

Strategic Research Plan for The University of Windsor

(February 2006)

INTRODUCTION

The University of Windsor research priorities were initially established in *The Best of Both Worlds (BOBW)*, a strategic blueprint for the University's development over the period 1999-2004 that was adopted by the University Senate and Board of Governors in 1998. Building on the demonstrated success of that plan, the next phase, *To Greater Heights (TGH)* was adopted for the 2004 to 2009 period and provides the general framework for this Strategic Research Plan.

In order to foster excellence and ensure the selective and effective investment of research resources our criteria for measuring research excellence consist mainly of substantial peer-reviewed publication records and research funding and the prominence of researchers in terms of awards and recognitions. University research priorities are built on our established and developing strengths, societal and community needs and a vision for the future. The University of Windsor emphasizes the need for expansion of our graduate programs and training of highly qualified personnel to meet social and economic needs through research.

MAJOR OBJECTIVES

In order to reach our goals we have six major objectives in our Strategic Research Plan:

- 1) To enhance the international competitiveness of our discovery and innovation activities.
- 2) To foster, broaden and enhance research and scholarly activities across the campus
- 3) To enhance opportunities for individual and group scholarly excellence.
- 3) To enhance the international renown of our research and scholarly activities.
- 4) To encourage collaboration with external research organizations.
- 5) To ensure the effective and efficient use of research infrastructure resources.
- 6) To enhance the ability to attract, develop and retain outstanding scholars.

RESEARCH THEME AREAS

The University of Windsor is committed to sustaining its three research themes, enhancing its well-established research programs and developing new and emerging areas. The three theme areas involve Automotive, Environmental and Social Justice research. Each theme incorporates a variety of strengths, thus fostering multidisciplinary research activity. This approach also encourages collaboration between research groups in our well established areas and the theme areas. Environmental research has now been expanded to include researchers from the Faculty of Engineering and the Centre for Catalysis and Materials Research (CCMR), whose research includes the development of new environmentally-friendly processes and materials as well as materials characterization methodologies.

In addition, a broad new research focus in health is emerging. Since our last plan was submitted two complementary research foci have emerged from previously-noted areas of strength. From social justice, we now have a critical mass of researchers examining health and wellness from a social sciences and humanities perspective and, from our Faculty of Science, biochemistry is leading a research group with a health sciences perspective.

Theme 1: Automotive Research

The University is committed to conducting world-class research and educational initiatives that are essential to the Canadian automotive industry as a whole and to the manufacturing sector in maintaining and enhancing its competitive advantage in the global economy. Following its commitment to the automotive, manufacturing and industrial areas, the University has allocated significant human resources for the growth of several Faculties, especially Engineering. This commitment has also led to the establishment of many collaborative partnerships with industry, thereby fostering a culture within which both fundamental and strategic research can flourish.

Researchers from various disciplines are involved in projects involving materials characterization, acoustical imaging, advanced image processing, tribology, welding, aluminum and magnesium casting, emerging materials; vehicle systems design and power-trains, e.g., intelligent, lean and green manufacturing, fasteners; hydroforming, clean diesel technology and cars and computers, all supported by Canada Research Chairs, alternative fuels, autotronics, Environmental Engineering, e.g., fluid dynamics, industrial waste management, emission control and air pollution, recycling and life cycle assessment.

Collaboration between University researchers and industry has led to the formation of various research centres including the Centre for Integrated Microsystems (RCIM) and Intelligent Manufacturing Systems Centre (IMSC), the Centre for Automotive Research and Education (CARE), the new University of Windsor/International Truck and Engine Centre for Innovation, the Clean Diesel Technology Group, the Ford/University of Windsor Powertrain Engineering Research And Development Centre, Fluid Dynamics Research Institute (FDRI), the Light Metals Casting Technology Research Group, the \$600 million University of Windsor/DaimlerChrysler Automotive Research and Development Centre (ARDC), the GM/NSERC IRC – Tribology of Lightweight Materials, and the newly formed Tessonics Inc, another joint initiative with DaimlerChrysler, which is a spin-off company from the University's research.

