

University of Guelph
Strategic Research Plan
2012-2017

November 29, 2011

DRAFT FOR DISCUSSION



Table of Contents

	Page
1.0 Introduction	3
2.0 Purpose	5
3.0 Mission and Goals	5
4.0 Framework	6
5.0 Objectives	8
6.0 Research Themes	9
6.1 Agriculture, food and the bioeconomy	9
6.2. Animal and human health and well being	10
6.3 Economic management, governance and public policy	11
6.4 Environment and ecology	11
6.5 Human behaviour, cultural evolution and creative communities	12
6.6 Science and engineering technology	13
7.0 Appendix	14

1.0 INTRODUCTION

The University of Guelph (“the University”) is one of Canada's top comprehensive universities, owing to a commitment to student learning and innovative research. The University is dedicated to cultivating the essentials for quality of life – water, food, environment, animal and human health, community, commerce, culture and learning – through basic and applied research.

The University’s Strategic Research Plan (SRP) describes a broad set of themes and emphases which inform the research context for the University Integrated Plan, a document culminating from a planning process beginning at the academic unit level. The SRP plays a role in promoting and building on research for which the University has cultivated a deserved reputation, as well as in identifying where it can make a unique contribution to current and emerging research.

The SRP serves as a framework to influence research funding allocations made from various programs of the tri-council funding agencies (Canadian Institutes for Health Research, Natural Sciences and Engineering Research Council and Social Sciences and Humanities Research Council) such as the Canada Research Chair (CRC) program, and submissions of major institutional infrastructure requests to the Canada Foundation for Innovation (CFI) and the Ontario Research Fund. Excellence in research and strategic investment of resources aligned with the research themes that highlight our existing strengths and identify strategic areas for growth will give the University a distinctive edge and comparative advantage.

Institutionally, the SRP reflects the University’s mission statement, whose objectives include research intensity, internationalism and collaboration. The complete picture of research at the University includes outstanding performance in all areas of academic scholarship, including the arts, humanities, social sciences, life sciences, physical and engineering sciences, agriculture, food and veterinary sciences.

The University has a mandate to be a leader in Canada in carrying out community-engaged scholarship, rooted in extensive partnerships with local and global communities of interest with a focus on responsive research, knowledge mobilization activities and social impact. The University makes every effort to engage various communities in research, such as undergraduate students, the technology sector, the business community, the agri-community, rural or urban community, the education sector, the immigrant community, the Aboriginal community and the international community.

The University is proud of its heritage in agriculture and veterinary medicine, as well as more recent developments in science and engineering, social and applied human sciences, liberal arts, humanities, fine and performing arts and economics and business. The richness of the past enables it to fully engage in the emerging collaborative and interdisciplinary nature of research, in a climate of innovation and global competitiveness. The SRP builds on the institution’s history and embraces the richness

of a diverse scholarly community that is positioned to contribute fully to key strategic priorities of the University and society.

As a comprehensive university, the University champions arts and sciences, and promotes individual and collaborative research. The research environment continues to develop, and will be sustained by the creativity and excellence of individual researchers. It is recognized that the research strength of individuals is a critical component of an effective thematic approach. That the SRP identifies thematic research areas does not diminish the importance and impact of individual researchers and creative practitioners. These individual research strengths should be used to define particular strategic research directions.

Investment in research enhances the teaching and learning experience for students through mechanisms that include incorporation of research techniques and discovery in curriculum, active participation of students in research design and execution and involving students in knowledge mobilization and transfer. Additionally, student queries may inspire research questions.

Leadership is required to educate students about human differences in an increasingly diversified world, to help develop civil citizens and a civil society. Through research initiatives, we must instill in our undergraduate and graduate students appreciation of societal structures and social and scientific responsibility for a sustainable world.

Research-intensive faculty members provide opportunities for undergraduate and graduate students to explore scholarly research through focused course seminars, independent study semesters, curriculum-embedded community-based research and through thesis supervision. The development and incorporation of these activities heighten the experience of faculty, as well as students who are destined to become alumni and who are important to the research mission. They provide future research collaborations with business, industry, government and other academic organizations, future funding of research infrastructure and student scholarships.

The University is committed to creating a supportive environment, which promotes collaborative interdisciplinary research, and scholarship in which researchers can thrive. The SRP acknowledges our mission to change lives and improve life. As a result of creativity in discovery, we will generate innovation, and out of innovation, we will develop applications that have both societal and economic impacts and benefits.

