

## **Nova Scotia Agricultural College Strategic Research Plan Summary**

### **INTRODUCTION:**

The vision of the Nova Scotia Agricultural College (NSAC) is to be recognized for excellence in learning that builds leaders, for innovations that sustain communities and for the creation of opportunities that shape global agriculture. Accordingly, the research mission is to encourage, support and conduct research in agriculture, aquaculture, the environment, and related fields, recognizing that research and education are inextricably linked. The main objectives of research are to advance knowledge and new technologies for environmental sustainability, rural growth and bioresource innovation in support of the agri-food and aquaculture industries and society at large.

### **RESEARCH PRINCIPLES:**

NSAC promotes fundamental and applied research. It believes that the agri-food industry and rural communities, the public, researchers and students are best served by a research atmosphere that allows for the pursuit of ideas on an independent basis. NSAC subscribes to the concept of academic freedom and encourages, promotes and supports excellence in all research programs. Ultimately, agri-food research must be interpreted in the broadest sense to fully understand its consequences, and a team approach is required to address its multi-faceted issues. Linkages among researchers, and between NSAC and private industry, are important features of this approach. The driving forces affecting further growth of Atlantic Canada's agri-food sector include the need for developing and adopting economically and environmentally sustainable agricultural systems, effective trade policies, food safety and security policies that instill public confidence, and overall development of the rural economy. Overall, NSAC's strategy has been formulated to address these challenges through research and graduate-level training.

### **RESEARCH TRAINING:**

Researchers at NSAC involve undergraduate students, graduate students, postdoctoral fellows, visiting scholars, technicians and technologists in their research. NSAC has educational programs at the technical, undergraduate and post-graduate levels focused on agricultural sciences and business, environment and rural issues. NSAC partners with Dalhousie University to offer a Master of Science program with specializations in agriculture. This degree provides formal research training in various subdisciplines of environmental, plant and animal sciences. Several NSAC researchers partner with colleagues at other universities to supervise doctoral students on site, or host students and scholars from international partner institutions. All students in the Bachelor of Science in Agriculture program, our flagship degree, conduct an undergraduate thesis in their fourth year, providing a key research link between the main undergraduate study body and research. An increasing emphasis on international agriculture

within curriculum paired with international recruitment and student mobility programs broaden student expertise and outlook.

**LINKAGES:**

NSAC faculty have established links with researchers at other colleges and universities, with scientists at Agriculture and Agri-Food Canada (AAFC) research centers and other national and international agricultural institutions. NSAC faculty value their interaction with industry partners and technology transfer professionals, and are committed to the dissemination of research results. NSAC has recently established an Industry Liaison Office to expand industry sponsored research, to provide technology transfer and commercialization services, and to transfer research results from the laboratory to industry. NSAC has strengthened industry linkages by establishing industry and government supported research professorships in a number of areas. Current partnerships address applied research in farm energy conservation, edible horticulture, tree fruit and blueberry bio-product development, mink immunology, plant stress physiology, entomology, waste management, and precision agricultural systems. Several new partnerships are proposed. Past disciplines supported through this program include blueberry and carrot physiology and production, dairy cattle and mink genetics, fur animal nutrition and production, poultry products, potato physiology and molecular biology, cropping systems agronomy, turf grass production and breeding, and climate change. The most successful research professors have migrated to tenure-track positions at NSAC and continue to carry out research supported by industry partners.

**INFRASTRUCTURE:**

Development and maintenance of quality infrastructure is fundamental to the support of research. NSAC maintains a modern, well-equipped campus that includes various horticultural and field crop sites, an aquaculture facility, small animal and livestock units, a mouse colony, and a bio-environmental engineering facility. A 245-hectare farm complex supplies feed and housing for dairy cattle, sheep, poultry and fur animals used in research and teaching. The land base provides for conventional and organic crop research and feed stocks for the research milking herd, beef animals and sheep flock. The university also has extensive pasture, field and turf grass facilities, an experimental orchard and a number of outlying research facilities including a wild blueberry research centre. The library houses the largest repository of agricultural resource material in Atlantic Canada and is a member of the Atlantic Scholarly Information Network with access to more than 27,000 electronic journals. A computer network and the integrated, automated library system are accessible from both local and remote sites. NSAC also runs AgriTech Park, an agricultural business incubator. The Atlantic BioVenture Centre is a self-managed entity to explicitly develop commercially viable products using the bio-resource assets in Atlantic Canada under the concept of "development requiring research". The Organic Agriculture Centre of Canada was created at NSAC to enhance the environmental and social

integrity of agriculture through the scientific analysis of methods to improve the sustainability of farming. This centre conducts research with collaborating institutions across the country.

NSAC is committed to supporting operational and maintenance costs that are associated with research infrastructure, and continues to improve its research capabilities. Significant recent improvements include extensive renovations of a suite of molecular genomics laboratories, construction of the largest fur animal research centre in North America, and development of a new poultry facility which includes an abattoir and food science laboratory for post-harvest food quality research.

**PRIMARY RESEARCH AND RESEARCH TRAINING:**

**Canada Research Chairs Program**

NSAC has been allocated three Canada Research Chairs (CRC), including one Tier I and two Tier II chairs, and has identified research thrusts where strengths and opportunities for success fit into the CRC program. NSAC has implemented the Chairs as indicated below in Table 1. In the first round, the Tier II Chair in Agricultural Resource Management was offered to an outstanding faculty member already at NSAC, while the Tier II Chair in Organic Farming was offered to an outstanding researcher who was in a contract position at NSAC. The Tier I Chair was recruited from outside the institution.

