

The University of Western Ontario **2008-2011 Strategic Research Plan Summary**

Introduction

With annual research income of more than \$220M, Western (including its newly integrated Robarts Research Institute and its affiliated Lawson Health Research Institute), ranks within the top ten research-intensive universities in Canada. The University has performed exceptionally well in a range of Federal granting programs, including the Canada Foundation for Innovation, ranking seventh overall in Canada and second in Ontario in terms of allocated funding to date. Provincially, the University places second in Federal Tri-Council funding, and second in receipt of competitive research funding from Provincial sources.

Rooted firmly in Western's most recent institutional plan, *Engaging the Future*, the Strategic Research Plan (SRP) seeks to:

- Identify specific areas of existing and potential research strength at Western
- Assist the recruitment, training, and retention of highly qualified faculty, students, postdoctoral fellows, and staff at Western
- Encourage propagation of the collaborative and interdisciplinary research models required to tackle increasingly sophisticated research issues
- Provide direction to facilitate the development of infrastructure and services required to promote excellence in research, and to meet specified targets for research performance for Western as compared to other research-intensive universities in Canada
- Promote opportunities for researchers to transfer the knowledge they have generated to the benefit of Canadians
- Cultivate broader research partnerships in London and Southwestern Ontario, the province, the nation, and internationally.

Defining and Promoting our Research Strengths

Based upon the Faculty Academic Plans submitted during the annual planning exercise and using an iterative process involving the Deans, Associate Deans (Research) and the Offices of the Provost, and the Vice-President (Research & International Relations), respectively, Western has defined four primary research fields that capture the breadth of work done at the University: Life Sciences and the Human Condition; Culture, Analysis and Values; The Human and Physical Environments; and Social Trends, Public Policy, and Economic Activity. These core fields are built on our nearly 50 specific areas of research strength and underscore the individuals and groups at Western that have achieved special recognition for research excellence (please see the appended chart).

In addition, 10 areas in which Western has achieved an international reputation in research and teaching have been named by the University as "signature areas". These signature areas include:

- **Imaging**, as recognized by the broadly acknowledged leadership at Western/Robarts and the Lawson Health Research Institute in the use and development of imaging technologies across the disciplinary spectrum, including sophisticated tools used in medical diagnostics and advanced analysis of materials and paleontological and anthropological artifacts
- **Wind Engineering and Natural Disaster Mitigation**, as recognized through our global leadership in the wind tunnel testing of some of the world's most recognizable buildings, bridges and structures, and related work in the sciences and social sciences in hazard assessment, simulated structural testing and the development of policies and programs to help mitigate the devastating effects of natural disasters including wind, earthquakes, and floods.
- **Neuroscience/Brain and Mind**, as indicated by internationally recognized research undertaken in a variety of disciplinary areas pivotal to an understanding of brain, its functioning and health, linking cell biology, brain imaging and psychology

- **Environmental Sustainability and Green Energy**, as recognized through the accomplishments of the large number of faculty working collectively through the newly approved Interdisciplinary Initiative (IDI) and School of Environmental Sustainability, our expertise and state-of-the-art facilities in climate-change research (such as the Institute for Chemicals and Fuels from Alternate Resources and The Claudette MacKay-Lassonde Pavilion), and in our world-leading work in alternate energy and biomass conversion to bio-oil
- **Materials and Biomaterials**, as shown by our pioneering work in the development and application of synchrotron radiation to materials science, leading to the establishment of the Canadian Light Source, our broadly recognized leadership in the synthesis, characterization, and application of materials, and our emerging work in chemical biology and proteins
- **Literature and Cultural Theory**, as indicated by our national and international reputation and recognition in the study of literature, critical theory and the critical examination of contemporary popular culture
- **Health Education**, as indicated through high quality of instruction offered across a variety of disciplines and professions at Western, including our wide range of continuing education and graduate programs, as well as unique programming in undergraduate medical sciences, nursing care and public health
- **Philosophy of Science**, as demonstrated by our position as one of the world's acknowledged leaders in research on conceptual issues concerning the origins and nature of scientific theories, relations among theories as well as between theories and the world, and the impact of scientific theories on contemporary society.
- **Business**, as indicated by global reputation and ranking success of the Ivey School of Business, and the achievements of our faculty in areas related to the study of management and economics
- **Music**, as demonstrated by national recognition of program quality, library resources, and the success of our graduates

