RESEARCH & INNOVATION

Seneca's research activities focus on building institutional capacity for applied research, and integrating research into baccalaureate programs and Centres of Excellence. The Office of Research and Innovation assists faculty and staff in developing research and grant proposals, integrating research into curricula, and conducting relevant applied research. It has developed a full set of relevant applied research support policies for Seneca faculty.

Seneca is also a Social Sciences and Humanities Research Council (SSHRC) eligible college and a Natural Sciences and Engineering Research Council (NSERC) of Canada-eligible college.

The College has committed considerable resources to enhancing its long-term research capacity. In 2007/2008, the estimated value of student and faculty participation in applied research was more than $8.5 million. Applied research activity has grown steadily since 1999, some examples of Seneca's applied research successes include:

EDUCATION RESEARCH:

COLLEGE MATHEMATICS PROJECT

The College Mathematics Project (CMP) uses the model of "deliberative inquiry," a methodology used specifically for addressing policy research problems. The CMP analyzes mathematics achievement of first semester college students, particularly in relation to their secondary school mathematics backgrounds. The results inform discussion in and between college and school communities about the ways to increase student success in college mathematics. Through the ongoing support of the team of individuals from the Ministry of Training, Colleges and Universities and the Ministry of Education, Seneca College has been able to expand this funded research study from a local pilot project to a complex research study involving 11 colleges and almost every school board across the province in just four years. CMP is a collaborative project housed within the York/Seneca Institute for Mathematics, Science and Technology Education and involves researchers from Seneca and York University's Faculty of Education.

ENHANCING STUDENT SUCCESS AND FACULTY INNOVATION IN INTRODUCTORY SCIENCE AND MATHEMATICS USING COLLEGE CLASSROOM TECHNOLOGY

This project will evaluate the use of HP Tablet PCs for improving student engagement and learning in mathematics and science. Tablet technology will be used to create an environment in which teachers can provide specific, rapid feedback and prevent the integration of misconceptions into their conceptual framework. The ability to use a stylus provides an interface that is both more familiar and less restrictive than a traditional mouse and keyboard. Students will be provided with appropriate digital learning activities in order to support the learning of difficult concepts and how these are applied. Learning in this environment will be compared with similar students in the same course where tablet PCs are not used in the classroom. Funding is provided through the HP Technology for Teaching grant.

INTERACTIVE MATH LEARNING OBJECTS PROJECT

This project was designed to build on the results of the College Mathematics Project (CMP) with the aim to improve mathematics competency for college students. The project has located previously existing interactive digital math learning activities and is creating new learning objects in areas of weakness identified in CMP. The new Reusable Learning Objects (RLOs) were designed by college faculty from Ontario partners in CMP. These RLOs are being developed by student programmers and will be user tested with college students as well as suitable students in K -12. A long range goal of this project is to link new and previously available RLOs with standardized mathematics assessment tests to provide remedial/review activities for students to increase their success in college programs. This project is funded as an Inukshuk Wireless content development project.

LEARNING OBJECTS REPOSITORY RESEARCH AND DEVELOPMENT PROJECTS

The focus of this project is to support the infrastructure to develop an open-source repository environment for use in primary to post-secondary schools. The project is in partnership with McGraw-Hill Ryerson, Pearson Education and Sun Microsystems.

RESTRUCTURING AND EQUITY IN COMMUNITY COLLEGES

This project explores the impact of economic globalization on the role of the college teacher, the reorganization of college academic labour, and the outcome for quality education. The project is in partnership with the Social Sciences and Humanities Research Council (SSHRC).

APPLIED TECHNOLOGY:

AMCAT PROJECT

The AMCaT Project (Animating MoCap Capacity and Training) is a partnership between Seneca College and Interactive Ontario to establish a motion capture data "clean-up" facility, and provide training, research and awareness of motion capture and its importance in the entertainment industries. Motion capture is a technique of digitally recording movements for characters in entertainment, sports, and medical applications. It is widely used in video games and movies, such as Lord of the Rings. This project is funded through the Ontario Partnership Fund, administered through the Ontario Media Development Corp.

APPLIED MARKET INTELLIGENCE RESEARCH

Students will be working with a consortium of six global companies and the Town of Markham Economic Development Office to identify key success factors and trends within B2B (business to business) targeted industries. Partners will receive a summary report which will also be published as a white paper for broader readership. At least one senior representative of the partner companies will be on campus each week to work directly with the students in a mentoring role. The project is jointly funded by the industry and municipal partners.

CATGAMES (CREATIVITY ASSISTIVE TOOLS FOR GAMES) NETWORK

CATGames (Creativity Assistive Tools for Games) Network is a research network that includes Seneca College, as the host organization, the University of Western Ontario, Simon Fraser University and Credo Interactive. Its vision is to create innovative, leading-edge technology tools for game production that support Canada's burgeoning games industry. Seneca's project involves advancing the state of the 3D functionality of a web browser gaming platform. This project was made possible with the support of the Department of Canadian Heritage through the Canadian Culture Online Strategy.

CENTRE FOR DEVELOPMENT OF OPEN TECHNOLOGY RESEARCH

Seneca faculty and students are working with open source companies and industry partners around the world in order to solve complex computing problems. Specifically, Seneca has a strong partnership with the Mozilla Corporation, creators of the popular Firefox web browser. Seneca works closely with Mozilla to enhance and improve Firefox and the web. Other partnerships include Red Hat, where Seneca is working on projects related to infrastructure and deployment, including operating system virtualization.