The University of Windsor is the host institution to AUTO21 – a Network of Centres of Excellence bringing together more than 230 top Canadian researchers from 37 universities and more than 110 industry and government partners. Through AUTO 21, Windsor researchers are bringing in new ideas and expertise in areas such as crashworthiness, child injury research and advanced fuel research. Several of these initiatives at the University are multidisciplinary and reflect the diversity and complexity of the industry. The University is also committed to setting up an advanced image processing research facility for high definition video for pattern recognition, security and quality process control.

Specific Objective 1: Research Synergy

To develop synergistic collaboration among engineers, scientists, social scientists, nursing, business and human kinetics professionals and others in developing world class centres in automotive research through continuing and strengthening interactions with the auto industry and becoming one of the leading automotive research institutions in the world.

Specific Objective 2: World Class Infrastructure in Automotive Research

To sustain the growth in automotive research, the University is commissioning the design of a new engineering building and renovating other space to house innovative teaching and research facilities to enhance its research capabilities. The University will continue to concentrate its research efforts in this theme area and pursue innovative solutions to maintain and improve Canada's industrial competitiveness, especially in the automotive sector, through cutting-edge and applied research.

Theme 2: Environmental Research

Focused environmental research at the University of Windsor began with the establishment of the Great Lakes Institute for Environmental Research (GLIER). This is a collection of researchers, principally from earth sciences and biology, who target a range of issues including monitoring the fate, transport and bio-availability of contaminants, understanding of mechanisms and action of pollutants and bio-accumulation and the ultimate effects of pollutants on biological processes.

Environmental research has now been broadened to include a cross-section of researchers from engineering and our Centre for Catalysis and Materials Research (CCMR) in Chemistry and Biochemistry, whose research involves the development of new environmentally-friendly processes and materials as well as materials characterization methodologies. This research targets advanced technologies such as molecular devices, nano-structured solid-state materials, new bio-degradable polymers and clean stoichiometric and catalytic processes, new batteries and semiconductors, and waste water treatment as well as new process-monitoring and materials characterization technologies. Each of these groups has independently developed outstanding national and international reputations and has established CFI supported facilities. A series of Canada Research Chairs and one NSERC Industrial Chair support this research theme.

Specific Objective 1: Research Synergy

The synergistic collaboration between environmental and materials scientists and engineers is essential to the development and assessment of environmentally friendly technologies such as new sensor technologies for pollutants detection, new remediation technologies, innovative recyclable or replacement materials, manufacturing technologies, and new chemical processes.

Collaboration among these strong research groups provides a unique capacity for environmental research in Canada with capabilities to detect, monitor and understand the impact of contaminants as well as to develop both long- and short-term approaches to solutions of these environmental concerns.

Specific Objective 2: World Class Infrastructure

Essential to the growth of such interdisciplinary research is the establishment, development, support and operation of new, world class infrastructure. These central facilities will collectively comprise the Windsor Environmental Research Centre (WERC) and will provide unique capabilities to Windsor researchers.

Theme 3: Social Justice Research

Research in social justice and injustice, a theme area in which a substantial proportion of research, scholarship and community work is concentrated, spans a multiplicity of disciplines in the Faculty of Arts and Social Sciences (FASS) and in the Faculties of Law, Nursing, Business, Education and Human Kinetics. The Faculty of Law has been a leader in the Canadian legal community in pursuing scholarly activity and community work under its long-standing commitment to “access to justice”.

The University of Windsor plans to strengthen the focus on social justice, including discipline-specific and interdisciplinary research. Areas include Social and Criminal Justice, Social Justice and Cultural Studies, Community Based Research, Social Justice and health.