Attracting and Retaining Canada's Best Researchers

Recruiting and Retaining Outstanding Faculty

Overall, the research prowess of the University—whether conceived within or well beyond the context of signature or other defined areas of strength—is inextricably linked to the quality of its faculty. In support of building our world-class researcher complement, the Office of the Vice-President (Research & International Relations) commits to working with the Provost, the Vice-Provost (Academic Planning, Policy and Faculty) and the Deans, within existing structures and agreements, to:

- Maintain the highest standards for recruitment, promotion, and granting of tenure for faculty members
- Encourage and support the Faculties in expanding the mentoring of new faculty members by experienced faculty
- Recognize outstanding faculty members through specialized internal programs such as the Hellmuth Awards, the Distinguished University Professors and Faculty Scholars awards, as well as nomination to distinguished external awards as offered by the Tri-Council, the federal and provincial governments, and other national and international agencies and foundations

Building the Collaborative Model

Historically, Western's faculty members have been engaged in a wide variety of collaborative—and often interdisciplinary—research projects. Many of these have been formally established in research groups, centres, and institutes. For example, Western researchers from Earth Sciences and Physics & Astronomy have created a rapidly developing group focussed on research and graduate education in

Planetary Science. This group has begun to focus on the collection and analysis of extraterrestrial materials and to plan for the procurement of specialized equipment and facilities that will allow for characterization of materials brought back to Earth from planned future missions to Mars and other planets. In the future, this area will also count on the innovative research now underway at the threshold of the natural and life sciences in the field of chemical biology and proteins. The Boundary Layer Wind Tunnel has attracted a strong interdisciplinary team of researchers from Engineering, Social Science and Applied Mathematics. Western has been a world leader in the development of experimental techniques for modelling the behaviour of structures in response to wind loading. In addition, with its research partners in London, Western has fostered the development of outstanding research groups within the *Life Sciences and the Human Condition* field, including the Centre for Brain and Mind and the imaging groups at Lawson and Robarts Research Institute, the Ontario Institute for Cancer Research Imaging Program and Platform, the Health Policy Initiative, the Canadian Surgical Technologies and Advanced Robotics (CSTAR) team, the Canadian Centre for Activity and Aging and the National Centre for Audiology. *Social Trends, Public Policy, and Economic Activity* incorporates a number of leading research groups of national and international importance including the Centre for American Studies, the Population Studies Centre, and the Political Economy Research Group. Finally, colleagues from the Richard Ivey School of Business are leading a national initiative to enhance sustainability practices within industry.

In an increasingly competitive environment that emphasizes and rewards collaborative approaches to research, the University must continue its strong support for collaborative and interdisciplinary research by:

- Supporting the continued selective allocation of resources to assist and promote key interdisciplinary and collaborative research and teaching strengths
- Facilitating access to highly sophisticated electronic collaborative tools such as SHARCNET's Access Grid and other vehicles for web-based videoconferencing

The Canada Research Chairs Program

A vital tool in faculty recruitment, retention and the development of research strengths in key areas is the Canada Research Chairs (CRC) program. In total, Western has been awarded 68 CRCs, in accordance with the proportion of funding the University receives annually from each of the Tri-Council agencies. Of these, all have now been assigned to Faculties, with 14 in the SSHRC area, 26 in the CIHR area, and 28 in the NSERC areas. To date, 63 have been filled, with five appointments yet to be made. In accordance with the review process at Western, all CRC nominations are forwarded by the Faculties and approved by both the Vice-President (Research & International Relations) and the Provost. In the selection process, particular emphasis is placed upon the proposed Chair's fit with Departmental, School, and Faculty academic plans, and the University's SRP. In many cases, particular emphasis has been placed on making interdisciplinary appointments that serve the needs of more than one Faculty.