ENCOURAGING INCREASED PHYSICAL ACTIVITY IN THE ELDERLY AND PEOPLE WITH DISABILITIES USING A WII INPUT DEVICE WITH MON AMI

This project will build a prototype of a module to be delivered using Mon Ami. The purpose will be to encourage the Mon Ami user to participate in physical movement that will maximize movement and thus increase circulation and overall sense of well being. The prototype will use the Wii wand and or other Wii input devices to communicate directly with the Mon Ami control unit. The challenges include modification of the output from the Wii sensing device (wand or other) in a way that will fit with the Mon Ami controller, and to program the activity in the Linux environment compatible with Mon Ami.

ENHANCING STUDENT SUCCESS IN POST-SECONDARY EDUCATION PROJECT

Supported with funding from Human Resources and Social Development Canada, the Enhancing Student Success in Post-Secondary Education Project focused on student retention and success. This was an experimental research project based on both quantitative and qualitative data collected from three participant groups of college students assessed to be at risk of not completing their program. They were required to participate in one or more of four intervention strategies based on the individual student's

at-risk assessment. The goal was to determine the impact of each of these interventions, and the research was expanded to include students in two other colleges in the Foundations for Success project supported by the Millennium Scholarships Foundation.

FEASIBILITY STUDY FOR THE CONVERSION OF A MUNICIPAL SOLID WASTE SITE

This project will undertake the characterization of a closed, mixed use landfill order to establish an appropriate sampling grid for a baseline study. Sampling and monitoring programs will be developed for the full-scale pilot of an Aerobic Bioreactor that the municipality is planning to implement at the site.

FOUNDATIONS FOR SUCCESS PROJECT

An extension of the research of the Seneca's Enhancing Student Success in Post Secondary Education Project. The Foundations for Success study seeks to determine the academic impact of two different interventions (i.e., required participation in academic support activities and bursary financial assistance) on the retention of students identified as being at risk of not completing a two year program of study. Participating students were from Seneca College, Mohawk College and Confederation College. The goal is to determine if student academic outcomes varied between the groups and whether the differences could be attributed to the different treatments received. The project is supported by the Millennium Scholarships Foundation.

INVESTIGATION OF WIMAX BROADBAND WIRELESS TECHNOLOGIES

This project, in partnership with Redline Communications, will establish a WiMAX link capable of providing broadband wireless both point to point and point to multipoint distribution systems. The deployed system will be an urban test bed for investigation of live system characteristics in a field setting, to provide data to make empirically-based adjustments in the deployment strategies that will be used in future customer installations. The live test system enables a greater confidence level in performance and behaviour of deployed WiMAX systems. Faculty and students will initially test in a fixed deployment environment but future research and development projects are expected to include mobile WiMAX. This project is funded as a CONII Proof of Principle project in collaboration with the business partner, Redline Communications.

MON AMI PERIPHERALS TO ENHANCE QUALITY OF LIFE PROJECT

Mon Ami is a computer-based system designed to assist elderly and individuals living with physical challenges to living independently and enables easy communication with caregivers. Seneca faculty and students are working with Tertec Enterprises to develop two unobtrusive wireless devices: a person sensing system designed to improve user safety and a system that enhances current affordable voice recognition that will be incorporated into the main Mon Ami system. This project is funded by a partnership of Health Technology Exchange (HTX), Communications and Information Technology Ontario (CITO) and Industrial Research Assistance Program with business partner contributions from Tertec Enterprises.

PREDICTIVE MODELING OF FAILURE MECHANISMS IN ELECTRONICS EQUIPMENT CORRELATING HALT (HIGHLY ACCELERATED LIFE TESTING) METHODOLOGY

This project will allow online monitoring, analysis and control of the HALT test data at any geographical location with Internet access. This project experiments with new materials for soldering which has the potential to increase the competitiveness of the electronic sector substantially. Partners include Autoliv and private sector partners.

COLLABORATION AND NETWORKS

Seneca has a history of effective research-oriented partnerships with other organizations, as well as active participation in research-oriented networks, including:

AVATIVUT – An organization of seven Canadian colleges that explore research and undertake solutions for restoring the built environment through urban sustainability.

COLLEGES INTEGRATING IMMIGRANTS TO EMPLOYMENT (CIITE) – Ontario's 24 colleges are partnering to improve access for internationally trained immigrants to the college system. http://www.collegeconnect.on.ca/ciite/pages/general_main.asp

COLLEGE ONTARIO NETWORK FOR INDUSTRY INNOVATION (CONII)

Seneca is the lead college in an alliance of 10 Ontario colleges and institutes which have come together to build capacity for industry-led applied research and commercialization. This project is in partnership with the

Ministry of Research and Innovation and Colleges Ontario and the private sector. http://www.conii.ca/

INNOVATION SYNERGY CENTRE IN MARKHAM (ISCM)
Seneca is an active partner and participant in the Innovation Synergy Centre in Markham, which provides assistance to small- and medium-sized enterprises (SMEs) through industry-driven problem solving and applied research. This project is in partnership with the City of Markham, York University, the National Research Council of Canada and the Royal Bank of Canada.

POLYTECHNICS CANADA – An alliance of Canada's seven leading polytechnic institutes that advocate for more federal recognition of the vital role played by these institutes in applied research and commercialization in Canada. Partner polytechnic institutes include BCIT, SAIT, Conestoga, Humber, Sheridan and George Brown. http://www.polytechnicscanada.ca

THE TECHNOLOGY ENHANCED LEARNING INSTITUTE – a partnership with York University that promotes innovative, collaborative approaches to teaching and learning through transformative technology.

GOVERNMENT RESEARCH FUNDING PARTNERS SINCE 1999:

- Canada Foundation for Innovation
- Ministry of Education
- Ministry of Research and Innovation
- Ministry of Training, College and Universities
- Ontario Centres of Excellence
- Ontario Innovation Trust
- Social Sciences and Humanities Research Council

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