These active research areas are interdependent and relate to the work of many researchers and scholars operating within and outside the area of social justice. This interdependency can be seen, for example, in research into occupational health and safety, the characterization of cultural barriers to health care, and the effects of globalization on health evident in a multiplicity of research projects related to HIV and AIDS. From this group of researchers has emerged a strong focus on Social Justice and Health.

Social Justice is an important area of research at the University of Windsor. It is broad and multidisciplinary and arises naturally from our tradition of community-based research. The inclusion of the social, cultural and population health components within CIHR and an emphasis on health research in some SSHRC programs suggest that this particular health research focus is increasingly valued.

Specific Objective: Research Synergy

Social Justice research is embedded within and bridges diverse disciplines. The Centre for Studies in Social Justice is drawing on disciplinary knowledge and facilitates synergy among disciplines, faculties, communities, institutions and organizations.

Emerging Area: Health

Health research has emerged as a new area of strength since our Strategic Research Plan was originally filed. It has evolved from existing strengths in biochemistry, biotechnology and biology, sociology and psychology supported by CFI investment, and through the increasing synergies between University researchers and community partners, which have evolved from our long tradition of community-based research. The University also plans to enhance basic health research by supporting the development of the Centre for Nitric Oxide (NO) Signalling, where the role of NO in cardiovascular disease and cancers will be researched. The increased multidisciplinary health related research activities and their impact are evidenced at the University of Windsor in numerous health-related research projects funded by Provincial health initiatives, SSHRC, NHRDP, NIMH, CIDA, IDRC, CIHR, OWSA and private foundations.

Other specific local issues include the impact of environmental and workplace contaminants on health. To promote development of research capacity in these health-related issues, the University has allocated several Canada Research Chairs to promote this area. The establishment by Fall of 2008 of a new medical education facility at the University of Windsor, in collaboration with the University of Western Ontario, will expand all health related research capabilities and encourage collaborative research with the University of Western Ontario, Wayne State University (Detroit) and other area health research centres.

Specific Objective 1: Research Synergy

The subject of health-related research is broad and multidisciplinary. In this emerging focus, links among social scientists and physical and biological scientists as well as local health professionals are critical. To facilitate these efforts, the University has dedicated three out of possible twelve potential University of Windsor Research Leadership Chairs for Health research. These leaders will foster internal and external collaborations. For example, one of these Chairs is already collaborating with colleagues in biology, physics and engineering to develop new, minimally-invasive optical and ultrasonic characterization methods and diagnostic technologies.

Specific Objective 2: World Class Infrastructure for Biochemistry and Biotechnology

Essential to the growth of research capabilities in biochemistry, molecular biology and microbiology is the enhancement of facilities to probe protein structure and function, medical biochemistry–nitric oxide signalling, photobiology, biomolecular imaging, bioinformatics/genomics-based medical diagnostics and drug design, and computational methods for predicting protein structure. The University will support the innovative Centre for Nitric Oxide Signalling by integrating a world-class laboratory into the new medical school building.

Specific Objective 3: Expanded Space for Research in Health and Wellness

The University will also support the construction of a facility, the Community Health and Wellness Research Institute (CHaWRI), for a large and multifaceted research team to advance answers to some of the most fundamental questions facing our national health care system. Some of the pressing research questions will include health and wellness promotion, illness prevention, adherence, medical literacy, cultural barriers to health care and social influences on health and wellness. The consequences will be improved healthcare for Canadians.

Linkages among the Theme Areas

It is well recognized that the theme research areas are both interdisciplinary and interrelated. For example, Automotive research encompasses technologies that have an impact on Environmental, human Health and Social Justice issues. Similarly, issues such as the environment, occupational health and safety, cultural barriers to healthcare and globalization have an impact on the three thematic areas.

In addition to the specific areas of interest, infrastructure developed for one thematic area also imparts enhanced capabilities to others. For example, the centralized analytical facilities developed for WERC will also provide additional capabilities for all researchers on campus. Similarly, the Community Health and Wellness Research Institute will provide unique facility for community based health research.