2.0 PURPOSE

The SRP provides a roadmap to ensure the development of the identity of the University outside our campus, to promote the creation of high quality and impactful research and to facilitate innovation across all of our research disciplines. Accordingly, the SRP will:

- Serve as road map for establishing institutional focus, infrastructure, and capability necessary to improve research performance both as individuals and collectively as an institution.
- Help to articulate the University's strengths by identifying integrative research themes that cross both disciplinary and administrative boundaries.
- Promote awareness of our major research areas and themes and facilitate the development of interdisciplinary teams and create enhance opportunities to make new and different discoveries on multi-dimensional research questions which will have an impact on our community of practice.

3.0 MISSION AND GOALS

Broadly said, the mission of the University's research enterprise is to put research into practice and to make a difference in everyday lives. The University's research mission serves as a high-level roadmap for the SRP.

Knowledge generation and knowledge mobilization and transfer through research, scholarship, and teaching are fundamental to the research mission of the University. To ensure research growth and continued success, it is imperative to recruit and retain outstanding scholars who will attract highly qualified graduate and undergraduate students, champion innovative research initiatives, strengthen critical areas of research, develop new areas of excellence in emerging research areas, and enhance synergies between teaching and research.

One of the University's key research strengths is its ability to form interdisciplinary linkages between the major areas of scholarly activity, which crosses traditional disciplines internally and externally, in academia and industry. The breadth of these linkages and the willingness of our researchers to explore these opportunities have promoted the development of programs capable of carrying ideas from the conceptual and discovery stages of research and through advanced knowledge mobilization and translation into innovation and commercialization opportunities and to informing policy and practice, nationally and internationally. The University encourages and supports interdisciplinary initiatives that build on its strengths and show potential for significant impact and leverage.

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

1. To increase our research profile in our community of practice by being recognized for high-quality scholarly output and impact on the advancement and transfer of knowledge to all sectors of society and to the research community.
2. To be the national leader in transforming knowledge for the benefit of society by moving from ideas to discovery, innovation and commercialization.
3. To obtain funding to seed key initiatives, recruit high-profile faculty members and students.
4. To build our research infrastructure.
5. To develop extensive collaborative and international networks with academia, industry and government.

4.0 FRAMEWORK

The intentions of the SRP are pursued within a framework that emphasizes the following:

Training highly qualified personnel (HQP)

University research is critical to HQP development. Awareness is increasing about 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 funding through tri-council funding that support strategic and infrastructure programs and provincial investment programs -- are attracting excellent graduate students. The University ensures that through its teaching requirements, Canada Research Chair holders and all leading researchers serve an important role in undergraduate and graduate programs. Value-added training is being provided through various learning opportunities offered through graduate programs.

Research excellence

Research includes all forms of scholarship that create new knowledge. The University encourages research excellence in all fields of enquiry by individuals and groups through interdisciplinary and collaborative research and through dissemination of results through mechanisms that show quality and impact.

Support for creativity and diversity

There is widespread recognition that the University's vibrancy is reflective of its diversity and creativity. The University strives to be a recognized centre of discovery and advanced training of HQP and to be respectful of fundamental, discipline-based research. It is also recognized that discovery-based research extends and evolves into distinct opportunities to address matters of importance to society. Indeed, applied research is an important aspect of the research undertaken at the University, a recognized leader in knowledge mobilization and transfer, and collaborations with external partners and community engagement strategies.

Innovation

Broadly defined, innovation includes advances in how knowledge is created and applied. University researchers play a leading role in contributing to Canada's stock of innovative ideas, products and methodologies. Research figures prominently in the current federal and provincial government innovation and commercialization agendas. Innovation covers the breadth of the University, from creative writing to advanced genomics.

Public policy and consumer protection

Research in policy-rich areas such as animal and human health, culture, economy, work, crime, poverty, language, agriculture, food safety and environment (including sustainable water management and climate change) draws the University into the critical debate and development of public policy and the advancement of societies and governments. Conducting research that provides critical new knowledge to policy is an important contribution the University will make within Canada and internationally.

Collaboration

The University has a conventional structure in terms of academic units, but there are a growing number of multidisciplinary research teams throughout the University. Further planning and development by the University will lead to the establishment of focused research institutes around specific areas where a combination of research resources, critical activity, opportunity and collaborations exist. Collaboration across disciplines is truly one of the University's strengths and is a distinguishing feature of the institution's culture.