Overall, however, the goal is to optimize the strategic impact of the CRC program by creating the best avenue for fostering and developing internationally competitive research programs in key areas of strength as defined earlier in this document. Thus, in the *Life Sciences and Human Condition* field, four CRCs have been allocated to Biomedical Imaging, and an additional four to the related Neuroscience area. Three have been directed towards support of Immunology, Chronic Disease and Transplantation. In *Social Trends, Public Policy and Economic Activity*, one chair has been allotted to Engaging Emerging Markets, and two to Social Demography and Change, while in *Culture, Analysis and Values*, one has been awarded to Literature and Cultural Theory and another to Bioethics. In the *Human and Physical Environments* field, seven Chairs have been allocated in support of Materials and Biomaterials, five to Environmental Sustainability and Green Energy, six to Computational Sciences, two to Wind Engineering, Natural Disaster Mitigation and Management, and one to the Philosophy of

Science.

Building the Support Infrastructure for Research Excellence

Core Facilities and Physical Infrastructure

The University has invested in the past, and will continue to invest significant funds in building and maintaining the infrastructure utilized by researchers across campus. To date, researchers and research groups have worked diligently with staff across the University to seek external funding for the establishment of an impressive inventory of research space and facilities that are now heavily utilized not only by faculty, students, and postdoctoral fellows on campus, but by researchers across Ontario and Canada and, in many cases, around the world. With funding from the Canada Foundation for Innovation (CFI), the Ontario Innovation Trust (OIT), the Ontario Research & Development Challenge Fund (ORDCF), the Ontario Research Fund (ORF), industry partners, internal and other sources, the total value of these projects has now exceeded \$350M, placing Western in the very top tier of Canadian universities in terms of availability of leading-edge research space and equipment in a broad variety of fields. In the *Life Sciences and Human Condition*, facilities include the recently completed London Regional Innovarium, a \$35M project that provides state-of-the-art animal care facilities supporting the work of biomedical research teams from the London region and beyond; and the Centre for Brain and Mind, designed to facilitate the study of cognitive function and dysfunction in a broad range of neurological and psychiatric disorders. With a recent contribution of \$12M from the Ontario Research Fund for new imaging equipment to be emplaced at Robarts Research Institute—complementing an existing broad array of imaging equipment and expertise at both Robarts and Lawson Health Research Institute—Western is arguably the leading centre for imaging in Canada, and a global leader in this field. In the *Human and Physical Environments* field, our capacity for materials characterization is set to expand as well with the planned construction of the Canadian Astromaterials Facility (CAF), providing what will be the planet’s most advanced centre for the analysis of extraterrestrial material. The Boundary Layer Wind Tunnel has long been recognized as Canada’s premier wind testing facility for large-scale civil construction projects, including some of the most recognizable structures in North America, Europe, and Asia. Western’s capacity for wind testing and disaster mitigation increased markedly in 2006 as well with the construction of The Insurance Research Lab for Better Homes (Three Little Pigs). Located at London International Airport, this one-of-a-kind CFI-OIT/ORF, insurance industry-funded venture allows researchers to test—at full scale—the ability of houses to withstand forces of nature including hurricanes, tornadoes, and earthquakes. There has been significant growth and expansion of the research facilities supporting work in the *Culture Analysis and Values* and *Social Trends, Public Policy, and Economic Activity* fields. Of note here is the establishment of the Statistics Canada Research Data centre in the Faculty of Social Science, and the the creation of the Science, Epistemology, and Ethics Research (SEER) lab, a state-of-the-art physical and virtual meeting and discussion space linking researchers, practitioners, students and community members with interests in the pursuit of value questions related to medicine and to science more broadly.

