

# **Dalhousie University Strategic Research Plan Summary**

**November 2013**

## **1. Introduction and Objectives**

Founded in 1818 in Halifax, Nova Scotia, Dalhousie University attracts more than 18,000 high achieving, motivated and engaged students from around the world. Classified as a medical doctoral university, Dalhousie offers a broad range of educational and research activities across four campuses, in more than 190 undergraduate and graduate programs, across 12 faculties. It provides an interactive and collaborative environment for creating and sharing knowledge with diverse, challenging academic programs and excellent research.

Dalhousie University is a member of the U15 group of leading research-intensive universities in Canada. The university attracts more than \$140 million in research grants and awards annually, making it the largest research university in the region. Indeed, more than 25% of the university's total budget is from research funding. Dalhousie embraces interdisciplinary collaborations within the university, across Canada and around the world to address complex scientific and societal challenges.

Dalhousie University's research objectives are:

- to maintain and build capacity for excellent research in areas of current or emerging strength;
- to recruit outstanding scholars;
- to enhance research networking and collaboration across the university, nationally and internationally;
- to provide an outstanding training environment for highly qualified personnel;
- to enable the translation of research results for the benefit of society.

The Dalhousie University Strategic Research Plan (SRP) serves as a roadmap to enable targeted, efficient pursuit of these objectives. It provides a cohesive and clear guiding statement in which members of our research community can find themselves represented and are challenged to excel. The university recognizes that to attain excellence, choices must be made and priorities set. The SRP has been developed to meet these objectives, identify areas in which the university will focus its efforts and propose the allocation of resources. The priority research areas in this Plan build on Dalhousie's strong research foundation and are studied from a number of theoretical and practical perspectives with a variety of methodologies and tools.

## **2. Priority Research Areas**

The four priority areas of research in which Dalhousie intends to distinguish itself are: Ocean Studies; Advanced Materials and Clean Technology; Health and Wellness; and Governance, Society and Culture. Three areas identified as emerging research strengths are: Information Science and Communication; Agriculture and Food Technologies; and Energy and the Environment.

## **2.1 Ocean Studies**

Dalhousie has established itself as a national leader in ocean research and is on its way to being defined as a world leader in this area. Ocean studies at Dalhousie are interdisciplinary and involve more than 100 researchers in six faculties. With its extensive network in areas of oceans education, research and outreach, Dalhousie is ideally positioned to contribute solutions to many of the challenges facing the world's oceans and coasts.

Several large-scale research initiatives headquartered at Dalhousie greatly enhance the university's strength in Ocean Studies: the Ocean Tracking Network (OTN); Canada Excellence Research Chair (CERC) in Ocean Science and Technology; the Network of Centres of Excellence in Marine Environmental Observation, Prediction and Response (MEOPAR); the Halifax Marine Research Institute (HMRI); and the Aquatron sea water testing facility. All of these research efforts are located in the new Dalhousie Ocean Sciences Building.

Ocean Studies encompasses eight research clusters:

- Marine Biological Resources and Conservation of Biodiversity;
- Marine Technologies;
- Ocean Environmental Processes;
- Arctic Studies;
- Ocean Law and Governance;
- Atmospheric Science;
- Marine Bio-Resources; and
- Marine Affairs.

## **2.2 Advanced Materials and Clean Technology**

Dalhousie is a leader in advanced materials and clean technology research, with world-renowned researchers developing products that improve performance, productivity and efficiency while at the same time reducing costs, energy consumption and waste. Research in this area focuses on finding better ways to use resources, generating innovative ways to use renewable resources, developing new ways to generate and store energy, and creating more energy efficient materials and material assemblies.

Materials and clean technology research at Dalhousie is interdisciplinary with a number of Industrial Research Chairs, a university-wide institute and several faculty-based centres. The Institute for Research in Materials (IRM) engages faculty members across the university in tackling major research and development projects in partnership with private industry.

The five clusters in this priority research area are:

- Clean Energy and Storage;
- Semiconductors;
- Environmentally Sustainable Materials and Clean Manufacturing;
- Sustainable Civil Infrastructure; and
- Water Management.

## **2.3 Health and Wellness**

Health and Wellness encompasses the activities of over 500 faculty members at Dalhousie and its affiliated teaching hospitals. Dalhousie is the major training centre in the Maritimes for life sciences, health professions and health law and policy research personnel. An epidemic of physical inactivity and

obesity, an aging population, increased concern for global health and global pandemics combined with unprecedented medical and technical advances, a greater emphasis on health promotion, primary care and disease prevention, and a focus on improved human function despite disruptive life events present a multidimensional research challenge. Dalhousie acknowledges the diversity of health research and the multifaceted nature of how health and disease impact our population. The university is well-positioned to address these challenges within a broad health framework.

Research in this area involves extensive collaboration with many national programs supported by the federal granting agencies as well as the Dalhousie Medical Research Foundation (DMRF), the Nova Scotia Health Research Foundation (NSHRF) and industries in Nova Scotia's life science sector. There are many externally-funded Chairs as well as centres and institutes in this priority research area. These include the Beatrice Hunter Cancer Research Institute, Brain Repair Centre, Atlantic Health Promotion Research Centre, and the Health Law Institute.

Dalhousie will continue to emphasize and build capacity in the following research clusters:

- Biological Structures and Mechanisms;
- Medical Products, Vaccines and Technologies;
- Clinical Patient-Oriented Research and Translation to Health Outcomes, Services and Policy;
- Social, Cultural and Environmental Determinants of Health and Wellness; and
- Life Course Development.

