

Summary of Strategic Research Plan (SRP)

1. Main objectives pertaining to chair candidates recruitment

In the framework of recruiting candidates for the Canadian Research Chair (CRC) program, the main goals of the Institut national de la recherche scientifique (INRS) are 1) to recruit and retain chairholders who are renowned leaders in their fields; 2) to focus its efforts to obtain resources (mainly laboratories, infrastructure and funding) ensuring the success of their research programs; 3) to help maintain their performance by creating a favorable, high level academic and research environment; and 4) to use these CRC as an institutional development tool consistently with its strategic plan, the scientific programs of its four research centres, as well as its institutional scientific program in its most highly competitive dimensions and at various levels.

2. Principal research and research training priorities

2.1 Institutional mission

INRS is a research-intensive, graduate level-only, university whose mission was defined upon its foundation in 1969 and is still relevant today: to conduct high-level research with the aim of producing new basic and applied knowledge in specific areas for the societal, economical and cultural benefit of today's society. Research at INRS is essentially interdisciplinary and inter-sectoral by its nature and seeks to lead to new fundamental and practical knowledge that can be quickly transferred and mobilized into technical and social innovations. Research at INRS is also a privileged means to train future scientific leaders at the national and international level.

As a graduate level-only university, INRS maintains stringent recruitment criteria, particularly with respect to its faculty research activities. Given INRS particular context and unique mission, CRC represent an extraordinary development tool, to better serve society as a whole. INRS mission, as per its Letters Patent, guides the institution's R&D efforts and research development plan, as well as its areas of excellence and its investments in material, financial and human capital. It also underpins INRS efforts to diversify knowledge and the origins of its academic and research staff, to internationalize research activities and outreach, and to ensure sound management of research funds, governance, ethics and sustainable development policies. In summary, INRS values are excellence, interdisciplinarity, commitment, fairness and integrity intertwined with an exemplary normative framework and support of a harmonious living environment.

2.2 Research areas

INRS is composed of four interdisciplinary university centres that operate in major fields of research and training in order to address major contemporary societal challenges: i) Centre Eau Terre Environnement; ii) Centre Armand-Frappier Santé Biotechnologie; iii) Centre Énergie Matériaux Télécommunications; and iv) Centre Urbanisation Culture Société. Building on the areas of specialization and expertise of its faculty members, INRS has

grouped complementary research themes to create critical mass, to better position itself in strategic areas and to reinforce the multidisciplinary character of its four centres. As part of its scientific development strategy, and in addition to the research areas described in the following paragraphs, INRS plans to consolidate existing research activities while also developing research partnerships as well as stimulating collaborative research initiatives and internal synergies between its centers.

2.2.1 Centre Eau Terre Environnement (INRS-ETE)

The Centre INRS-ETE focuses its research activities on four main research and development areas, *Hydrology*, *Aquatic Biogeochemistry*, *Geological Sciences*, and *Environmental Decontamination and Waste Reclamation*. The *Hydrology* program is divided into six components: i) urban hydrology and hydraulics (stormwater, drinking water, and hydraulic infrastructure), ii) watershed hydrology, iii) hydraulics and environmental monitoring of rivers and water bodies, iv) weather and climate extremes, v) cryological monitoring, and vi) water-atmosphere-infrastructure interactions in coastal areas. Researchers in the *Aquatic Biogeochemistry* program study issues related to the deterioration of aquatic environments due to human activity and the dynamics of aquatic environments in the current context of environmental change. The *Geological Sciences* program covers regional geological studies, the exploration and characterization of mineral, oil and gas resources, as well as environmental and groundwater characterization. Finally, researchers in the *Environmental Decontamination and Waste Reclamation* program work on developing new treatment, decontamination, biotransformation, and reclamation technologies for different types of waste, effluent, and urban and industrial sites.