Allocation of Tier I and Tier II Canada Research Chairs by Year and Research Thrust

<b>CRC Tier</b>	<b>CRC Title</b>	<b>Research Thrust</b>	<b>Appointment Date</b>	<b>Renewal Date</b>
Tier I	Agricultural Biotechnology	Molecular Genetics, including molecular characterization and selection of animals	01-Apr-04	31-Mar-11
Tier II	Agricultural Resource Management	Agricultural resource and waste management	01-Apr-03	Completed & reassigned
Tier II	Organic Agriculture	Soil impacts and nutrient cycling in organic systems	01-May-05	30-Apr-10
Tier II	Aquaculture & Agriculture Resource Management	Waste water treatment research and development	Being recruited	

The Canada Research Chairs allocated to NSAC address the following major areas of research:

**1. Applied Molecular Biology and Biotechnology:** The objective of this research thrust is to build a strong team that effectively and efficiently uses the principles of molecular biology to solve biological, agricultural and environmental problems in a wide range of disciplines. Six faculty, including a Tier I Canada Research Chair, depend on molecular biology to support research in reproductive biology, animal breeding, animal molecular biology, potato physiology, nutrient-gene interactions and forage genetics. NSAC has excellent capital infrastructure for molecular biology research that has been acquired through a variety of sources, including the Canada Foundation for Innovation. The Tier I CRC will be instrumental in bringing this diverse group of researchers together into a successful research team and in initiating broader collaborations with other researchers at NSAC and elsewhere.

**2. Agricultural Resource Management:** The objective of this research thrust is to develop programs on air and water quality management and monitoring as related to agricultural and aquaculture resources and wastes. This collaboration involves at least seven faculty, including the previous Tier II Canada Research Chair. Specific projects address greenhouse gas emissions from agricultural systems, pathogen, nitrogen, and phosphorus management in surface and groundwater, bioremediation, agricultural systems modeling at regional, watershed and farm levels, soil conservation, soil quality, alternate energy sources in agriculture, soil-plant-environment interactions, soil fertility and nutrient management, composting, and wastewater and waste management. Technical and infrastructure resources include analytical, atmospheric, and environmental monitoring capabilities. Infrastructure at the Bio-Environmental Engineering Centre includes manure storage structures, a compost facility, constructed wetlands, wastewater treatment systems and tile drainage water monitoring sites.

**3. Organic Farming:** The objectives here are to develop and improve the science of organic agriculture, to support the research objectives of the Organic Agriculture Centre of Canada (OACC), which is based at NSAC, and to link with other established NSAC research and emerging research needs. NSAC can play the leading role in developing science-based knowledge and providing education for students, farmers and others regarding the production of safe and nutritious food according to organic principles. Current organic farming research involves at least 13 faculty members, including the Tier II Canada Research Chair. Faculty expertise includes animal science, horticulture, agronomy, soil science, compost science, engineering, pest management, history, geography, extension research, ethology, and economics. Infrastructure is derived from several sources, including the Canada Foundation for Innovation. The Tier II CRC associated with this research thrust will be the team leader in many of the research projects undertaken by this group.

All CRC positions are further evaluated individually based upon the number of referred publications, the impact rating of the journals published in, the number of graduate students supervised or co-supervised, and the level of research funding attained. A review committee will be appointed by the Vice-President Academic to evaluate the CRC position one year prior to the end of the incumbent's term.

**MEASURING THE PLAN'S SUCCESS:**

The success of the Strategic Plan for Research will be measured on an annual basis using several numeric indicators. These include both general indicators, such as the number of industry sponsored research chairs, the number of graduate students enrolled at NSAC and within each of the areas of research thrust, the number of industry and other collaborators, total research dollars and the ratio of research dollars per faculty member, and discipline-related indicators, such as the number of publications, grants, contracts, awards, and honours. Increases in infrastructure for research and national rankings of research intensity will also be used.

**PLANNING AND APPROVAL PROCESS:**

Canada Research Chair positions are advertised nationally and internationally. Position advertisements are approved through NSAC's Human Resources office and are further screened by the Nova Scotia government. Employment equity issues are addressed in the advertisements to ensure that applications are encouraged from all qualified individuals. An interdepartmental selection committee is formed and screens and evaluates all candidates. This committee also interviews selected individuals and acts as an editorial board for subsequent CRC nominations and CFI applications. CRCs are assigned the appropriate academic department.

CFI applications are coordinated through the Office of Research and Graduate Studies and are subject to both internal and external review. The NSAC Executive is consulted on all aspects of CRC and CFI initiatives.

**AFFIRMATIVE ACTION AND GENDER REPRESENTATION IN RELATION TO CRC NOMINATIONS:**

NSAC has an Affirmative Action Program that promotes equity and diversity in the workplace for visible minorities, aboriginal people, persons with disabilities and women. NSAC takes positive steps to ensure that designated groups are represented in all positions and at all levels to no less than the same extent they are represented in the general population.

With specific regards to the Canada Research Chairs (CRC) program, NSAC encourages persons within all groups, including women and others generally under-represented in academia, to apply for Canada Research Chair positions. Where possible, NSAC solicits applications from women and minority groups.