5.0 OBJECTIVES

The SRP has the following objectives:

- Maximize opportunities for scholarly activity, discovery-based research and innovation
- Create strong accountability models with our industry and government sponsors and partners
- Promote internationally competitive, high quality and impactful research and scholarship
- Cultivate and sustain excellence across existing research strengths and through strategic investment in emerging areas of research
- Facilitate collaborations across disciplinary and institutional boundaries
- Recruit outstanding students; recruit and retain outstanding research fellows and faculty
- Value effective communication and dissemination of research results
- Optimize use of our research and scholarship resources

6.0 MAJOR RESEARCH THEMES

The University is a leader in responsible community engagement, in cultivating creativity and in understanding the social, cultural, economic and ecological context and constraints in which technological progress unfolds. The University makes unique and leading contributions to research in several distinct areas of importance in Ontario, Canada and internationally. We recognize that research is integrative and our programs often span more than one theme.

Creating themes to represent the broad diversity of topics studied is a challenge. The major research themes for the University have been created to highlight our critical strengths, to capture the true interdisciplinary nature of our research and to illustrate the complex relationships among the arts, human and social sciences and the natural, physical and applied sciences.

The themes were selected to capture the interdisciplinary nature of the university. Researchers from all seven colleges can be active in any thematic area.

Themes

1. Agriculture, food and the bioeconomy
2. Animal and human health and well being

3. Economic management, governance and public policy
4. Environment and ecology
5. Human behavior, cultural evolution and creative communities
6. Science and engineering technology

6.1 Agriculture, food and the bioeconomy

The University has a long history of research in agriculture, especially in the production and use of foods. A Science Watch study ranked the University seventh worldwide for its impact on agricultural sciences over the past decade. A recent Deloitte impact study concluded that the partnership between the University and the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) had direct and spin-off impacts on the Ontario economy of more than \$1 billion per year. In addition, the focus on agriculture at the University has led to the clustering of numerous agri-food organizations, agri-food research and agri-technology companies around and in the University of Guelph Research Park. Foremost among the newer areas of research interest are applications of molecular genetics, genomics, bioinformatics, modeling and systems research to create novel crops and livestock, to ensure that agricultural practices are economically and environmentally sustainable, and to ensure the safety of our food systems. Consumer reaction to new food and biotech products is also an emerging area of strength. The newly created Institute for Food will provide a vehicle for coordinating teaching and research across the broad spectrum of the food chain.

The sub-themes in which the University places particular emphasis include:

- Agricultural products and the bioeconomy
- Sustainable agricultural systems
- Food and health, safety and security
- Plant and animal breeding
- Animal welfare and behaviour
- Impact, adaptation and mitigation of climate change
- Enhanced agriculture and food value chains
- Sociological impact, financial assessment and food policy
- Market demand and consumer acceptance of new food and biotech products

6.2. Animal and human health and well being

The University has an integrated view of and approach to health-related issues, from cultural to scientific, from individual to community, from theoretical to applied, and from animal to humans. The development of policy recommendations based on effective management practices and risk analysis is a particular priority. The University is well-positioned to make significant and unique contributions to the improvement of

human and animal health. This is consistent with the needs of Canadians who, as part of their concern about how a degraded environment could affect public health, are seeking a more integrated approach to health issues and health research. The University has made strong gains through CFI investments and CRC successes, in areas such as zoonoses and vaccine development.

The sub-themes in which the University places particular emphasis are:

- 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 and clinical nutrition
- Genomics and biodiversity
- Biomedical technology and ethics
- Neurosciences and behavioural sciences
- Human development and aging
- The human-animal relationship
- Population and public health

6.3 Economic management, governance and public policy

The University conducts world-class research into the role that governance structure, effective management and public policy play in shaping the development and performance of organizations, institutions and markets nationally and on a global scale. Strategic areas of research include the effect of institutions and policies on human prosperity and well-being, human resource management, labour market analysis, environmental governance, the criminal justice system, discrimination, income inequity, homelessness, human rights, and international politics. There are a number of cross-college collaborations focusing on leadership, racial and gender discrimination, and work-family policies. Studies undertaken under this theme are of great value in informing our research community of many current and upcoming issues influencing the daily lives of the world's citizens.