To ensure that Western researchers are well equipped to continue their work both within the context of their discipline and collaboratively, we will continue to:

- Work in collaboration with the Deans to ensure the financial viability, functionality of, and broad access to our current network of core research facilities in key areas of strength
- Identify existing external programs providing support for infrastructure development and renewal, and provide support to researchers through all phases of the project development process, from application, to implementation and project management

Establishing Key Partnerships for Research

Within academe, Western has led or been an active partner in several major inter-institutional initiatives. One of the largest current examples of partnerships supporting research in the *Human and*

Physical Environments, is the establishment of the Canadian Light Source, first formed as a joint venture of The University of Western Ontario and the University of Saskatchewan. There is a long history of collaboration as well between researchers in Engineering, the Schulich School of Medicine & Dentistry, and London's National Research Council (NRC) facility in a range of areas including automotive design, manufacturing process, robotics and medical devices. Other significant examples include collaborations involving faculty working on planetary and lunar science with colleagues at the Canadian Space Agency (CSA), new initiatives to develop closer ties with the mineral and petroleum industries in the Department of Earth Sciences. In addition, with the Insurance Council of Canada and ORDCF, Western has established the Institute for Catastrophic Loss Reduction, with a mandate to research ways to mitigate the impact of natural disasters. In support of the *Social Trends, Public Policy and Economic Activity*, and *Culture, Analysis and Values* fields the University hosts two SSHRC Community-University Research Alliance projects, one involving applied research to assist children with special needs, and another which looks at ways of improving the quality of life for former psychiatric patients now resident in the community. In the *Life Sciences and the Human Condition* field, Western has created the CFI-OIT funded National Centre for Audiology, and hosts the Institute of Infection and Immunity, one of the 13 institutes operating under the umbrella of the Canadian Institutes of Health Research (CIHR).

To further promote and enhance the benefits of the partnership process, the University shall undertake to:

- Review and strengthen agreements between the University and its affiliated research institutions and continue to encourage collaborations across institutions and with the community generally
- Establish stronger working relations at the institutional level with federal laboratories in London, including both the National Research Council, and AgCanada's Southern Crop Protection and Food Research Centre
- Establish closer working relationships with local, provincial, and national economic development bodies

Enhancing Research Impact by Expanding Opportunities for Knowledge Mobilization and Transfer

Over the last decade, increasing numbers of faculty on campus have expressed an interest in applying the benefits of their research to the service of the community and society more broadly. This is especially true in areas such as Education, Medicine & Dentistry, and Health Sciences, and Law, where faculty are heavily involved in projects designed to improve the quality of life for individuals, whether in Canada or abroad. In some cases, researchers have secured funding from the Tri-Council agencies precisely for this purpose. For example, the SSHRC Knowledge in Society Award won by faculty at the Richard Ivey School of Business to help Canadian companies adopt environmentally friendly practices of benefit both their own operations and the public at large.

Western also has greatly enhanced its capacity to assist faculty in engaging in commercialization and related ventures. To this end, Western has actively encouraged intellectual property disclosure and assignment, assisted faculty in the management of intellectual property, and has worked with researchers in the formation of spin-off companies. Through the \$400,000 Western Innovation Fund, Western has additionally provided researchers in disciplines ranging from education and psychology to the life sciences and engineering with direct assistance in product and technology development. Moreover, members of Western's Technology Transfer and Commercialization Council—made up of several Deans and community-based entrepreneurs—have provided hands-on assistance to inventors through the project development and/or company start-up process. The University has further contributed to commercialization by creating an integrated, city-wide technology transfer organization called "WORLDdiscoveries" with our partners The Robarts Research Institute and the Lawson Health Research Institute.