#### **2.4 Governance, Society and Culture**

There are few aspects of social life that are ungoverned or unregulated; few that emerge without historical, institutional or philosophical impetus; and few that are manifested without cultural expression or mediation. Research in this area includes the regulation, ethical use and security of tangible and intangible resources in Canada and abroad; cultural and artistic aspects of new information and communications technologies tied to digitizing information; Canadian cultural products; and research on indigenous peoples. In a world of increasing connectedness through globalization, the challenges and opportunities associated with effective and innovative governance strategies are becoming more complex.

Demonstrating Dalhousie's strength in this area are a number of Chairs and many centres and institutes. These include the Centre for Foreign Policy Studies, the Marine & Environmental Law Institute, the European Union Centre of Excellence and the Centre for European Studies.

Dalhousie is internationally recognized as a leader with strength in several related clusters, including:

- Peace, Conflict Management, Mediation and Security;
- Ethics, Values and Expert Knowledge;
- Studies of Europe;
- Social Justice and Development;
- Cultural Studies, including Aboriginal and Migration Research; and
- Cultural Aspects of Digital and Social Media.

#### **Areas of Emerging Research Strength**

In addition to areas where Dalhousie has already built a strong research foundation and attained a level of recognition for excellence, there are other areas that have demonstrated potential for significant growth. They are:

## **2.5 Information Science and Communication**

Information and communication are central to social life and to our scientific endeavors. At Dalhousie, the applications of research in this area have a very broad interdisciplinary scope, building on work being undertaken in seven faculties. Dalhousie researchers have expertise in the study of broadband and wireless networks; text mining; information retrieval; knowledge management; “big data” use, analysis and interpretation; algorithms; data structures; high performance computing; analytics; computing architectures; cloud computing and web service architectures; digital media; gaming; visualization; human-computer interaction; and social media and networking.

Clusters in this research area are:

- Computer and Wireless Information Networks;
- Information Systems; and
- New Media.

## **2.6 Agriculture and Food Technologies**

The Faculty of Agriculture, formerly the Nova Scotia Agricultural College, is the only one of its kind in Atlantic Canada. Research addresses the challenges of sustainable agricultural systems, food safety and security, economic trade and social policies and rural well-being. Existing collaborations among researchers, private industry, scientists at Agriculture Agri-Food Canada and other research centres demonstrate the broad-based, interdisciplinary approach to agricultural and food research.

Research and teaching are supported by an experimental orchard, greenhouse and growth chamber facilities, a plant material drying facility, 400 hectares of farm and field facilities, and modern dairy, sheep, fur and poultry research facilities. Dalhousie researchers have access to the Atlantic Food and Horticultural Research Centre and the Nappan Research Farm.

Cluster areas include:

- Sustainable Agro-Ecosystems;
- Applied Molecular Biology, Genomics and Biotechnology; and
- Bio-Product and Bio-Resource Management.

## **2.7 Energy and the Environment**

Dalhousie researchers contribute to, and remain engaged in, studies related to oil and gas, hydroelectric power and tidal power in the Bay of Fundy. These not only have significant economic impact on the region but also have the potential for significant benefits to the people of Atlantic Canada.

Complementing the large group of researchers working on energy generation is Dalhousie’s recognized world leadership in energy storage technologies, as well as burgeoning research in supply and demand side management and energy conservation.

Three clusters of growing expertise in Energy and the Environment have been identified:

- Sustainable Energy;
- Non-Renewable Energy; and
- Reduction of Energy Use.

## **3. Inter-institutional and Inter-sectorial Collaborations**

The priorities outlined in this plan demonstrate the breadth and depth of Dalhousie’s interdisciplinary research environment. Dalhousie promotes a cooperative, collaborative and interdisciplinary

approach to research across its faculties and fosters new partnerships with other regional, national and international universities, affiliated teaching hospitals, non-governmental organizations, communities, governments and industry. The university will continue to build on existing partnerships with other institutions to develop exceptional research strengths. Collaboration with other institutions in the province, Atlantic region and across Canada is expected to increase.

#### **4. Gender Representation and Diversity in CRC Nominations**

Metrics of research funding and productivity are used by the university in its strategic planning, including its allocation of CRCs. The university strategically selects its CRCs by aligning them with priority research areas. Dalhousie nominates individuals whose work will enhance a priority research area of the university and are aligned with its collaborative, multidisciplinary environment. The majority of the university's CRC allocations are used for external hires of the most qualified people, whether they have a national or international background. Dalhousie University is committed to employment equity and affirmative action practices and makes every effort to attract, recruit and retain members from the traditionally under-represented groups of Aboriginal people, persons with a disability, racially visible persons and women.

#### **5. Planning and Approval Process**

The priorities identified in this document are the result of an iterative process. Deans and Associate Deans encouraged their Departments and Faculties to define and refine research goals, which have informed the identification of the research themes. The process also examined levels of research activity and awards within the past decade, as well as the university's potential growth areas for the next decade. This Strategic Research Plan has been reviewed by Deans, the Dalhousie Research Advisory Committee and the Vice President Research of the affiliated hospitals and approved by the University Senate.

#### **6. Assessment of Success in Meeting Objectives**

Using the Strategic Research Plan as a guide for investment and planning, Dalhousie will enhance its reputation as a research leader in the region and gain national and international recognition for success in the strategic areas. Dalhousie continually tracks its research performance against other research intensive Canadian universities to assess its progress in a national context and set goals for future growth. To this end, a companion document to the Strategic Research Plan has been developed. The Institutional Framework for the Support of Research (IFSR) complements the SRP by proposing an integrated range of new and existing supports for building a thriving research environment at Dalhousie. The fundamental concept behind the IFSR is that while the SRP sets priorities and informs decisions, the IFSR defines actions and services that build the framework to enrich the research ecosystem and enable measurement of growth and success.