University of Guelph
Strategic Research Plan Summary (2012-17)

1. Introduction

The University of Guelph ("the University") is one of Canada's top comprehensive universities because of its commitment to student learning and discovery and to innovative research. The University's mission is to change lives and improve life. It is dedicated to cultivating the essentials for quality of life through basic and applied research. Our goal is to use knowledge and research talent to help people, here and around the world.

The University is proud of its heritage in agriculture and veterinary medicine, as well as its accomplishments and programs in science and engineering, social and applied human sciences, liberal arts, humanities, fine and performing arts, and economics and business. Our rich history enables us to engage in collaborative and interdisciplinary research in a world of innovation and global competition.

As a comprehensive university, the University promotes individual and collaborative research, endeavoring to engage various communities in our research efforts. Investment in research enhances student teaching and learning through incorporating research techniques and discovery into the curriculum, through involving students in research design and execution, and through mobilization and transfer. Creativity in discovery generates innovations that benefit society and the economy. Through fundamental and applied research, we can address challenges and capitalize on opportunities.

The University's Strategic Research Plan (SRP) builds on the University's history and embraces a diverse scholarly community equipped to address key strategic priorities of the University and society. It focuses on key areas and supports opportunities for interdisciplinary, transformative research that span colleges and departments and reach industry and government. The SRP also provides a framework for research funding allocations from programs of the tri-council funding agencies (the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council, and the Social Sciences and Humanities Research Council) such as the Canada Research Chair (CRC) program, and for submissions for major institutional infrastructure funding from the Canada Foundation for Innovation (CFI) and the Ontario Research Fund. Excellence in research and strategic investment of resources aligned with research themes that highlight the University's strengths and identify strategic areas for growth will give the University a distinctive edge and comparative advantage.

2. Major goals and objectives of the SRP

The following are the University's broad research goals for 2012-2017:

- To be a national leader in transforming and mobilizing knowledge to benefit society by moving from ideas to discovery, innovation and commercialization
- To obtain funding for key initiatives and to recruit high-profile faculty members and students
- To build research infrastructure
- To develop extensive collaborative and international networks with academia, industry and government
- To conduct research that provides critical new knowledge relevant to public policy, nationally and internationally
- To increase recognition of the University's high-quality scholarship and its benefits to all sectors of society

The specific objectives of the SRP are as follows:

- Maximize opportunities for scholarly activity, discovery-based research and innovation

- Enable the development of strong accountability models with industry and government sponsors and partners
- Promote internationally competitive, high-quality and high-impact research and scholarship
- Cultivate and sustain excellence across existing research strengths through strategic investment in emerging areas of research
- Facilitate collaborations across disciplinary and institutional boundaries
- Recruit outstanding students, research fellows and faculty
- Engage in effective communication and dissemination of research results
- Optimize research and scholarship resources, and increase effectiveness and efficiency of research support services
- Forge productive research partnerships within the University and with other institutions in Ontario, Canada and abroad
- Develop large-scale research facilities along with other institutions (e.g. CLS, TRIUMF, iBOL and the Canadian Space Agency)
- Optimize existing investments by leveraging funding and expanding collaborative research and knowledge mobilization
- Attract new research talent by investing in state-of-the-art research space and equipment in fundamental and applied research
- Augment research capacity, when possible, through private-sector contributions and working with University alumni
- Assess risk and develop mitigation strategies for complex and high-risk projects
- Support the development and enhancement of intellectual capital at the regional campuses and research stations
- Foster entrepreneurship and develop industry networks through enhanced services from the Catalyst Centre
- Reduce the gap between basic and applied research through strategic linkages for real-world solutions

3. Major research themes: priorities for research and research training

Creating themes that represent the broad diversity of topics studied at the University is a challenge. The major research themes included in the SRP are intended to highlight critical strengths, to capture the interdisciplinary nature of University research, and to illustrate the complex relationships among the arts, human and social sciences, and the natural, physical and applied sciences. The selected themes and sub-themes capture the interdisciplinary nature of the University, as researchers from all seven colleges may be active in any thematic area.

1. **Agriculture, food and the bioeconomy**
   - Agricultural products and the bioeconomy; sustainable agricultural systems; enhanced agriculture and food value chains; food and health, safety and security
   - Plant and animal breeding
   - Impact, adaptation and mitigation of climate change
   - Sociological impact, financial assessment and food policy
   - Market demand and consumer acceptance of new food and biotech products
2. **Health and well-being in humans and animals**
   - Animal health, welfare and productivity
   - Links among animals, humans and ecosystems, comparative health and disease

- Health genomics (nutrigenomics, personalized medicine, food safety and surveillance)
- Nutrition and health, clinical nutrition
- Genomics and biodiversity
- Biomedical technology and ethics
- Neurosciences and behavioural sciences
- Human development and aging
- Population and public health

3. Economic management, governance and public policy

- Economics and business of agriculture and food
- Corporate governance and risk management
- International and comparative politics
- Ethical management of organizations
- Economic growth, environmental governance and natural resources policy
- Health policy
- Global community and emerging markets
- Cultural goods and services, social capital and sustainability

