on the University's research enterprise. Many of our infrastructure grants and applications are led by or include CRC award holders and are aligned with training and educational initiatives. Finally, the research thrusts to which CRC appointments are made reflect ongoing academic planning which is guided by the key institutional goals and realized through strategic planning within departments and faculties.

The CRC program allows our research-intensive university to build research strength in foundational areas essential to a broad range of research activities. As such, some of our CRC appointments may not be directly related to a specifically-defined strategic area. For example, as a foundational discipline, mathematics plays a key role in many scholarly areas of inquiry and our faculty in the Department of Mathematics and Statistics Department collaborate with researchers in fields ranging from epidemiology to theoretical physics and materials. CRC appointments are one important resource for building and sustaining excellence in mathematics even though this field is not identified as a specific institutional strategic area.

McMaster's CRCs – Current Status and Planning & Approval Process

Planning for the allocation of CRCs is driven by the Faculties within an overarching institutional framework developed by the Senior Academic officers and subsequently approved by the senior academic planning body at McMaster, the University Planning Committee (UPC). CRC's are allocated to Faculties proportional to the Agencies' funds secured by each faculty. Each Faculty develops a plan to allocate CRCs in accordance with identified research thrusts. These plans are then reviewed and endorsed at the institutional level. Flexibility is built into this CRC process to allow for emerging opportunities that arise throughout the life of the program.

Nominations for faculty with clinical or cross-appointments with affiliated teaching hospitals are consistent with established mutual priorities. External recruitment for clinical faculty is performed in conjunction with clinical program leaders and in consultation with the relevant teaching hospital.

McMaster is committed to actively seeking qualified candidates from under-represented groups and will take additional steps to address imbalances that may occur throughout our CRC nominations processes. In particular, McMaster is committed to achieving our objective of 25% female representation in our initial nominations as well as our CRC renewals.

Research Training

Graduate education is central to research intensity at McMaster University. In our latest university-wide strategic plan (*Refining Directions*) increasing graduate enrolment to 20% of the total university enrolment (from the current 13%) was identified as a major goal. As a research-intensive university, this is a necessary and important ambition

for McMaster. Higher graduate enrolments are targeted among programs that are high quality, nationally and internationally recognized and inter-disciplinary programs which are consistent with the University's areas of strategic priority.

Knowledge and Technology Transfer

McMaster University is recognized and ranked nationally as a first-class research and educational institution. To support the research enterprise, McMaster has invested heavily into services to assist researchers in knowledge transfer activities, including commercialization of research results.

McMaster has developed a unique set of policies covering intellectual property management which is inclusive of all work conducted with our hospital teaching partners. Equally notable, the University has invested strategically in Hamilton's capacity for supporting and nurturing such initiatives. In the past 12 months, McMaster has experienced significant expansion of our industrial liaison staffing. We have acquired property and developed space for incubator and early-stage companies to flourish and have partnered with city, regional and provincial planning agents in focused economic development activities with an emphasis on biotechnology development. These initiatives equip the University and our hospital partners with the ability to execute technology transfer and commercialization in collaboration with our biomedical industry partners.