2.2.2 Centre Armand-Frappier Santé Biotechnologie (INRS-AFSB)

The Centre INRS-AFSB seeks to enhance human, animal, and environmental health through research on four major themes: i) **infection/infectiology and immunity**, specifically host-pathogen interactions and functions as well as the regulation of immunity effectors related to the control of infectious diseases and immune response; ii) **use of microorganisms for sustainable development and the production of value-added products**, drawing on life sciences and bioengineering to exploit the potential of microorganisms, plants and resulting nanobiotechnologies to restore and preserve the environment and manage resources sustainably; iii) **effects of environmental and genetic factors on disease development**, which uses *in vivo* and *in vitro* research to determine and enhance our understanding of the links between exposure to physical and chemical agents and the occurrence of human pathologies, with a special focus on the evaluation of hormonal signaling and modulation, neurotoxicity of oxidative stress, and physiology; iv) **development of new therapeutic and preventive agents** for developing new medications and therapeutic approaches that can enhance human and animal health.

2.2.3 Centre Énergie Matériaux Télécommunications (INRS-ÉMT)

Research at the Centre INRS-ÉMT concerns mainly telecommunications systems, ultrafast photonics, advanced materials and nanotechnology, and sustainable energy. In view of its specific objective of developing materials, technologies, and communications for the future, the Centre INRS-ÉMT focuses on four main research areas: i) telecommunications, wireless networks and multimedia signal processing; ii) nanotechnology, advanced materials and

components, radiofrequency, and photonics engineering including applications to the biomedical sector; iii) ultrafast photonics; and iv) materials and decentralized energy systems.

Like the other centres, INRS-ÉMT fosters a multidisciplinary approach to fulfil these research priorities, so as to meet society's technological needs and ensure a highly competitive research environment with a view to train the next generation of scientists in these areas.

2.2.4 Centre Urbanisation Culture Société (INRS-UCS)

The research program at the Centre INRS-UCS is designed to enrich our knowledge of social and cultural realities by developing links with communities and enriching collective thinking to ensure knowledge is transferred to users. To meet these objectives, the Centre INRS-UCS focuses on three research areas: i) urban issues (processing of spatial statistics, urban development and governance, migration, lifestyles, social deprivation, processes and structures of collective action); ii) social ties and life paths (relations between cultural groups, social networks, family and intergenerational dynamics, youth, and aging); and iii) culture and the knowledge society (aboriginal knowledge, knowledge transmission, cultural employment, dissemination of culture, and regional cultures).

2.3 Research training at INRS

INRS offers 26 thematic (rather than discipline-based) graduate programs. This reflects the university's particular research priorities and gives it a unique structure. Rather than being composed of single-discipline departments, as in "traditional" comprehensive universities, INRS is organized as an array of multidisciplinary units. In each of INRS four centres, faculty from some ten different fields work side by side, developing a highly diverse range of research projects and training programs. The Canadian Research Chairs are part of this interdisciplinary framework. INRS also has an unusual operating model under which faculty members are subject to a professional exclusivity clause. This promotes team work, requires staff to collaborate in sharing research resources, and guides training priorities while at the same time focusing efforts on developing the university, for the benefit of society. Under this model, students receive their supervisor's full attention. Research laboratories are organized as user facilities and are therefore shared. Each laboratory is managed and developed according to a business plan that is periodically reviewed by the university. The quality of training is also carefully monitored to ensure a constant level of excellence and relevance. Programs are regularly evaluated and revised to guarantee that training meets the highest standards, driven by new research challenges.

3. Main research fields (chairs and funding from the Canadian Foundation for Innovation)

INRS recognizes that each Canada Research Chair must benefit society in a broad sense. A chair that contributes to a professor's success only has value if it also helps INRS fulfill its core mission. The university's policy on research chairs is designed to enhance the public good and applies to all types of chairs, including Canada Research Chairs. The chairs are an invaluable collective tool. Consequently, INRS spares no effort in ensuring that the chairs are awarded to outstanding individuals and receive strong institutional support. INRS also vigorously promotes these research chairs and their chairholders in all of its activities,

recognizing them as the pillars of the university’s research program and focusing resources, fundraising and marketing efforts around them. Regarding material resources, infrastructure support is closely linked to INRS recruitment process. For instance, the institutional quota for the Canadian Foundation for Innovation John-R.-Evans Leaders Fund is earmarked to newly appointed faculty.