To further its goals with respect to the transfer of knowledge in the service of our city, our region, our province and our country, the University will continue to:

- Be proactive in encouraging and supporting faculty engagement in collaborative research with community groups, industry, and government agencies while protecting academic freedom and the integrity of the research process
- Actively seek external funding to support knowledge and technology transfer and commercialization activities undertaken by faculty members at Western
- Support and nurture the growth of faculty-based start-up companies based at Western

Enhancing Undergraduate, Graduate-Level and Post-Doctoral Contributions to Research

To enhance the quality of research training for undergraduates, graduate students and postdoctoral fellows at Western, and to ensure their continued contribution to the research enterprise at Western, we commit to:

- Widely promote access to external (e.g. NSERC Undergraduate Student Research Awards) and broaden eligibility for internal funding programs which provide opportunities to undergraduates to participate in research on campus
- Develop new graduate programs in areas of research strength, with special emphasis on programs in interdisciplinary areas, such as the CIHR STIHR program and the new NSERC CREATE initiative
- Enhance the profile and the visibility of postdoctoral fellows on campus, and ensure that the conditions under which they are contracted are commensurate with those at other Canadian universities
- Maintain competitive financial support for graduate students, including guaranteed minimum support for Ph.D Students

Measuring and Promoting Our Success

In order to measure and monitor more effectively our successes in promoting collaborative research, and concomitantly, research excellence within and beyond our areas of strength, and to develop more effectively a broad “culture” of research at Western, we must develop additional indicators and find means to disseminate such information broadly. We must:

- Closely track our research performance in the publication of books, journal publications, awards and distinctions, and our success in meeting targets in research funding and commercialization as established in this document
- Seek ways to better understand and quantify the contribution of research to the economic, social, and cultural development of the local region, the province, and the country, especially in areas where such contributions may be less well known, in the arts, social sciences and humanities
- Work with Communications and Public Relations to develop a quantitative and qualitative database of our research accomplishments through publication or other activities

Chart 1: Areas of Research Strength at Western

<i>Life Sciences and the Human Condition</i>	<i>The Human and Physical Environments</i>	<i>Social Trends, Public Policy, and Economic Activity</i>	<i>Culture, Analysis and Values</i>
Biomedical Imaging	Advanced Fluid Mechanics	Building Sustainable Value	20 th Century Music
Brain and Mind/Neuroscience	Advanced Robotics and Real-Time System Controls	Distance Education	Chamber Music
Cancer and Cell Biology	Bioengineering	Educational Policy and Leadership	Communication, Consumption, and Culture
Cardiac and Vascular Biology and Respiration	Computational Sciences	Employment and Labour in Organizations	Cultural Industries and Institutions
Health Services	Computer Based Systems and Environments	Engaging Emerging Markets	Ethics
Health and Aging	Electrostatics and Electromagnetics	Entrepreneurship and Innovation	Intellectual and Cultural History
Health Promotion	Environmental Sustainability and Green Energy	Feminist Theory and Sexuality Studies	Literature and Cultural Theory
Health, Hazards, and the Quality of Life	Fluidization and Particle Technology	Government and Public Policy	Music in Education
Hearing Science	Functional Genomics and Evolution	Information and Media Policy	Musical Performance and Practice
Immunology, Chronic Disease, and Transplantation	Information Engineering	International and Intercultural Relations	New Music
Maternal and Newborn, Child and Family Health	Materials and biomaterials	Leading Cross-Enterprise	Popular Music Studies
Robotic-Assisted Minimally Invasive Surgery	Mathematics and Science Education	Neural, Social, and Economic Foundations of Behaviour	Theoretical and Applied Linguistics
Musculoskeletal Health	Philosophy of Science	Organization and Management of Information	Visual Culture and Film
Rehabilitation Science	Planets and Stars	Role of Courts in Society	Vocal Arts
Speech, Language and Literacy	Power Systems and Power Electronics	Social Change	
	Wind Engineering, Natural Disaster Mitigation and Management	Social Construction and Use of Media and Information	
		Social Justice and Equity in Education	