The sub-themes in which the University places particular emphasis include:

- Economics and business of agriculture and food
- Corporate governance and risk management
- Biotechnology and bioeconomy
- 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

6.4 Environment and ecology

The University has a rich and diversified history in a broad research theme embracing the environment, ecology and conservation that spans the entire campus. The institution continues to make strategic investments in infrastructure and research chairs in this area, and will build on excellence in these areas, from theoretical research to applied research to innovation and commercialization. The University will continue to grow efforts in emerging areas such as bioenergy through initiatives such as the support of the Nation Strategic Network in Bioconversion. A well-defined strength in biodiversity is supported through the Biodiversity Institute of Ontario.

The sub-themes in which the University places particular emphasis include:

- Relationship between economic development, conservation and biodiversity in terrestrial and aquatic systems
- Natural hazard prediction, prevention and remediation
- Planning, development, management and sustainability
- Evolutionary, population and community ecology
- Applied evolution (genotype, phenotype, population responses of plants and animals to changing environments)
- Ecosystem science and natural resources
- Rural resource management
- Greenhouse gas management mitigation
- Water management and pollution control
- Climate change impacts and adaptation strategies
- Sustainable agriculture and food production systems
- Alternative energy (in particular, bioenergy)

6.5 Human behavior, cultural evolution and creative communities

This theme brings together researchers from all seven colleges to solve some of society's most fundamental and critical issues. The University embraces innovative research within individual clusters and groups of research and promotes interdisciplinary areas of study. With major strengths in critical, aesthetic, historical, and philosophical enquiry and creative response, this theme addresses pressing issues

such as gender, family, community, ethnicity and class, which underpin society and are an engine for societal change. Underlying technological innovation to support collaborative tools, and global access to historical and archived documents, are resulting in a new focus on digital humanities. The University has a strong reputation for working with marginalized communities nationally and internationally. Creative communities are explored through high impact activities such as the Guelph Jazz Festival that operates in conjunction with a large SSHRC funded project in Improvisation, and the Trans Canada Institute.

The sub-themes in which the University places particular emphasis include:

- Families and work
- Justice studies
- Print culture and literacy
- Dramatic literature and performance arts
- Social and cultural history
- Cultural production and creative communities
- 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

6.6 Science and engineering technology

This theme captures significant efforts and resources the University commits to underpin basic and discovery science, to show the links between discovery and applied sciences and engineering and to facilitate innovation and commercialization efforts. It is also recognized that discovery-based research extends and evolves into distinct opportunities to address matters of importance to society. Particular emphasis is placed on the generation and translation of knowledge to the benefit of our society and the environment in which we live – or in the case of space studies, the environment in which we may *someday* live. Interdisciplinary faculty research from across the university demonstrates growing concern with the changing nature of human communication systems and Canada’s media environments. Collaborative research considers information and communication technologies within the realm of digital citizenship, linking to questions of access, equality and social inclusion. Technology is also a research tool that is studied as part of the sociable web to foster innovation by way of open source, open access, and open content projects. This research facilitates collaborative working and learning, innovation in knowledge production, organization

and dissemination. The University has made strong gains in science and engineering technology through allocation of CRC chairs and the success of its researchers in CFI competitions. Additionally, the University will increase its support for facilities such as the Advanced Analytical Centre, which provides access to state-of-the-art analytical equipment.

The sub-themes in which the University places particular emphasis include:

- Biomaterials and bioproducts
- Electrochemistry
- Mathematics and modelling of biological systems
- Robotics, artificial intelligence, intelligent systems
- Support for all aspects of life in space
- Water technology (such as treatment and filtration)
- Synthesis and fabrication of novel molecules and nanostructures
- Information communication and new media (digital media)
- Technology and new media in the fine arts, performing arts and liberal arts
- Ethical evaluation and ethical implication of technology and biotechnology
- Synthesis and fabrication of novel molecules and nanostructures
- Nature, origins and fate of the universe
- Molecular evolution
- Biodiversity

7.0 APPENDIX

The SRP was developed using a multi-faceted approach, driven by participation at the college level. During the development of this SRP, an advisory committee was established that included two representatives from each college, the Associate Vice-President Research Services and the Vice-President Research. The advisory committee completed a number of tasks including a review of the existing SRP, review of individual college SRPs, review of SRPs from successful comparator universities, undertaking a visioning exercise, and identifying existing strengths and emerging areas of strength and importance. The information evaluated during this process was used to create the framework for the SRP. Input from multiple stakeholders, including college deans, Research Services Council and Senate Research Board was collected and used to revise the draft SRP created by the advisory committee.