4. Biodiversity, environment and ecology

- Natural hazard prediction, prevention and remediation
- Planning, development, management and sustainability
- Evolutionary, population and community ecology; applied evolution; ecosystem science
- Environmental humanities and eco-criticism
- Natural resources; rural resource management
- Greenhouse gas management and mitigation; water management and pollution control
- Climate change impacts and adaptation strategies; sustainable agriculture and food production systems
- Alternative energy (in particular, bioenergy)

5. Human behaviour, cultural evolution, communities

- Families and work
- Justice studies
- Literacies in the 21st century (visual, digital media and print)
- Nations and transnationalism
- Cultural production and performance
- Evolution, cognition and culture (social and natural sciences)
- Urban and rural communities; globalization and adaptation
- Development of human thought, cultures and institutions
- Society and the environment

6. Technology and applied sciences

- Biomaterials and bioproducts
- Electrochemistry
- Membranes and surfaces
- Mathematics and modelling of biological systems
- Robotics, artificial intelligence, intelligent systems; support for all aspects of life in space
- Water technology
- Information communication and new media (digital media)
- Technology and new media in the fine arts, performing arts and liberal arts
- Ethical evaluation and ethical implications of technology and biotechnology
- Synthesis and fabrication of novel molecules and nanostructures

- Nature, origins and fate of the universe
- Applications for biodiversity (e.g. DNA barcoding)

7. Foundations of science

- Fundamental interactions of matter and their role in the physical sciences
- Simulations of natural phenomena on computers, together modelling and experimentation
- Structure/function relationships in biological molecules and their evolution
- The laws of interactions of biological molecules making up cells, biological membranes, organelles, tissues and living organisms
- Quantum information

4. Addressing issue of gender representation in CRC nominations

In accordance with the University's equity goals, all faculty recruitment and appointments endorse the principle of employment equity, including gender representation. Annually, the University monitors its progress in addressing equity amongst its CRC appointments according to the target setting methodology implemented by the CRC program.

5. Distribution of CRCs/CFI support by research area

The University has a current allocation of 39 CRCs, as of the 2010 re-allocation exercise. The following table shows CRCs (both occupied and vacant) by research area and by granting council:

	CIHR		**NSERC**		**SSHRC**		**Totals**	
Research area	Tier 1	Tier 2	Tier 1	Tier 2	Tier 1	Tier 2	Tier 1	Tier 2
1. Health and well-being in humans and animals	3	2	1	2			4	4
2. Agriculture, food and the bioeconomy			4	2			4	2
3. Economic management, governance and public policy						1		1
4. Biodiversity, environment and ecology			1	5	1	1	2	6
5. Human behaviour, cultural evolution, creative communities					2	2	2	2
6. Technology and applied sciences			3	1			3	1
7. Foundations of science	2		2	2			4	2
TBD				2				2
Totals	**5**	**2**	**11**	**14**	**3**	**4**	**19**	**20**

The University expects to deploy future CFI support across all of its research areas. The following table shows the distribution of current CFI projects by research area:

Research area	**No. of projects**
1. Health and well-being in humans and animals	55
2. Agriculture, food and the bioeconomy	57
3. Economic management, governance and public policy	3
4. Biodiversity, environment and ecology	41

5. Human behaviour, cultural evolution, creative communities	14
6. Technology and applied sciences	26
7. Foundations of science	31
Total	**227**

6. Development of research and research training: new areas 2012-17

University research is critical to training students and other trainees. There is growing awareness of the importance of research training in many of the University's undergraduate programs. The numerous research clusters and centres at the University—many of which have significant federal and provincial infrastructure support—are attracting excellent graduate students. Holders of CRCs and other leading researchers play an important role in undergraduate and graduate programs. Value-added training—such as research seminars with renowned scholars visiting the campus—is offered by many graduate programs. The University expects to enhance its training capacity in all research areas identified in the SRP. In particular, the University expects to expand upon commitments made to Food, Health and Nutrition (established Canada's Food Institute), Civil Society (established the School for Civil Society), and Water and Health (established the Southern Ontario Water Consortium).

7. Inter-institutional and inter-sectoral collaborations

The University contains a growing number of multi-disciplinary research teams spanning departments and colleges. Further planning and development will enable us to establish focused research institutes in specific areas that combine research resources, critical activity, opportunity and collaborations. Cross-disciplinary collaboration is a strength, and a distinguishing feature of research at the University.

8. Assessment of SRP goals and objectives

The University is committed to evaluating research performance and excellence, especially in the strategic areas of research identified above. While there is no single measure of research performance, promotion and tenure committees use a variety of metrics formally and informally. In the context of the SRP, the University is in the process of developing a set of institutional-level metrics to indicate the impact of its research enterprise. Further, the University will evaluate its progress in the training of highly qualified personnel and collaborations through CRC and CFI project annual reports.

9. Planning and approval processes

The University selects CRC candidates in areas of research relevant to its SRP and has improved its record of equity among CRCs appointed. The University has made a conscious decision to place CRCs in clusters of strength in support of multi-disciplinary approaches to problem-solving.

As with all faculty appointments, requests for nominations must be accompanied by a recruitment report. The Provost and the Vice-President (Research) must be confident that equity issues, including gender equity issues, have been addressed in the report. The University's Validation Committee reviews prospective CRC nominees and makes recommendations on the likelihood of a successful nomination. If the candidate is deemed not suitable for nomination, the University may reallocate the CRC to a different research area. The President provides final approval on nominations submitted to the CRC Program.