University Research-Support Infrastructure

In 2003, the University demonstrated its heightened research commitment with the appointment of its first Vice-President Research. The University is in the process of establishing twelve Research Leadership Chairs to complement the other Research Chairs with the goal of promoting and enhancing research activity and productivity. As part of these efforts, it is also recognized that the University needs to further enhance its research support staff, including specific technical support, a strong infrastructure and augmented administrative support for research.

Specific Objective 1: Technical and infrastructure Support

The University is committed to expanding its support of research activity with technical expertise and infrastructure support in centralized research facilities. It is recognized that such commitments are required to establish truly world-class facilities and foster interdisciplinary opportunities.

Specific Objective 2: Research Services

The dramatic growth in research activity and corresponding growth in graduate students across the campus dictates a need for enhanced University staffing and support in financial services and the Office of Research Services. The University is committed to such expansion.

CANADA RESEARCH CHAIRS

This strategic plan highlights the on-going and future major research programs and activities which the incumbents of our Canada Research Chairs will help to strengthen and for which research infrastructure support has been or will be requested from the Canada Foundation for Innovation to support the Chairs. The Canada Research Chairs and associated CFI infrastructure have and will continue to be deployed to enhance the above established research themes and our objectives (see table attached). The holders of these Chairs meet international standards of academic excellence. In addition, they provide research leadership, linkages to external research organizations and serve as mentors and role models within between and among disciplines.

FINANCIAL RESOURCES

A top priority for the University is to continue its recent aggressive growth of graduate programs and research. To this end, Windsor has already increased its commitment for support of graduate students, and graduate student numbers have doubled over the past five years. The University plans to continue its strong support for increased research capabilities, particularly within its theme areas and the emerging area in health, with increased resource allocations (expanded space, faculty members, support staff, infrastructure and graduate student support). This enhanced support will enable the University to achieve the global research goals identified above.

PLAN EVALUATION

The University is committed to developing a set of criteria and plans for evaluating the Strategic Research Plan objectives. The achievement of the plan's objectives will be judged according to observable outcomes over the next four to six years in the identified areas.

GENDER REPRESENTATION IN CRC APPOINTMENTS

Gender representation in the filling of all faculty positions is governed by the University's policy on employment equity which is administered by the President's Committee on Employment Equity (PCEE). Accordingly, each Appointments Committee has an Equity Assessor (EA) as a member. Of the 11 CRC nominations made and accepted to date, four have been filled by women, two in each of the tiers.

**Canada Research Chair Allocations
University of Windsor**

SRP Research Area	Subject	Status	Year	Sponsor	Tier
Social Justice	Sexual Health	Appointed	1	SSHRC	1
Social Justice	Globalization	Appointed	2	SSHRC	2
Social Justice	TBD	Vacant	6	SSHRC	2
Environment	Great Lakes Research	Appointed	1	NSERC	1
Well-Established	Supramolecular Chemistry	Appointed	2	NSERC	1
Automotive	Manufacturing Systems	Appointed	3	NSERC	1
Automotive	Sensors and Sensing Systems	Appointed	4	NSERC	1
Well-Established	Catalysts and New Materials	Appointed	5	NSERC	1
Environment	Conservation Genetics	Appointed	1	NSERC	2
Environment	TBD	To be refilled	1	NSERC	2
Environment	TBD	To be refilled	2	NSERC	2
Automotive	Metal Forming Processes	Appointed	3	NSERC	2
Well-Established & Emerging	Bioinformatics	Vacant	5	NSERC	2
Automotive	TBD	Vacant	6	NSERC	2
Environment	TBD	To be refilled	2	Special (NSERC)	2*
Automotive	Diesel Engine Technologies	Appointed	3		2*
Well-Established	Psycholinguistics	Appointed	3	Special (SSHRC)	2
Social Justice	International Health	Pending	4		2
TOTAL					18

*A Tier 1 Special Allocation was split into two Tier 2s.