Chairs are awarded in key areas of the INRS scientific program. They are collectively assigned and strategically promoted by the university administration. Internal renewal of the chairs is not automatic and is rather based on a thorough evaluation. The number of chairs allocated to each centre is determined on a *pro rata* basis according to the relative performance of the centres, while taking into account equity, diversity and inclusion (EDI) aspects.

Canada Research Chairs distribution at INRS over the last five years

	INRS-ETE (NSERC)		INRS-EMT (NSERC)		INRS-IAF (NSERC and CIHR)		INRS-UCS (SSHRC)		TOTAL
	Tier 1	Tier 2	Tier 1	Tier 2	Tier 1	Tier 2	Tier 1	Tier 2	
2014–2015	2	2	3	2	2	1	1	1	14
2015–2016	2	2	4	2	2	1	1	1	15
2016–2017	2	2	4	2	2	1	1	1	15
2017–2018	2	2	4	2	2	1	1	1	15
2018–2019	2	2	4	2	2	1	1	1	15

The strategic choices made in awarding chairs can be summarized as follows:

- Allocation of a new chair to an INRS centre is based primarily on the average funding received by the same centre from the relevant tri-council agency over the previous three years.
- The administration selects the research field, however this decision is to be endorsed by the faculty boards, based on the centre’s five-year research development plan and the university’s strategic plan.
- Calls for applications are advertised in major scientific journals, newspapers, etc., through INRS member networks, or by an internal selection of exceptional candidates. The aim is to attract outstanding candidates.
- INRS has set up an EDI committee and has developed an EDI action plan aiming at identifying and eliminating systemic barriers for the four designated groups (women, persons with disabilities, Indigenous peoples and members of visible minorities) in compliance with the guidelines of the Canada Research Chairs Program.

4. Collaboration among institutions and sectors

Since its creation in 1969, INRS has always encouraged cooperation between its centres and research and training sectors and its main academic, government and private sector partners. These partnerships are designed to i) achieve and exceed critical mass in certain sectors and thus concentrate excellence, concentrate resources and achieve significant, visible impact for society; ii) foster the transfer of scientific and technical knowledge to public, broader public, and private-sector organizations; and iii) provide scientific leadership on national and

international research and research training priorities. INRS plans to build on and further develop these practices.

5. Evaluating fulfillment of objectives

INRS regularly monitors the performance of each member of its academic staff. Annual reporting is required by the board of directors. INRS intends to continue this process, while paying particular attention to the performance of chairholders. The action plan and action plan indicators set out in the strategic plan will act as a guide for determining whether objectives have been fulfilled.

6. Planning and approval process at INRS

The scientific program process is initiated in each center by the faculty board, together with its liaison committee, an advisory body composed of representatives from the centre's partners and stakeholders. INRS institutional scientific program is then developed based on the four center's scientific program, in close consultation with the INRS Scientific Committee made up of national and international external experts from the public, non-governmental, and private sectors. The resulting program is examined for recommendation by the board of directors and the INRS Academic and Research Committee prior to its adoption by INRS Executive Board, which is composed of over ten representatives of the broader community.

These scientific programs (from INRS and each of its centers) extend over five years, thereby initiating a process to determine the need for new expertise and infrastructure with a view to fund new research programs. These plans have thus a significant impact from a budgetary standpoint and in terms of faculty recruitment. At INRS, the process of developing, evaluating and updating the scientific program ensures that the activities of its faculty members are well aligned with the development priorities of the society, and that INRS fulfills its multidisciplinary and thematic research and training mission.